PRODUCT SELECTION GUIDES

TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 1999 EDITION OF EEM

Batteries, Product Selection Guide **D•1313**

Cabinets, Enclosures, Racks & Chassis, Product Selection Guide **C•1003**

Capacitors, Product Selection Guide **A•1003**

Coils, Chokes, Inductors, Product Selection Guide **A•1153**

Connectors & Sockets, Product Selection Guide **C•1127**

Cores, Magnets & Ferrites **A•1349**

Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Guide **A•1365**

Data Acquisition/Handling Systems & Accessories **D•1139**

DC-DC Converters **D•1879**

Delay Lines, Product SelectionGuide **A•1545**

Discrete Semiconductors, Product Selection Guide **A•2049**

Displays, Readouts, & CRTs, Product Selection Guide **B•1006**

Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide **C•1470**

Fiber Optics, Product Selection Guide **B•1163**

Filters, Power, Product Selection Guide **A•1577**

Filters, Signal, Product Selection Guide **A•1615**

Instruments, Test & Measuring, Product Selection Guide **D•1178**

Keyboards, Keypads & Membrane Switches, Product Selection Guide **B•1613**

Lamps, Lights, & Indicators, Product Selection Guide **B•1089**

LAN Products **B•1002**

Microwave Components, Product Selection Guide **A•1671**

Motors, Drives, & Rotating Components, Product Selection Guide **B•1169**

Oscilloscopes, Product Selection Guide **D•1309**

Panel Hardware, Product Selection Guide **C•1446**

Panel Meters, Analog & Digital, Product Selection Guide **D•1273**

Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide **A•2010**

Power Supplies, AC, Product Selection Guide **D•2147**

Power Supplies, DC, Product Selection Guide **D•1379**

Protective Components (Fuses, Circuit Breakers, etc.) Product Selection Guide **B•1231**

Relays, Product Selection Guide **B•1285**

Resistors, Product Selection Guide **A•1857**

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Switches, Product Selection Guide **B•1467**

Terminal Blocks **C•1383**

Test Accessories **D•1270**

Thermal Components, Product Selection Guide **B•1667**

Transducers & Encoders, Product Selection Guide **B•1736**

Transformers, Product Selection Guide **A•2079**

Wire & Cable, Product Selection Guide **C•1581**

AR® Amps.

Performance Beyond Power And Bandwidth.

For more than 25 years we've promised you more power and more bandwidth than the competition. And we've delivered.

If the power you're receiving isn't what you expected, or the bandwidth isn't available full-time, you're compromising.

We've left nothing to chance in the engineering of our amplifiers. Our rigorous, minimum-power rating method gives you output power at least at stated levels across the bandwidth. Without shutdown. Regardless of reflection or VSWR.

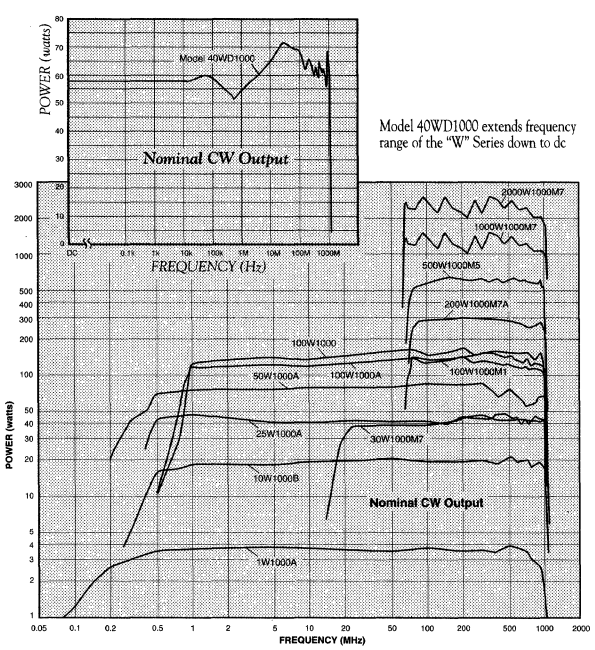
AR Amps. Intelligent Instruments for RF Test.

Broadband RF Amplifiers. "W," "L," And "A" Series.

"W" Series. 1 to 2000 watts. dc to 1 GHz.

- Moderate-power series
- Class A
- All solid-state
- Ultra-broadband
- Linear
- Higher-power versions available

"W" Series		
Model	RF Power (watts, min.)	Frequency
1W1000A	1	100 kHz-1000 MHz
10W1000B	10	500 kHz-1000 MHz
25W1000A	25	1-1000 MHz
30W1000M7	30	25-1000 MHz
40WD1000	40	dc-1000 MHz
50W1000A	50	1-1000 MHz
100W1000	100	1-1000 MHz
100W1000M1	100	80-1000 MHz
100W1000A	100	1-1000 MHz
200W1000M7A	200	80-1000 MHz
500W1000M5	500	80-1000 MHz
1000W1000M7	1000	80-1000 MHz
2000W1000M7	1800	80-1000 MHz

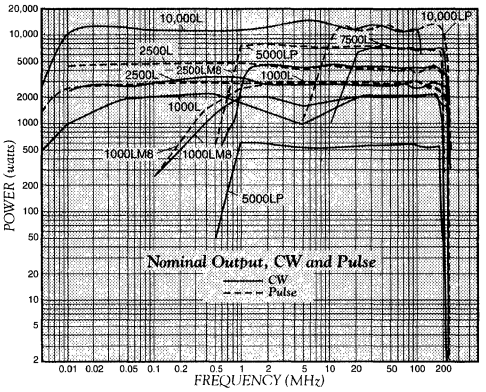


Model 40WD1000 extends frequency range of the "W" Series down to dc

"L" Series. 1200 to 10,000 watts. 10 kHz to 220 MHz.

- Highest-power series
- Class A
- Linear
- Four-decade bandwidth

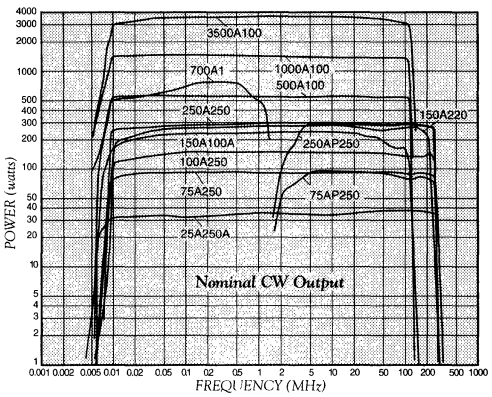
"L" Series		
Model	RF Power (watts, CW/pulse)	Frequency
1000L	1200/2500	10 kHz-220 MHz
1000LM8	1200/2500	1-220 MHz
2500L	2500/4000	10 kHz-220 MHz
2500LM8	2500/4000	1-220 MHz
5000LP	400/5000	1-175 MHz
7500L	7500	20-200 MHz
10,000L	10,000	10 kHz-100 MHz
10,000LP	2000/10,000	9-180 MHz



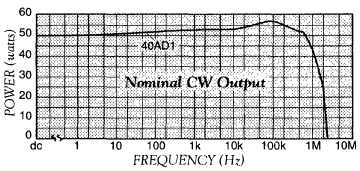
"A" Series. 25 to 3500 watts. dc to 250 MHz.

- Midrange-power series
- All solid-state
- Class A
- Excellent performance

"A" Series		
Model	RF Power (watts, min.)	Frequency
25A250A	25	10 kHz-250 MHz
75A250	75	10 kHz-250 MHz
75AP250	75	5-250 MHz
100A250	100	10 kHz-250 MHz
150A220	150	10 kHz-220 MHz
150A100A	150	10 kHz-100 MHz
250A250	250	10 kHz-250 MHz
250AP250	250	5-250 MHz
500A100	500	10 kHz-100 MHz
1000A100	1100	10 kHz-100 MHz
3500A100	3500	10 kHz-100 MHz
700A1	500	10 kHz-1 MHz
40AD1	40	dc-1 MHz



Model 40AD1 extends frequency range of the "A" Series down to dc

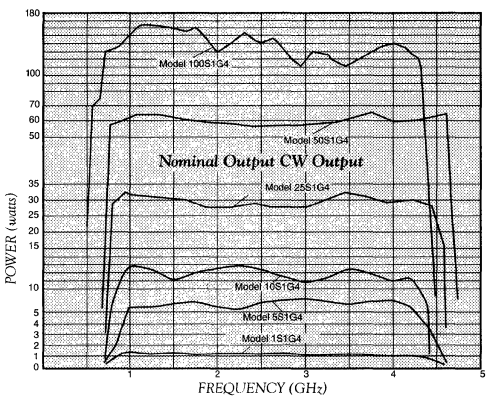


Microwave Amplifiers. "S" And "T" Series.

"S" Series. 1 to 100 watts. 0.8 to 4.2 GHz.

- All solid-state
- 100% load tolerant
- More bandwidth than competitive solid-state amplifiers
- Bandwidth instantly available
- Rated over two octaves

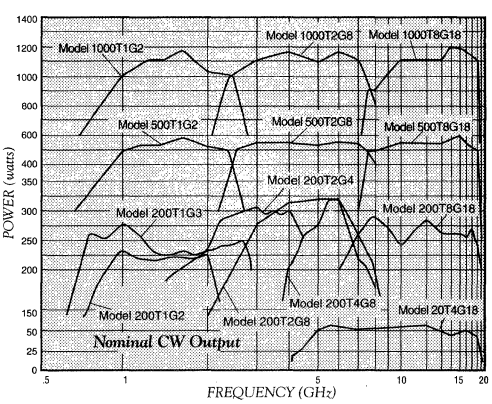
"S" Series		
Model	RF Power (watts CW/pulse)	Frequency
1S1G4	1	0.8-4.2 GHz
5S1G4	5	0.8-4.2 GHz
10S1G4	10	0.8-4.2 GHz
25S1G4	25	0.8-4.2 GHz
50S1G4	50	0.8-4.2 GHz
100S1G4	100	0.8-4.2 GHz

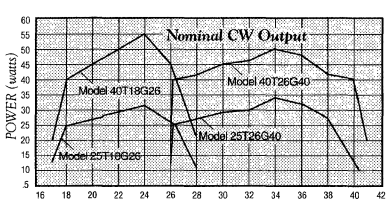


"T" Series. 20 to 1000 watts. 0.8 to 40 GHz.

- Power
- High-output TWTs
- Power-rated amplifier's output connector
- Full power across bandwidth

"T" Series		
Model	RF Power (watts CW/pulse)	Frequency
20T4G18	20	4.2-18 GHz
25T18G26	25	18-26.5 GHz
25T26G40	25	26.5-40 GHz
40T18G26	40	18-26.5 GHz
40T26G40	40	26.5-40 GHz
200T1G2	200	1-2 GHz
200T1G3	200	0.8-2.8 GHz
200T2G4	200	2-4 GHz
200T2G8	200	2.5-7.5 GHz
200T4G8	200	4-8 GHz
200T8G18	200	7.5-18 GHz
500T1G2	500	1-2.5 GHz
500T2G8	500	2.5-7.5 GHz
500T8G18	500	7.5-18 GHz
1000T1G2	1000	1-2.5 GHz
1000T2G8	1000	2.5-7.5 GHz
1000T8G18	1000	7.5 - 18 GHz





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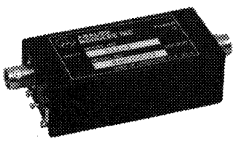
ANALOG MODULES, INC.

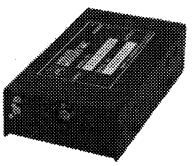
Specialists in Analog and Laser Electronics

LOW NOISE, HIGH GAIN AMPLIFIERS



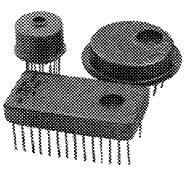
Analog Modules, Inc. (AMI) designs and manufactures a range of **TRANSIMPEDANCE, VOLTAGE,** and **LOGARITHMIC** amplifiers for OEM, medical and research applications. AMI's amplifiers combine low noise, high gain, large dynamic range, and small package size. Amplifier bandwidths range from DC to 350MHz.

PHOTODETECTOR-AMPLIFIER MODULES



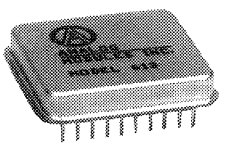
The 710 Series are high sensitivity, low noise photodetector-amplifier modules that offer the flexibility of incorporating a variety of silicon or InGaAs PIN or APD detectors. AMI also offers the capability of integrating other detectors on a custom basis. Bandwidths to 200MHz are available.

LASER RANGEFINDER RECEIVERS

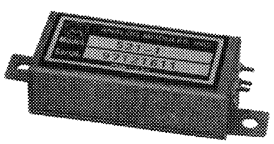


The 750 Series Laser Rangefinder Receivers offer high sensitivity and large dynamic range in compact hermetically sealed hybrid packages. The 750 Series are optimized for 1550nm (InGaAs PIN or APD) or 1.064μm (IR Enhanced Silicon APD) detection and pulsewidths from 6ns to ≥30ns. Custom hybrids can be provided for OEM quantities.

FAST PEAK PULSE STRETCHERS

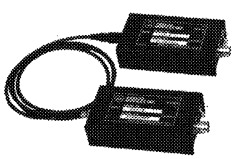


The 610 Series Pulse Stretchers output DC levels equal to the peak value of a single narrow pulse down to 20ns FWHM. Fast independent resets facilitate processing of complex multiple events. The DC output level allows for post processing at slower speeds.



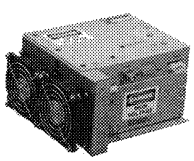
HIGH VOLTAGE BIAS SUPPLIES

The 520 Series are low noise power supplies designed for photodetector biasing applications. Output voltages up to 600V are available in two polarities. The compact size and shielded metal case make the 520 Series attractive for a variety of low noise biasing applications.



FIBER OPTIC LINKS

The 730 Series Fiber Optic Links are designed for short haul transmission of electrical signals for applications in which using electrical conductors are not appropriate. The 730 Series provide transparent transmission of information without the undesirable effects of EMI pick-up noise.



LASER ELECTRONICS

In addition to the products listed above, AMI manufactures a complete line of OEM laser electronics including: capacitor charging power supplies, simmer supplies, Pockels' cell drivers, CW arc lamp power modules, pulsed flashlamp drivers, high power laser diode drivers, and turn-key laser controllers.

For detailed information and data sheets on all of AMI's products, please visit our *Web Site* at:

www.analogmodules.com

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E-mail: amisales@analogmodules.com
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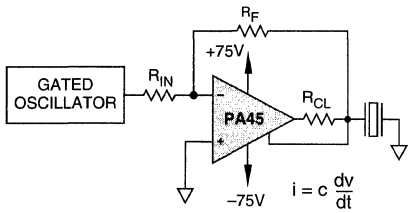
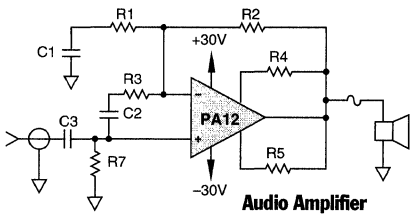
Applications 101: Power Amplifiers

APEX MICROTECHNOLOGY

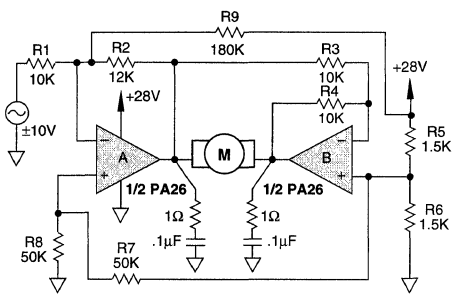
Power Amplifiers
PWM Amplifiers



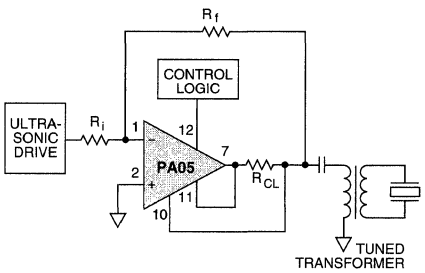
Simple Piezoelectric Transducer Drive



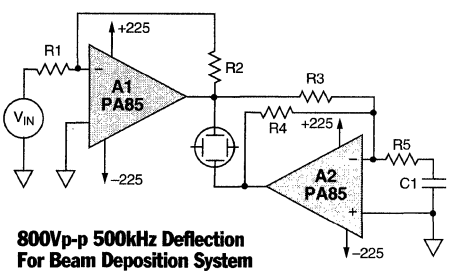
Audio Amplifier



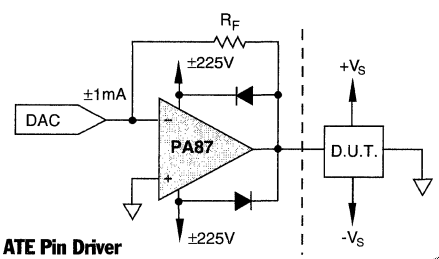
Bidirectional Small Motor Drive



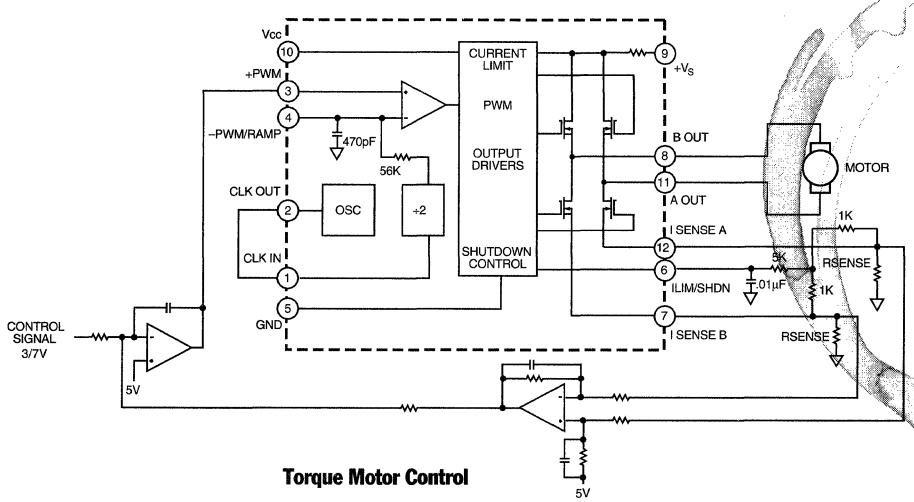
Sonar Transducer Drive



800Vp-p 500kHz Deflection For Beam Deposition System



ATE Pin Driver



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APEX MICROTECHNOLOGY

HIGH VOLTAGE/PWM AMPIFIERS

PRODUCT SELECTOR GUIDE

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HIGH VOLTAGE

Model	±Supply Range Volts Min/Max	I_{OUT} mA Cont. (min) **Pk (Typ)**	Saturation @I_O Cont. (V_S-V_O) Volts, Max	Internal Power Watts Max	Slew Rate V/µs Typ	V_{OS} Initial mV Max	V_{OS} vs Temp µV/°C Max	Bias Current nA Max	I_q mA Max	Gain BW Product MHz Typ	Current Limit (Amps)	Thermal Shutdown	Temp Range °C Min/Max	Packaging Type
PA89	75/600	75/**100**	30	40	16	2	30	.05	6	10	Ext Adj	No	–25/85	MO-127
PA89A	*	*	*	*	*	.5	10	.01	*	*	*	*	*	*
PA85	15/225	200/**350**	10	40	1000	2	30	.05	25	100	Ext Adj	No	–25/85	TO-3
PA85A	*	*	*	*	*	.5	10	.01	*	*	*	*	*	*
PA85M	*	*	*	*	*	4	30	.05	*	*	*	*	–55/125	*
PA88	15/225	100/**200**	10	15	30	2	30	.05	2	2.1	Ext Adj	No	–25/85	TO-3
PA88A	*	*	*	*	*	.5	10	.01	*	*	*	*	*	*
PA41	50/175	60/**120**	14	12	40	60	130	.05	2	1.6	Ext Adj	No	–25/85	TO-3
PA41A	*	*	12	*	*	30	65	*	1.8	*	*	*	*	*
PA41M	*	*	*	*	5	60	130	*	2	*	*	*	–55/125	*
PA42	50/175	60/**120**	14	9	40	60	130	2	2	1.6	Ext Adj	No	–25/85	SIP10
PA42A	*	*	12	*	*	30	*	*	1.8	*	*	*	*	*
PA44	50/175	60/**120**	14	12	40	60	130	.2	2	1.6	Ext Adj	No	–25/85	PSOP1
PA08	15/150	150	15	17.5	30	2	30	.05	8.5	5	Ext Adj	No	–25/85	TO-3
PA08A	*	*	*	*	*	.5	10	.01	*	*	*	*	*	*
PA08M/883	*	*	*	*	*	2	30	.05	*	*	*	*	–55/125	*
PB58	15/150	1500	11	83	100	1750	7000	—	18	2.5	Ext Adj	No	–25/85	TO-3
PB58A	*	2000	12	*	*	1000	*	—	*	*	*	*	*	*
PA83	15/150	75	10	17.5	30	3	25	.05	8.5	5	(.1)	Yes	–25/85	TO-3
PA83A	*	*	*	*	*	1	10	.01	*	*	*	*	*	*
PA83M/883	*	*	*	*	*	3	25	.05	*	*	*	*	–55/125	*
PA84	15/150	40	7	17.5	180	3	25	.05	7.5	75	(.05)	Yes	–25/85	TO-3
PA84A	*	*	*	*	*	1	10	.01	*	*	*	*	*	*
PA84M/883	*	*	*	*	*	3	25	.05	*	*	*	*	–55/125	*
PA82J	70/150	15	5	11.5	20	3	25	.05	8.5	5	(.025)	Yes	0/70	TO-3
PB50	30/100	2000	11	35	100	1750	7000	—	25	2.5	Ext Adj	No	–25/85	TO-3
PA81J	32/75	30	5	11.5	20	3	25	.05	8.5	5	(.05)	Yes	0/70	TO-3
PA45	15/75	5000	10	85	27	10	50	.1	50	4.5	Ext Adj	No	–25/85	TO-3
PA46	15/75	5000	10	75	27	10	50	.1	5/50	4.5	Ext Adj	No	–25/85	POWER SIP 10

†Specifications apply for T_C = 25°C, unless otherwise stated. *Specification is same as above.

PWM AMPLIFIERS

Model	Output Current (Cont.) Amps., Min	Power Delivery (Cont.) Watts	Efficiency %	Internal Power Watts Max	Supply Range Volts Min/Max	Switching Frequency KHz Typ	Bridge Type	Current Limit	Thermal Shutdown	Temp Range °C Min/Max	Packaging Type
SA01	20	2000	97	185	16/100	42	Full	Ext Adj	Yes	–25/+85	PD10/60S
SA02	10	800	94	160	16/80	250	Full	Ext Adj	Yes	–25/+85	DIP7
SA03	30	3000	97	300	16/100	22.5	Full	Ext Adj	Yes	–25/+85	MO-127
SA04	20	4000	97	300	16/200	22.5	Full	Ext Adj	Yes	–25/+85	MO-127
SA06	10	5000	97	300	16/500	22.5	Full	Ext Adj	Yes	–25/+85	MO-127
SA07	5	200	94	80	5/40	500	Full	Ext Adj	Yes	–25/+85	DIP6
SA13	30	3000	97	150	16/100	22.5	Half	Ext Adj	Yes	–25/+85	MO-127
SA14	20	4000	97	150	16/200	22.5	Half	Ext Adj	Yes	–25/+85	MO-127
SA16	10	5000	97	150	16/500	22.5	Half	Ext Adj	Yes	–25/+85	MO-127
SA50	5	400	97	120	– /80	45	Full	No	No	–25/+85	TO-3
SA51	5	400	97	120	– /80	–	Full	No	No	–25/+85	TO-3

APEX MICROTECHNOLOGY

HIGH CURRRENT/HIGH SPEED

PRODUCT SELECTOR GUIDE

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HIGH CURRENT

Model	Internal Power Watts Max	Output Current (Cont.) Amps., Min	±Supply Range Volts Min/Max	Saturation @I_OMax (V_S-V_O) Volts, Max	Slew Rate V/µs Typ	V_{OS} Initial mV Max	V_{OS} vs Temp µV/°C Max	Bias Current nA Max	I_q mA Max	Gain BW Product MHz Typ	Current Limit (Amps)	Thermal Shutdown	Temp Range °C Min/Max	Packaging Type
PA03	500	30	15/75	7	8	2	30	.05	300	1	Thermal	Yes	–25/85	MO-127
PA03A	*	*	*	*	*	.5	10	.01	*	*	*	*	*	*
PA04	200	20	15/100	6.8/10[1]	50	10	50	.05	90	2	Ext Adj	No	–25/85	MO-127
PA04A	*	*	*	*	*	5	30	.02	*	*	*	*	*	
PA05	250	30	15/50	5.8/11.2[1]	100	10	50	.05	120	3	Ext Adj	Yes	-25/85	MO-127
PA05A	*	*	*	*	*	5	30	.02	*	*	*	*	*	*
PA12	125	10	10/45	6	4	6	65	30	50	4	Ext Adj	No	–25/85	TO-3
PA12A	*	15	10/50	7	*	3	40	20	*	*	*	*	–55/125	*
PA12M/883	*	10	10/45	6	*	6	65	30	*	*	*	*	*	*
PA61[2]	97	10	10/45	7	2.8	6	65	30	10	1	Ext Adj	No	–25/85	TO-3
PA61A[2]	*	*	*	6	*	3	40	20	*	*	*	*	*	*
PA61M/883[2]	*	*	*	7	*	6	65	30	*	*	*	*	–55/125	*
PA51[2]	97	10	10/36	8	2.6	10	65	40	10	1	Ext Adj	No	–25/85	TO-3
PA51A[2]	*	*	10/40	*	*	5	40	20	*	*	*	*	–55/125	*
PA51M/883[2]	*	*	*	*	*	10	65	40	*	*	*	*	*	*
PA45	85	5	15/75	10	27	10	50	.10	50	4.5	Ext Adj	No	–25/85	TO-3
PA46	75	5	15/75	10	27	10	50	.10	50	4.5	Ext Adj	Yes	–25/85	POWER SIP 10
PA07	67	5	12/50	5	5	2	30	.05	30	1.3	Ext Adj	Yes	–25/85	TO-3
PA07A	*	*	*	*	*	.5	10	.01	*	*	*	*	*	*
PA07M/883	*	*	*	*	*	2	30	.05	*	*	*	*	–55/125	*
PA10	67	5	10/45	8	3	6	65	30	30	4	Ext Adj	No	–25/85	TO-3
PA10A	*	*	10/50	6	*	3	40	20	*	*	*	*	–55/125	*
PA10M/883	*	*	10/45	8	*	6	65	30	*	*	*	*	*	*
PA73[2]	67	5	10/30	8	2.6	10	65	40	5	1	Ext Adj	No	–25/85	TO-3
PA73M/883[2]	*	*	*	*	*	*	*	*	*	*	*	*	–55/125	*
PA01	67	5	10/28	10	2.6	12	65	50	50	1	*	*	–25/85	TO-3
PA02	48	5	7/19	4	20	10	50	.2	40	4.5	Ext Adj	No	–25/85	TO-3
PA02A	*	*	*	*	*	3	25	.1	*	*	*	*	–55/125	*
PA02M/883	*	*	*	*	*	10	50	.2	*	*	*	*	*	*
PA21	36	2.5	2.5/20	3.0	1.2	10	15 typ	1000	90	.6	(3)	No	–25/85	TO-3
PA21A	*	3.0	*	4.0	*	4	10 typ	250	*	*	(4)	*	*	*
PA21M	*	2	*	*	*	10	15 typ	1000	75	*	(3)	*	–55/125	*
PA25	36	2.5	2.5/20	3.0	1.2	10	15 typ	1000	90	.6	(3)	No	–25/85	TO-3
PA25A	*	3.0	*	4.0	*	4	10 typ	250	*	*	(4)	*	*	*
PA26	36	2.5	2.5/20		1.2	10	15 typ	1000	90	.6	(3)	No	–25/85	SIP12
PB50	35	2	30/100	11	100	1750	7000	—	25	2.5	Ext Adj	No	–25/85	TO-3
PB58	83	1.5	15/150	11	100	1750	7000	—	18	2.5	Ext Adj	No	–25/85	TO-3
PB58A	*	2.0	*	12	*	1000	*	—	*	*	*	*	*	*

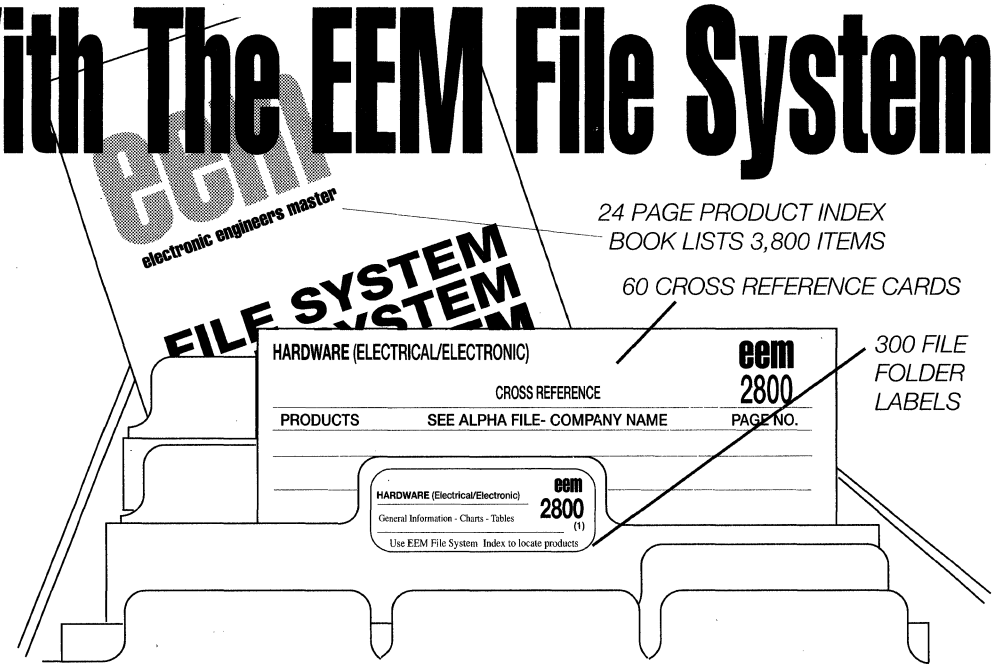
†Specifications apply for T_C = 25°C, unless otherwise stated. *Specification is same as above.
(1) 1st number with Boost Voltage = V_S + 5V; 2nd number without Boost Voltage (2) Class "C" output—optimized for low cost—not recommended above 1KHz

HIGH SPEED

Model	Slew Rate V/µs Typ	Output Current (Cont.) Amps., Min	±Supply Range Volts Min/Max	Saturation @I_OMax (V_S-V_O) Volts, Max	Internal Power Watts Max	V_{OS} Initial mV Max	V_{OS} vs Temp µV/°C Max	Bias Current nA Max	I_q mA Max	Gain BW Product MHz Typ	Current Limit (Amps)	Thermal Shutdown	Temp Range °C Min/Max	Packaging Type
PA85	1000	.2	15/225	10	40	2	30	.05	25	100	Ext Adj	No	–25/85	TO-3
PA85A	*	*	*	*	*	.5	10	.01	*	*	*	*	*	*
PA85M	*	*	*	*	*	2	30	.05	*	*	*	*	–55/125	*
PA19	900	4	15/40	5	78	3	30	.2	120	100	Ext Adj	Yes	–25/85	TO-3
PA19A	*	*	*	*	*	.5	10	.05	*	*	*	*	*	*
PA09	400	2	12/40	8	78	3	30	.1	85	150	(4.5)	Yes	–25/85	TO-3
PA09A	*	*	*	*	*	.5	10	.02	*	*	*	*	*	*
PA09M/883	*	3	*	10	*	3	30	.1	*	*	*	*	–55/125	*

†Specifications apply for T_C = 25°C, unless otherwise stated. *Specification is same as above.

Organize Your Files... With The EEM File System!



The EEM File System was developed 35 years ago to help you organize your catalog files the EEM way. The EEM File System follows the EEM cataloging system that organizes all electronic product information by the four-digit EEM Product Section Number. It puts an end to catalog clutter and filing frustration.

The EEM File System comes in one neat package:

Product Index Book - Tells you where to file information on each and every type of electronic product by generic product name and EEM Product Section Number.

300 File Folder Labels - Pressure sensitive labels are pre-printed with product names and EEM Product Section Number. You apply the labels to as many, or as few, file folders as you choose.

60 Cross Reference Cards - You'll never lose track of where you filed a catalog from a multi-product manufacturer.

With the EEM File System you can get organized and stay organized. You'll save countless hours of searching for elusive catalogs and data sheets. You'll be able to quickly find the catalog you need when you need it. The EEM File System is in everyday use in thousands of engineering and purchasing departments around the world. This proven, time-saving system belongs in your department!

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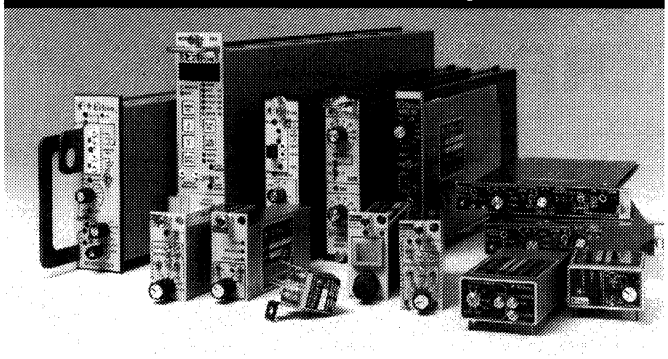
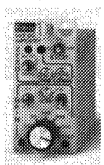
Ectron® CORPORATION

Transducer Conditioner-Amplifiers



- **The industry's most comprehensive line of precision instrumentation amplifiers and transducer signal conditioners**
- **Exceptional accuracy (to 16 bit), zero and gain stability, and response from dc to 3 MHz**
- **Pre-amplifiers for precision data systems**

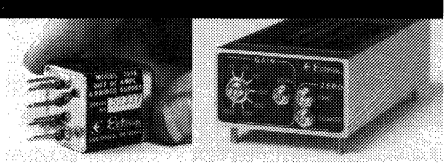
Specialists in low-level signal instrumentation, Ectron offers a wide choice of models with unique capabilities such as remote programmability, wide frequency response, selectable filtering, thermocouple linearization, or user-configurable plug-in modules for bridge completion and calibration resistors.



The compact **400 Series** Transducer Conditioner-Amplifiers have become the industry standard for on-board vehicle test. Small and rugged, they are able to condition almost any transducer, including strain gages, LVDT/RVDTs, RTDs, mag pickups, thermocouples and other low- and high-level signal sources. The 400 Series can produce high accuracy data despite temperature extremes, 100g shock, 20g vibration, EMI/RFI interference, and operation from vehicle battery supplies.

350, 400, 540, 560, 680, 750, 760, and 770 Series

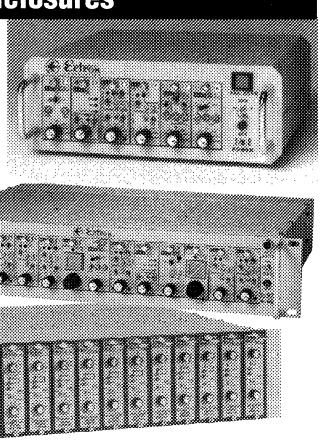
Amplifiers & Conditioners for Extreme Environments



These instruments have been used in many missile, rocket, and aircraft instrumentation systems as well as rocket test sleds and other difficult ground applications. The subminiature Model 314B is rated for 2500g shock and –25C to +71C operation, and offers low drift and noise despite its small size.

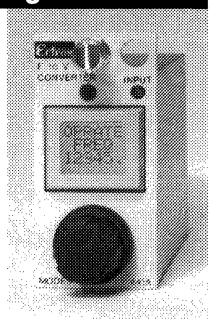
Models 314B, 351, 414, 416

Enclosures



Rack-mountable enclosures are available for all Ectron modular conditioner-amplifiers, and portable enclosures for the 400 Series and some other models. The enclosures provide environmental protection as well as convenient signal connection and bridge completion.

Precision Frequency-to-Voltage Converter

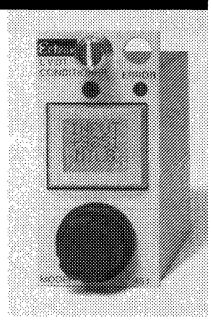


- **1 Hz to 50 kHz Frequency Range**
- **Precise Control of Output Voltage vs. Frequency**
- **Digital Periodic Filter**

Easily adjusted set points allow the user to closely bracket the frequency of interest as well as the output scale. Automatically provides correct operation for a wide variety of input signal waveshapes and amplitudes, even those without zero crossing.

Model 441A.

Precision LVDT/RVDT Conditioner



- **Calibration to LVDT while installed**
- **Front-panel display of Voltage and Actual Displacement in mils, mm or degrees**
- **Fast response**

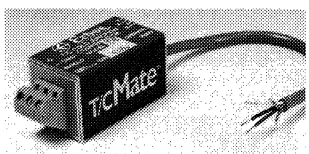
Three easy setup modes: In Example mode, capture two input positions and set the desired output voltages; in Scale mode, key in tranducer sensitivity and end points; in traditional Gain mode, set the gain. Autozero on command.

Model 451.

T/CMate™ Thermocouple Cold Junction Compensator

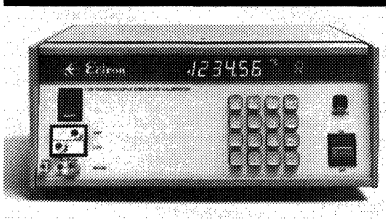
- **Precise Compensation for type E, J, K , and T thermocouples**
- **Use any instrumentation amplifier**
- **No batteries required**
- **Signal isolated from power source**

Eliminate long-distance thermocouple wire. Power is derived from any amplifier's excitation source, or any other available 5 V to 15 V supply.



Models 200 and 201.

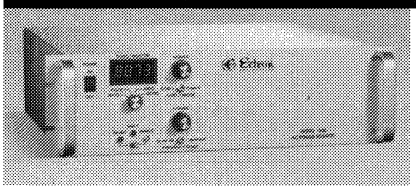
Thermocouple Simulator/Calibrators



Ectron thermocouple simulators are the industry standards for thermocouple instrument calibration. See the product descriptions in this catalog in section 4050, page D.2186.

Model 1120.

AC Power Sources



Get stable, transient-free sine wave power over a continuously variable 45 to 440 Hz frequency range. See the product descriptions in this catalog in section 4050, page D.2186.

1500 Series.

Powertron

RF Amplifiers

GENERAL SPECIFICATIONS

Frequency Response: 10Hz to 1MHz for full power

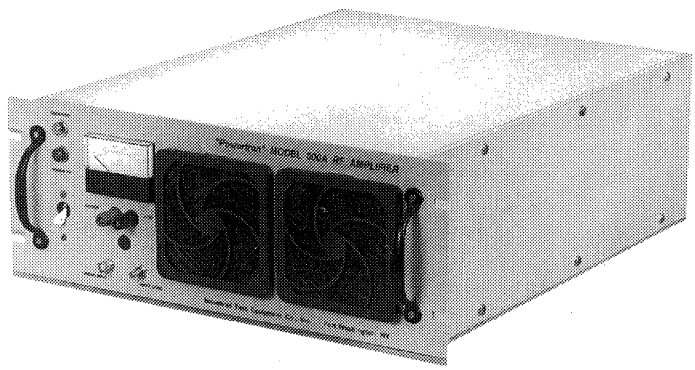
Distortion: 0.3% mid-band

Output Impedance: Nominally zero ohms

Output Meter: Analog volts, peak responding

Short Circuit Protection: Automatic reset thermostat, Input power circuit breaker

Input Power: 115 or 230 volts 50Hz or 60Hz single phase input (280V 50Hz/60Hz 3 phase unless otherwise specified for model 3000A)



MODEL	WATTS	RACK HT.	FREQUENCY	VOLTAGE RANGE (Zero to:)
250A	250	7"	10Hz-1MHz	22.5V rms. Up to 6000V (40mA) or 1.2V (200A) With Optional Output Transformer
500A	500	7"	10Hz-1MHz	22.5V rms. Up to 6000V (80mA) or 1.5V (300A) With Optional Output Transformer
1000A	1000	7"	10Hz-1MHz	22.5V rms. Up to 6000V (150mA) or 1.5V (500A) With Optional Output Transformer
1500A	1500	7"	10Hz-500KHz	22.5V rms Up to 6000V (250mA) or 3V (500A) With Optional Output Transformer
3000A	3000	14"	10Hz-500KHz	22.5V rms. Up to 6000V (450mA) or 5V (500A) With Optional Output Transformer

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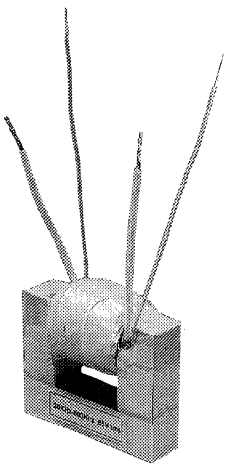
Powertron

RF Transformers

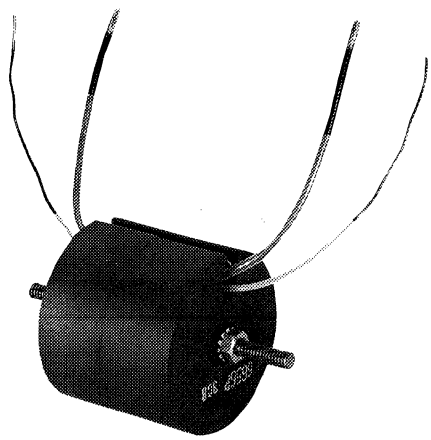
High Frequency, high voltage and high current transformers

In addition to RF amplifiers, a series of high frequency low voltage and high voltage transformers are available.

- Frequency Ranges from1KHz to 2MHZ are available
- All voltage ranges are available (Specified by customers)
- Low leakage inductance and low capacitance transformers can be built for special applications.
- Maximum output voltages can go up to 10,000V rms
- Maximum output currents can go up to 500A.

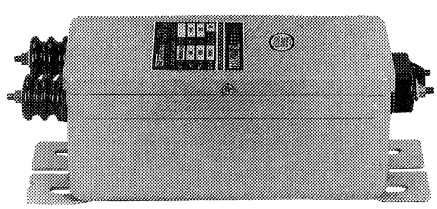


30 KHz-300KHz
65V rms



400 KHz-2MHz
1000V rms

3 KHz-80KHz
500A (1.5V)



60 Hz 9000V (16 mA)

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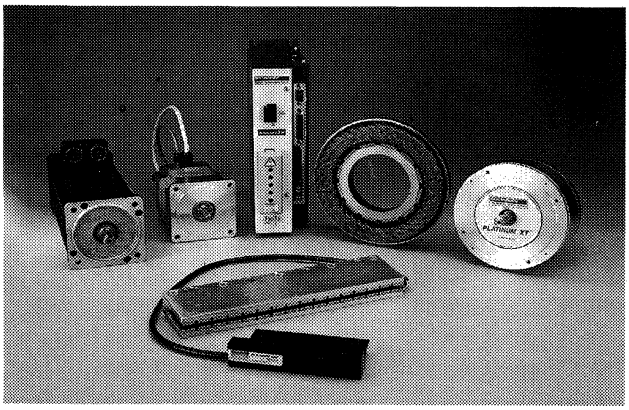
Kollmorgen SERVOSTAR™ Digital Amplifiers

Kollmorgen SERVO**STAR** Digital Amplifiers are compact and easy-to-use with many types of brushless servomotors. Simple installation and set-up with "MOTIONLINK® for SERVO**STAR**" software will have you up and running fast. Selectable tuning algorithms provide maximum flexibility for superior system performance.



Digital Amplifiers

SERVO**STAR** digital amplifier performance can create greater throughput for higher productivity and operational efficiency.

To complement SERVO**STAR**, Kollmorgen offers the world's broadest range of precision servomotor products to help you maximize overall speed, accuracy and reliability, while virtually eliminating interoperability problems.

As a universal amplifier solution, SERVO**STAR** is a unique combination of technology and operational simplicity that offers outstanding value in a space-saving package.

SERVO**STAR** Ratings

Model	Continuous Current Amps RMS/phase	Peak Current Amps RMS/phase	Height mm (inches)	Width mm (inches)	Depth mm (inches)
Sx03	3	6	238 (9.37)	75 (2.91)	175 (6.89)
Sx06	6	12	238 (9.37)	75 (2.91)	175 (6.89)
Sx10	10	20	238 (9.37)	90 (3.54)	175 (6.89)
Sx20	20	40	238 (9.37)	118.6 (4.67)	175 (6.89)
Sx30	30	60	238 (9.37)	142 (5.59)	175 (6.89)
Sx55	55	110	264 (10.39)	166 (6.53)	178 (7.01)

PA Power Supply Ratings

Model	Input Voltage VAC	Output Power kW	Height mm (inches)	Width mm (inches)	Depth mm (inches)
PA08	115 1Ø 230 1Ø 230 3Ø	0.65 1.3 2.4	238 (9.37)	63.5 (2.5)	175 (6.89)
PA14	115 1Ø 115 3Ø	1.1 2.1	238 (9.37)	124.4 (4.9)	175 (6.89)
PA28	230 1Ø /230 3Ø	2.4/8.4	238 (9.37)	124.4 (4.9)	175 (6.89)
PA50	230 3Ø	15.0	264 (10.39)	166 (6.53)	178 (7.01)
PA75	230 3Ø	22.5	264 (10.39)	166 (6.53)	178 (7.01)
PA85	230 3Ø	25.5	264 (10.39)	166 (6.53)	178 (7.01)

Please see our Ad in the 3500 Motors, Drives & Rotating Equipment Section

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2.5KHz-8GHz AMPLIFIERS

(3 Piece Set)

WOW!

only $1095 (Set of 3 1-9 qty.)

+20dBm Power Output, 20dB Gain

Model :	Freq. (MHz)	Gain (dB)	Power Output, dBm @ 1dB Compression	DC Power Volt V	DC Power Current mA	Conn. Type	Indiv. Price ($) (1-9 qty.)
ZHL-6A	.0025-500	21	+23	+24	350	BNC	199
ZHL-1042J	10-4200	25	+20	+15	330	SMA	495
ZRON-8G	2000-8000	20	+20	+15	310	SMA	495

Set of 3 Amplifiers # KZHL-318: $1095 (1-9 qty.)

Expand laboratory capabilities and put a full spectrum of power at your fingertips with Mini-Circuits 2.5KHz to 8GHz medium power amplifier set. Each ultra-wideband set contains three individual heat sinked RF amplifiers with at least +20dBm output and overlapping frequency response range capabilities; 2.5KHz to 500MHz, 10MHz to 4.2GHz and 2GHz to 8GHz. Applications for these amplifiers include increasing the signal levels to power meters, spectrum analyzers, frequency counters and network analyzers as well as boosting signal generator outputs.

You can buy these amplifiers individually at Mini-Circuits already low prices, or own the full spectrum set for the money saving price of only $1095 (1-9 qty.) ! To order from stock with a guarantee to ship within one week, call Mini-Circuits today !

Mini-Circuits...we're redefining what VALUE is all about!

Please refer to our complete catalog in Volume A, Section 3450

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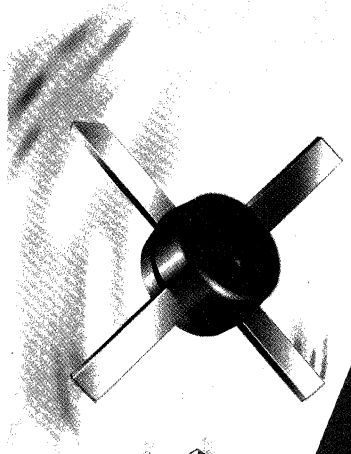


NEW ERA AMPLIFIERS

WOW! **DC to 8GHz** *(up to +18.5dBm output)* **From $1.19** (1000 qty.)

Mini-Circuits ushers-in a new era of technology and economy with ERA monolithic GaAs amplifiers. Just check the specs! These surface mount and drop-in amplifiers cover your applications to 8GHz with higher gain, more output, and flatter response. Characterized with S-parameter data, these amplifiers are very easy to use. Simply sketch an interconnect layout, and the design is done. And ERA's are engineered with wider bandwidths to eliminate your need for costly compensation networks and extra gain stages. So, review your present design and replace with Mini-Circuits new ERA technology. Lower overall cost, wide bandwidth, and lots to...*gain!*

Mini-Circuits...we're redefining what VALUE is all about!

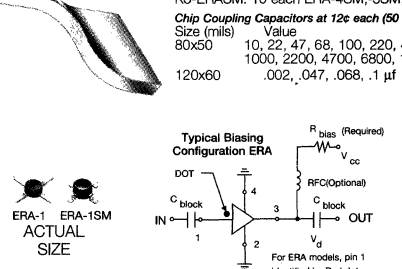
Model	*Freq. (MHz)	Gain (dB)	Max. Power Out (dBm, @ 1dB Comp)	Dynamic Range NF(dB)	Dynamic Range IP3(dBm)	@Device Current(mA)	①Price $ ea. (10 Qty.)
ERA-1	DC-8000	11.8	11.7	5.3	26.0	40	1.80
ERA-1SM	DC-8000	11.8	11.3	5.5	26.0	40	1.85
ERA-2	DC-6000	15.6	12.8	4.7	26.0	40	1.95
ERA-2SM	DC-6000	15.2	12.4	4.6	26.0	40	2.00
ERA-3	DC-3000	20.8	12.1	3.8	23.0	35	2.10
ERA-3SM	DC-3000	20.2	11.5	3.8	23.0	35	2.15
ERA-4	DC-4000	13.5	▲17.0	5.5	▲32.5	65	4.15
ERA-4SM	DC-4000	13.5	▲16.8	5.2	▲33.0	65	4.20
ERA-5	DC-4000	18.8	▲18.4	4.5	▲33.0	65	4.15
ERA-5SM	DC-4000	18.5	▲18.4	4.3	▲32.5	65	4.20
ERA-6	DC-4000	11.3	▲18.5	8.4	▲36.5	70	4.15
ERA-6SM	DC-4000	11.3.	▲17.9	8.4	▲36.0	70	4.20

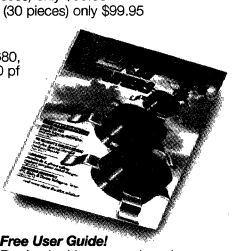
Note: Specs typical at 2GHz, 25°C. Exception: ▲ indicates typ. numbers tested at 1GHz.
* Low frequency cutoff determined by external coupling capacitors.
① Price (ea.) Qty.1000: ERA-1 $1.19, -2 $1.33, -3 $1.48, -4, -5 or -6 $2.95. SM option same price.

DESIGNER'S AMPLIFIER KITS:
K1-ERA: 10 of each ERA-1,-2,-3 (30 pieces) only $49.95
K1-ERASM: 10 of each ERA-1SM,-2SM,-3SM (30 pieces) only $49.95
K2-ERA: 10 of each ERA-4,-5 (20 pieces) only $69.95
K2-ERASM: 10 each ERA-4SM,-5SM (20 pieces) only $69.95
K3-ERASM: 10 each ERA-4SM,-5SM,-6SM (30 pieces) only $99.95

Chip Coupling Capacitors at 12¢ each (50 min.)

Size (mils)	Value
80x50	10, 22, 47, 68, 100, 220, 470, 680, 1000, 2200, 4700, 6800, 10,000 pf
120x60	.002, .047, .068, .1 µf





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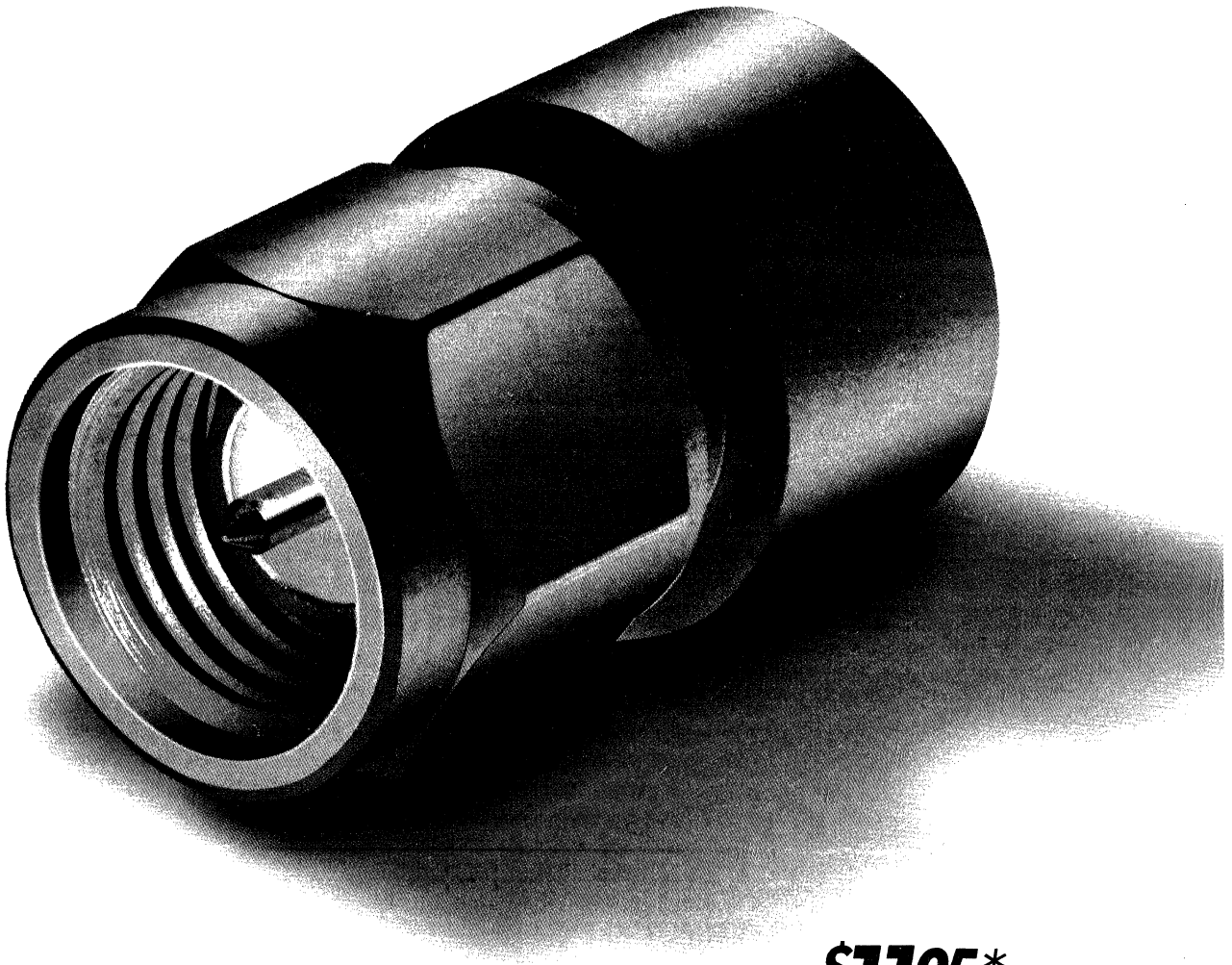

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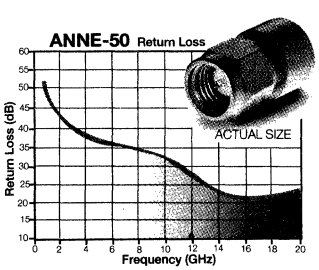
ANNE-50 SPECIFICATIONS

Freq. Range (GHz)	Return Loss (dB, Typ)
DC to 4	40
4 to 10	30
10 to 20	20

Power rating is 0.50W at 70°C, derate linearly at 0.005W/°C from 70°C to .35W at 100°C.



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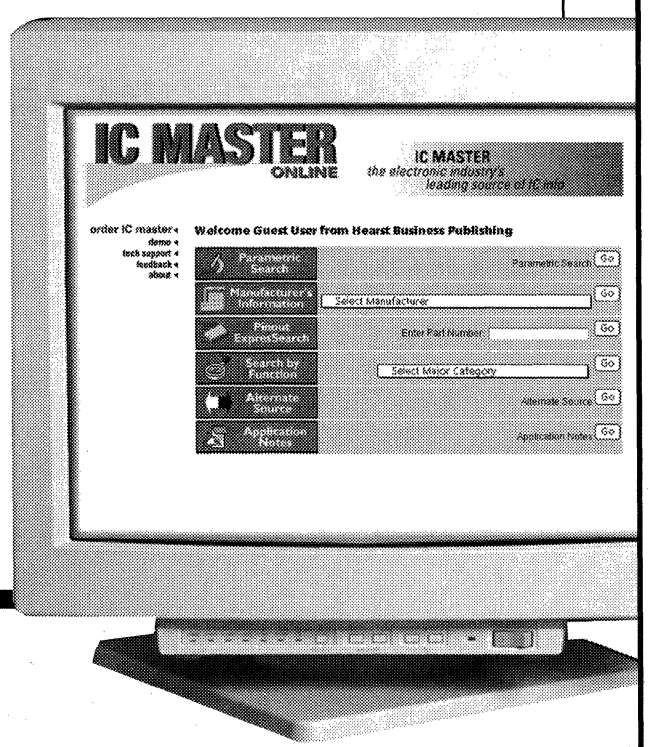

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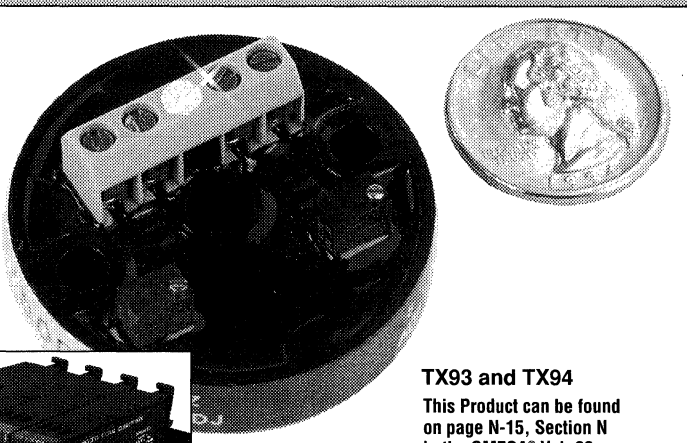
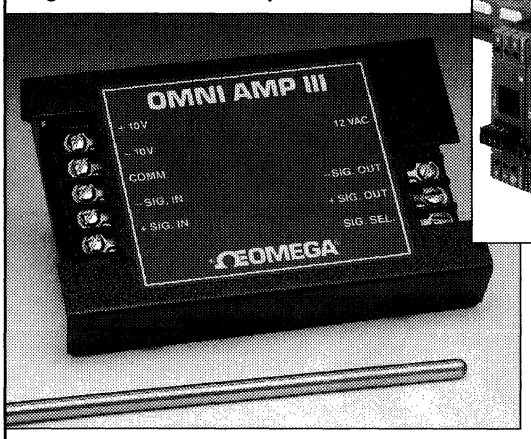
- Sensors and Instrumentation

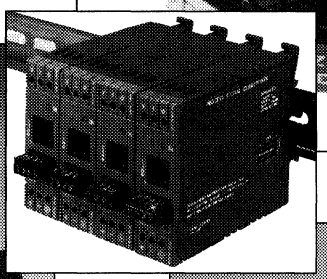


TX93 and TX94

This Product can be found on page N-15, Section N in the OMEGA® Vol. 29 Temp. Handbook Set.

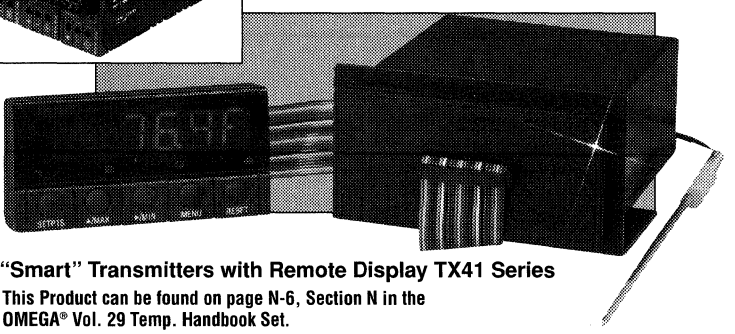
Signal Conditioners/Amplifiers





This DIN Rail Signal Conditioner can be found on page H-7, Section H in the OMEGA® Vol. 29 DAS Handbook Set.

This Product can be found in Section N in the OMEGA® Vol. 29 Temp. Handbook Set.



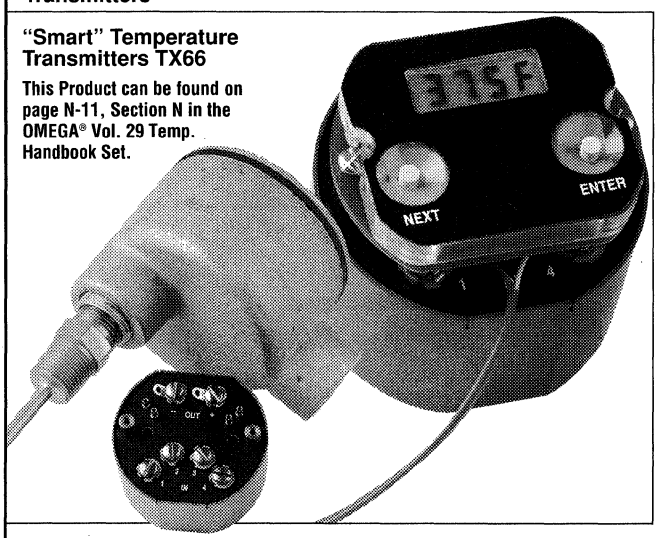
"Smart" Transmitters with Remote Display TX41 Series

This Product can be found on page N-6, Section N in the OMEGA® Vol. 29 Temp. Handbook Set.

Transmitters

"Smart" Temperature Transmitters TX66

This Product can be found on page N-11, Section N in the OMEGA® Vol. 29 Temp. Handbook Set.



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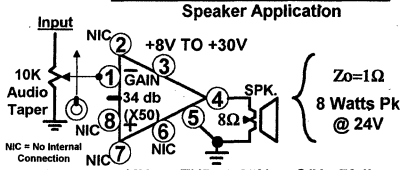
Model 34A AUDIO POWER AMPLIFIER

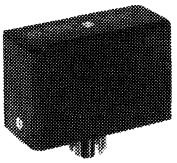
Speaker Application



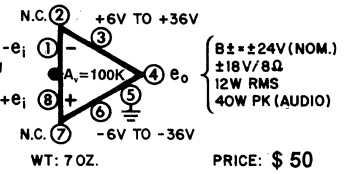
30Hz to 15KHz THD: 0.25% S/N : 70db

OCTAL PLUG-IN SIZE: 1" DIA x 2" H WT: 2 OZ PRICE: **$35**

MODEL 423 D.C. OPERATIONAL AMPLIFIER (REPAIRABLE)

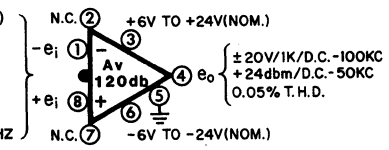


●D.C. TO 150KC ●±20mV OFFSET ●±10μV/°C DRIFT
●2μV(-115dbm) NOISE ●0.1% T.H.D.



OCTAL PLUG-IN
SIZE: 1-1/2" x 3-1/4" x 2-1/2" H. WT: 7 OZ. PRICE: $ 50

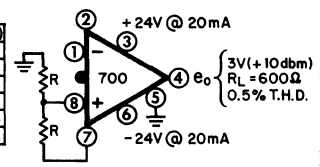
MODEL 425 D.C. OPERATIONAL AMPLIFIER



OCTAL PLUG-IN
SIZE: 1" DIA x 1-5/8" H WT: 2 OZ PRICE: **$35**

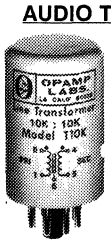
MODEL 700 AUDIO OSCILLATOR (EXTERNALLY ADJUSTABLE)

FREQ	R(±5%)	FREQ	R(±5%)
16CY	NONE	1KC	1.6K
50CY	43K	2KC	800Ω
100CY	20K	5KC	320Ω
200CY	9.1K	10KC	160Ω
440CY	3.6K	12KC	130Ω
500CY	3.2K	15KC	100Ω



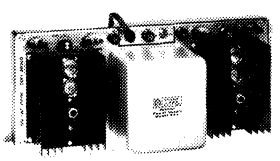
OCTAL PLUG-IN SIZE: 1" DIA x 2" H WT: 2 OZ PRICE: $ 50

AUDIO TRANSFORMERS



MODEL	DESCRIPTION	SIZE	PRICE
T-10K	10K/10K INPUT	1-3/8"D x 2"H	$35
T-18	600Ω/600 Ω +18dbm	1"D x 2"H	$20
T-25	600Ω/600 Ω +24dbm	1-5/8" x 2"H	$30
T-30	150Ω/150 Ω/600 Ω +30dbm	1-5/8" x 1-5/8" x 2-1/2"H	$35
422	Electronic Trans +24dbm	1"D x 2"H	$40

MODEL SM-100 DUAL 50W. OR MONO 100W. D.C. THRU AUDIO OPERATIONAL POWER AMPLIFIER



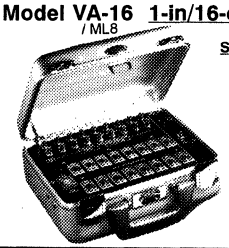
Description: Rack-Mounted Power Amplifier; consists of two 440 Power Amplifiers, one 536 power supply. Available in either Stereo (50W/Channel) or Mono(100W) configuration.

SIZE: 7"H x 19"W x 7"D
WT:15 LBS PRICE: **$350 / WIRED**

Model VA-16 1-in/16-out Video/Audio Distribution System

/ ML8

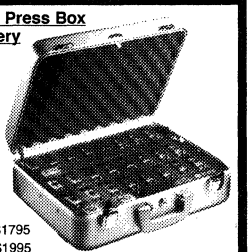
With 8 MIC-LINE Sw @ OUTPUTS



Specifications
Video: BNC Connectors
DC to 8 MHZ(-1db)
Unity gain (in-phase)

Audio: XLR-type connectors
Bal-in(10k),Bal-out(600 ohms)
30 HZ to 15 KHZ(-1db)
Output level: +18dbm
THD: 0.05%
Signal/Noise: >70db
Size: 10" x 12" x 5" Deep "Halliburton" case
WT: 8 lbs. Price $1195

MODEL A-24/2ML 2-in/24-out(mic/line) Audio Press Box
MODEL A-24/2ML/B Internal Rechargeable Battery



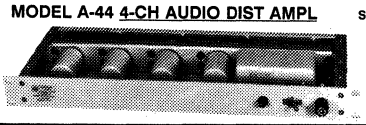
Specifications
Inputs: Two balanced microphone
(switchable to line inputs at 10K ohms)
Gain controls
VU Meter
Outputs-24 seperate outputs each one:
"XLR", 1/4"Phone Jack, RCA and 3.5mm Jack
Ground floating (Does not require ground lift)
+18dbm output capability
Transformer isolated
Mic/Line switchable
50HZ to 15KHZ (-2db)
50db Channel isolation

WT: 16 lbs A-24/2ML Price $1795
Size: 13" x 18" x 6" Deep "Halliburton" Case A-24/2ML/B Price $1995

MODEL V-44 4-CH VIDEO DIST AMPL

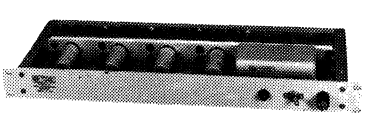
Specifications (per channel):
DC to 8 MHZ (±1DB)
Diff gain: 0.1%
Diff phase: 0.2 deg.
Tilt & overshoot: <1%
Hum & noise: -60 db
Isolation: >40 db @ 3.58mc
Size: 1 R.U. x 19"W x 6"D
WT: 5 lbs. Price: $400

MODEL A-44 4-CH AUDIO DIST AMPL



Specifications (per channel):
Bal(elec) Input Imp: 20k ohms
Freq. Resp: 20cy to 20kc (±1db)
Gain: Unity (0dbm)/THD: 0.05%
Output Imp: 600 ohm
Output level: +24dbm
Size: 1 R.U. x 19"W x 6"D
WT: 5 lbs. Price: $440

Model V-44/RGBS/G HIGH DEFINITION RGBS SYSTEM



RGB
*DC to 70 MHZ
*2 v p-p
*Output Imp 75 ohm
*6db gain (gain pot)
*BNC connector

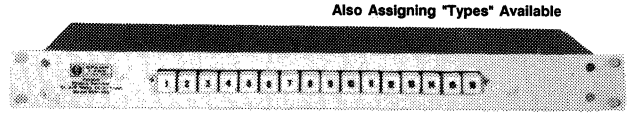
SYNC
*DC to 200 KC
*8 v p-p
*Output Imp 75 ohm
*6db gain (gain pot)

Size: 1-3/4"H x 19"W x 6"D Wt: 5 lbs Price: $700

Monitoring "Type" Routing Switchers

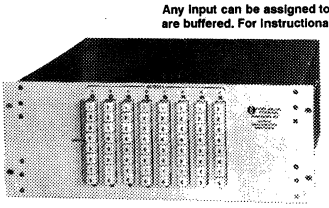
8-in/1-out	RSP-8 Mono-Aud/Video	$ 195
	RSP-8S St-Aud/Video	$250
12-in/1-out	RSP-12 Mono-Aud/Video	$250
	RSP-12s ST-Aud/Video	$325
24-in/1-out	RSP-24S St-Aud/Video	$450

Specifications
Interlock push-buttons
Audio(RCA) follow Video(BNC)
DC to 8 MHZ
Size:1-3/4" x 19" x 6-1/2"D
Wt: 3 lbs.
Also Assigning "Types" Available



Model MS/8X8/VSA Stereo Audio / Video Matrix Switcher

Any Input can be assigned to one, two, or more, or all outputs. All outputs are buffered. For instructional, commercial, and post production



Specifications
8-in/8-out Stereo Audio / Video
Interlock push-button switches lighted
Video DC to 8 MHZ
Audio DC to 20 KHZ

Price:

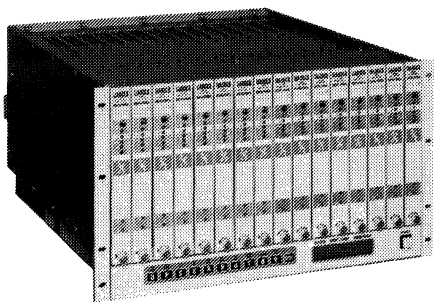
MS/8X8/VSA	Video-Stereo Audio	$2950
MS/8X8/VMA	Video-Mono Audio	$2750
MS/8X8/V	Video only	$2550
MS/8X8/VSA/B	12v DC operation	$2950

Size: 7" H x 19" W x 14" D Weight: 16 lbs.

An Introduction to Preston Scientific and Preston's Signal Conditioning & Instrumentation Amplifier Systems

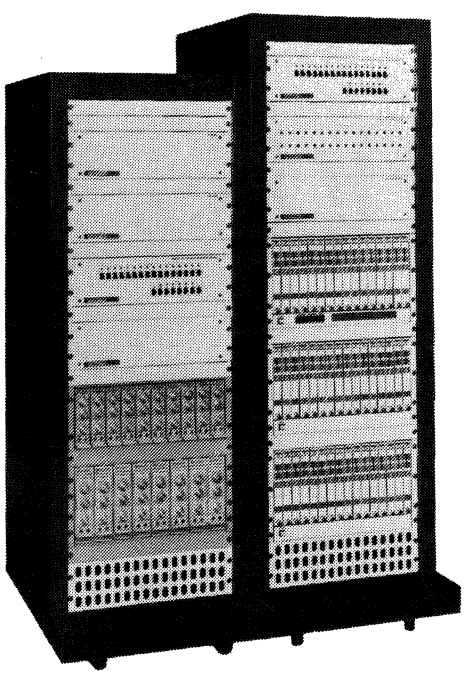
Model 8300 XWB, AU, DX and MX Series Amplifier

This is Preston's finest High Performance Instrumentation Amplifier with capability for meeting the most demanding instrumentation requirements for accuracy, versatility and reliability. Models are available that provide either or both manual or remotely programmed gain and filter selection on a per-channel basis. Models are offered with a variety of calibration, filter, configuration, system control options and input signal conditioning. Ask for 8300AU-S0P10 Data Sheet featuring 10 new high performance options for 1998.



8300AU Amplifier System
(Programmable Signal Conditioner/Amplifier)

Basic Features	Model				
	8300AU	8300XWB	DX/HDX	MX-B	GM20D
Manual (M) / Programmable (Pg)	M/PG	M	M	M	M
Signal Conditioning	optional	N/A	N/A	N/A	optional
Filter 2 Pole / 4 Pole	4	2	2	2	2/4
Cal Feature (Y) Yes (N) No	Y	Y	N	N	Y
Floating (Y) Yes (N) No	Y	Y	N	Y	N



Fully Integrated Data Acquisition Systems (Including MX-B, 8300XWB and 8300AU Amplifier)

Also refer to section 2325 for Preston Data Acquisition Systems pages D•1169-D•1170

General Specifications*	Model				
	AU	XWB	DX/HDX	MX-B	GM20D
Gain					
Ten fixed steps of 1 to 1000.(8300AU 1 to 2048)	✓	✓	✓	✓	✓
Variable gain between each step up to a gain of 2500	M/PG	M	M	M	N/A
Gain Accuracy (% of F.S.)	.1/.01%	.01%	.05%	.01%	.05%
Gain Linearity (% of F.S.)	.01%	.005%	.005%	.01%	.005%
Gain Temperature Coefficient (% /°C)	.002%	.001%	.002%	.002%	.002%
Gain Stability	0.01% (6 month term)				
Bandwidth (DC to _KHz)	100	100	40	80	40
Filter (Pg. Sw or fixed) (SW...Switched Manually)	Pg	Sw	Sw	Sw	F/Sw
Drift	1µV	0.1µV	1µV	0.3µV	1µV
Zero Drift RTI (uV/°C)	0.1mV	0.02mV	0.1mV	0.1mV	0.1mV
Zero Drift RTO (mV/°C)					
Long Term Zero Drift (30 day term)	±5µVRTI, ±1mVRTO at ±10% line voltage				
Common Mode Rejection (dB) @DC	150dB		120dB	150dB	120dB
@60Hz	130dB		100/80dB	120dB	80dB
Common Mode Voltage Peak AC or DC	350		10/250	350	10/250
Input Impedance	100 mehohms shunted by less than 0.002 ufd at DC				
Input Noise 10Hz BW (P.P)	0.3µV	2µV	0.2µV	4µV	0.2µV
WB (P.P)	20µV	15µV	3µV	50µV	3µV
Output Noise (Peak to Peak)	0.6mV	0.3mV	0.1/0.5mV	1mV	0.1/0.5mV
Output Capability Voltage Current	plus/minus 10 volts				
	20mA	100mA	100mA	100mA	5mA
Chopper Intermodulation (less than 0.01% where applicable ✓)	N/A	✓	N/A	✓	N/A
Amplifier Protection	Output is unconditionally short-circuit proof				
Operating Temperature	0°C to 50°C (15° to 40°C for 8300AU)				
Number (N) of Channels/Chassis	16	8	10	10	64
Mounting	Up to "N" units per 19 inch RETMA rack adaptor				

*Not all specifications are included in this advertisement.
Obtain complete data sheet for each model from Preston Factory Sales Office.

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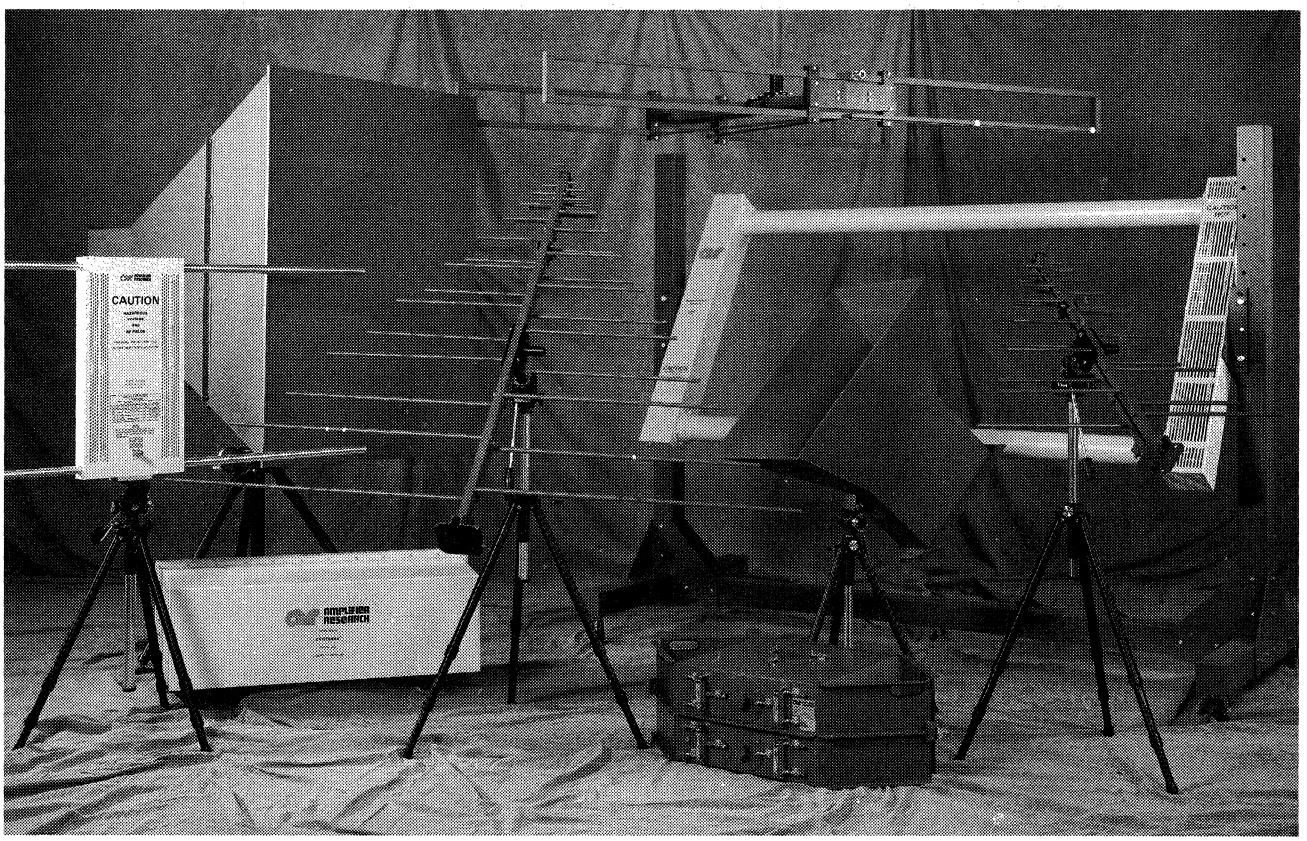
Preston Scientific
1180 N. Blue Gum Street, Anaheim, CA 92806 Tel: (714) 632-3700 FAX: (714) 632-7355



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Model	Type	Frequency Range	Power Input (cw max)	Power Gain	Impedance	VSWR	Connector	Size W x H x D cm (in.)	Other
AT1000	Log-periodic antenna	150–1000 MHz	2000 watts	6.5 dBi min. 7.5 dBi avg.	50 Ω	1.8:1 max. 1.5:1 avg.	Type C&N female supplied	102 x 13 x 91 (40 x 5.1 x 36)	Beamwidth: 60° E plane 105° H plane Front-to-back ratio: 15 dB
AT1080	Log-periodic antenna	80–1000 MHz	2000 watts	6.5 dBi min. 7.5 dBi avg.	50 Ω	1.8:1 max. 1.5:1 avg.	Type C&N female supplied	193 x 13 x 160 (76 x 5.1 x 63)	Gain flatness: ±1 dB Field intensities to 500 V/m
AT1225	Low-MHz array	25–50 MHz	10,000 watts	4.5 dBi nom. 4.0 dBi min.	50 Ω	2.5:1 avg. 3.5:1 max.	Type LC female	528 x 21.5 x 244 (208 x 8.5 x 96)	Beamwidth: 60° Front to back ratio...10 dB 100 V/m at 8 meters with 10 kW input
AT1250	Low-MHz array	50–100 MHz	10,000 watts	5.0 dBi nom. 4.0 dBi min.	50 Ω	2.0:1 avg. 3.0:1 max.	Type LC female	264 x 21.5 x 122 (104 x 8.5 x 48)	Beamwidth: 60° Front to back ratio...10 dB 100 V/m at 8 meters with 10 kW input
AT2000	Cavitenna	25–1000 MHz	3500 watts, 25–250 MHz; 1250 watts, 500–1000 MHz	NA	50 Ω	NA	Type C female	117 x 61 x 51 (46 x 24 x 20)	To 700 V/m at 250 MHz; covers difficult 25–200 MHz band
AT3000	E-field generator	10 kHz–30 MHz	2000 watts	NA	50 Ω	2.5:1 max.	Type C female	188 x 72 x 7 (74 x 28.3 x 2.8)	Up to 1000 V/m between elements
AT3001	E-field generator	10 kHz–25 MHz	3000 watts	NA	50 Ω	2.5:1 max.	Type C female	102 x 222 x 304 (40.2 x 87.4 x 119.7)	200 V/m between elements at 2500W input, large EUT capacity
AT3100	E-field generator	10 kHz–100 MHz	500 watts	NA	50 Ω	2.5:1 max.	Type N female	74 x 41 x 102 (29 x 16 x 40) w/"A" elements 104 x 41x 102 (41 x 16 x 40) w/"B" elements	Up to 350 V/m w/ "A" elements Up to 200 V/m w/ "B" elements
AT4000	High-gain horn antenna	200–1000 MHz	1500 watts	10 dBi min., increasing to 18 dBi at 1 GHz	50 Ω	2.5:1 max. 1.5:1 avg.	Type C female	109.2 x 145.8 x 175.3 (43.0 x 57.4 x 69.0)	Heavy-duty tripod included
AT4001	High-gain horn antenna	400–1000 MHz	1000 watts	10 dBi min., increasing to 15 dBi at 1 GHz	50 Ω	2.5:1 max. 1.5:1 avg.	Type C female	56.4 x 79.3 x 73.7 (22.2 x 31.2 x 29.0)	200 V/m at 3 meters
AT4002A	High-gain horn antenna	0.8–5 GHz	250 watts	12dBi min., increasing to 18 dBi at 5 GHz	50 Ω	2.0:1 max. 1.5:1 avg.	Universal Block N female	45.7 x 45.7 x 66 (18 x 18 x 25.2)	Beamwidth: 25° at 3 dB down from peak for E plane 26° at 3 dB down from peak for H plane
AT4003	High-gain horn antenna	4–8 GHz	250 watts	11.5 dBi min., increasing to 16 dBi at 8 GHz	50 Ω	1.6:1 max. 1.3:1 avg.	Universal Block N female	21.6 x 21.6 x 30.5 (8.5 x 8.5 x 12)	Gain enhancer increases gain to 21 dB at 8 GHz (AT4003) to 21 dB at 18 GHz (AT4004)
AT4004	High-gain horn antenna	8–18 GHz	250 watts	11.2 dBi min., increasing to 16 dBi at 18 GHz	NA	1.2:1 max. 1.1:1 avg.	WRD 750 waveguide	4.6 x 6.1 x 6.4 (1.8 x 2.4 x 2.6)	Removable gain enhancers AT4003 and AT4004
AT4510	High-gain horn antenna	1–4.2 GHz	1500 watts	13 dBi min., increasing to 18 dBi at 4.2 GHz	50 Ω	2.0:1 max. 1.5:1 avg.	7–16 DIN female	45.7 x 45.7 x 64 (18 x 18 x 25.2)	Field intensities to 500 V/m
AT4520	High-gain horn antenna	2.5–7.5 GHz	1400 watts	9.5 dBi min., increasing to 18 dBi at 7.5 GHz	NA	1.5:1 max. 1.3:1 avg.	WRD 250 waveguide	14.0 x 10.4 x 13.2 (5.5 x 4.1 x 5.2)	Beamwidth: 30° E and H Field intensities to 500 V/m
AT4530	High-gain horn antenna	7.5–18 GHz	1400 watts	15 dBi min., increasing to 21 dBi at 18 GHz	NA	1.5:1 max. 1.3:1 avg.	WRD 750 waveguide	9.7 x 7.0 x 15.0 (3.85 x 2.8 x 5.9)	Beamwidth: 18° E and H Field intensities to 500 V/m
AT5000	Broadband transmission line	10 kHz–100 MHz	3000 watts	NA	50 Ω	2.0:1 max. 10kHz-100MHz 6.0:1 max. 10-20 kHz above 1 kW input power	Type C female	265 x 240 x 120 (105 x 96 x 49)	2.0 x 0.9 meter test area between parallel conductors Field intensities to 500 V/m

Five groups of antennas bring you the fields and sensitivities to master almost any test scenario. Connect them to AR amps for a 1-to-1 power/frequency correspondence.

Log-Periodic 80 to 1000 MHz

The 1000: A compact version of the 1080. Less low-end frequency response.

The 1080: Power and bandwidth that matches IEC 1000-4-3 requirements.

Both: Field intensities to 500 V/m.

Low-MHz Array 25 to 100 MHz

The 1225 and the 1250: 10 dB front-to-back ratio; 60° beamwidth.

Cavitenna (The 2000) 25 to 1000 MHz

A top-loaded monopole that uses the ceiling or wall as a ground plane. Result: 25-1000 MHz bandwidth, comparable to that of a log-periodic antenna 16 ft wide.

E-Field Generators 10 kHz to 100 MHz

The 3000: 1000 V/m between elements. 100 V/m at one meter.

The 3001: Accommodates automobiles and large test items between elements. 200 V/m between elements at 2500 watts input, 10 kHz to 25 MHz.

The 3100: Broadest bandwidth of all—10 kHz to 100 MHz. Two sets of interchangeable elements accommodate wide variety of test items.

High-Gain Horns 200 MHz to 18 GHz

The 4000 Series: These moderate-to high-power antennas exhibit increasing gain with increasing frequency.

Balanced Transmission Lines 10 kHz to 100 MHz

The 5000: Generates E- and H- fields orthogonally, in ratios and conformation typical of free space. Over 500 V/m field strength at 2500 watts input.

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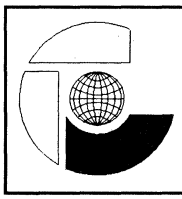

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JEMA is a leader in antenna design and manufacturing. Antennas available with any standard or custom RF connector and our factory can tool and mold your custom design.

UHF

Model No.	Wave	Height	Freq.	Design	Construction	Connector
JA-450-H-MT	1/4	8-9 cm	430-460 MHz	Helical	Molded	TNC
JA-450H-MB	1/4	8-9 cm	430-460 MHz	Helical	Molded	BNC
JA-450-FME	1/4	17 cm	420-460 MHz	PC Element	Molded	FME
JA-450-DB	1/4	17 cm	430-460 MHz	Speed Wire Element	Rubber	BNC, TNC
JA-450-MB	1/4	17 cm	430-460 MHz	Speed Wire Element	Molded	BNC
JA-450-MS	1/4	17 cm	430-460 MHz	Speed Wire Element	Molded	Stud (1/4-32x3/16)
JA-450-MT	1/4	17 cm	430-460 MHz	Speed Wire Element	Molded	TNC
JA-900H-DS	1/4	5 cm	890-960 MHz	Helical/Deeping	Molded	Stud
JA-900H-MS	1/4	5.5 cm	890-960 MHz	Helical	Molded	Stud
JA-900H-SMA	1/4	4.5 cm	890-960 MHz	Helical	Molded	SMA
JA-900-SMA(W/O)	1/4	9 cm	890-960 MHz	Speed Wire	Molded	SMA
JA-900-WS	1/4	10 cm	806-896 MHz	Spike Antenna	Flex Memory Wire: Polyur.	Stud
JSP-3-FME	1/2	18.5 cm	890-960 MHz	Spike Antenna	Rubber/Molded	FME
JA-2450-CS	1/4	3.2 cm	2.4-2.5 GHz	Helical	Rubber/Molded	Stud
JSP-6	1/4+1/2	22.5 cm	890-960 MHz	Spike Antenna	Rubber/Molded	BNC

VHF

Model No.	Wave	Height	Freq.	Design	Construction	Connector
JA-150-MS	1/4	17 cm	139-174 MHz	Helical/Deeping	Molded	Stud (1/4x32)
JA-150-MS1	1/4	9 cm	139-174 MHz	Helical	Molded	Stud (1/4x32)
JA-150-DB	1/4	18 cm	139-174 MHz	Helical/Deeping	Molded	BNC
JA-150-MB	1/4	18 cm	139-174 MHz	Helical	Molded	BNC
JA-150-MT	1/4	18 cm	139-174 MHz	Helical	Molded	TNC
JA-220-MS	1/4	14 cm	222 MHz	Helical	Molded	Stud (1/4x32)
JA-220-MB	1/4	15.4 cm	222 MHz	Helical	Molded	BNC
JA-220-MT	1/4	15.4 cm	222 MHz	Helical	Molded	TNC
JA-220-R/T	1/4	30 cm	222 MHZ	PC Element	Rubber or Molded	TNC (Rt Angle)

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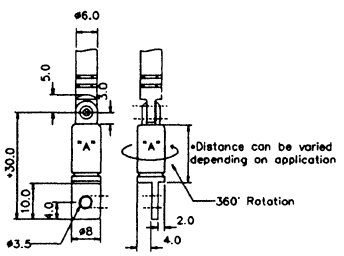
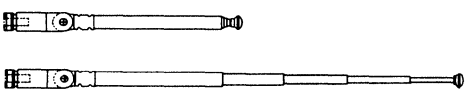
Low/Mid Band

Model No.	Wave	Height	Freq.	Design	Construction	Connector
JA-27B-T	1/4	20 cm	27 MHz	Speed wire/Base loading coil	Molded: Rubber/Ht. Shrink	TNC, BNC
JA-27-BW	1/4	107 cm	27 MHz	Telescopic	Molded	BNC, TNC
JA-27T-ST	1/4	25 cm	27 MHz	Helical/Top loading coil	Heat shrinkable tube	TNC
JA-27C-MT	1/4	25 cm	27 MHz	Helical/Center loading coil	Molded: Urethane	TNC
JA-27C-SB	1/4	26 cm	27 MHz	Helical/Center loading coil	Heat shrinkable tube	BNC
JA-27C-SM	1/4	26 cm	27 MHz	Helical/Center loading coil	Heat shrinkable tube	PL-259
JA-27C-ST1	1/4	13.5 cm	27 MHz	Helical/Center loading coil	Heat shrinkable tube	TNC
JA-50-MS	1/4	17 cm	46-49 MHz	Helical	Molded	Stud
JA-50C-MS	1/4	12 cm	46-49 MHz	Helical/Center loading coil	Molded	Stud
JA-50C-MS2	1/4	22 cm	49 MHz	Helical/Center loading coil	Molded	Stud (Rt Angle)
JA-50C-SS	1/4	12 cm	46-49 MHz	Helical/Center loading coil	Heat shrinkable tube	Stud
JA-50C-SS1	1/4	13.5 cm	46-49 MHz	Helical/Center loading coil	Heat shrinkable tube	Stud

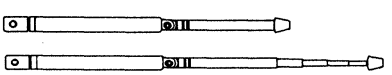
TELESCOPIC ANTENNAS / TELESCOPIC TOOLS



Universal Swivel Mount



Telescopic Antenna with Swivel Mount



Telescopic Antenna with Stud Mount

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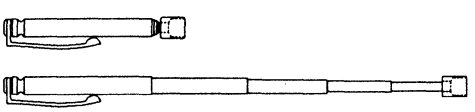

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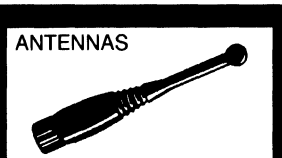

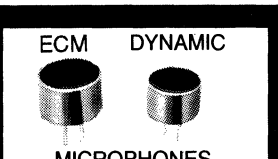

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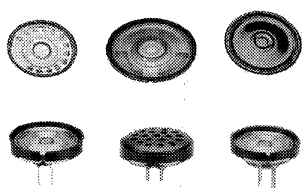
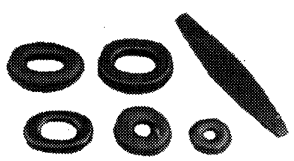
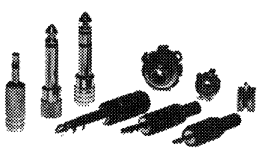


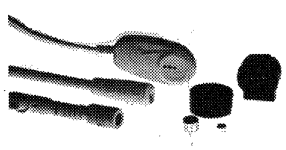
BOOM / HEAD BAND MATERIALS



CABLES, PLUGS, JACKS, AUDIO SWITCHES



MICROPHONES



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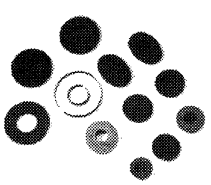
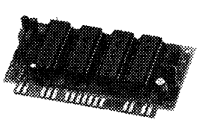


VOICE ROMS INTELLIGENT CONTROLLERS



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Our engineering brochure is detailed with product photos, performance specifications to surpass industry standards, and dimension drawings with mounting details. Please phone or fax us for a copy and we will send it today.

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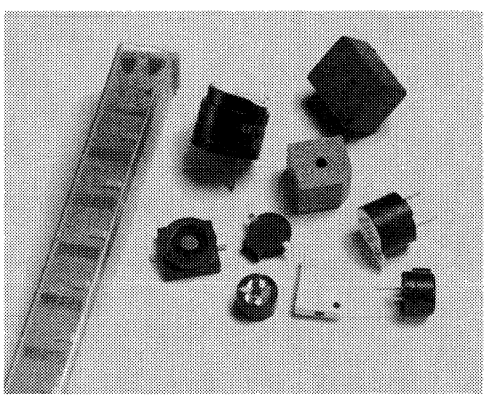
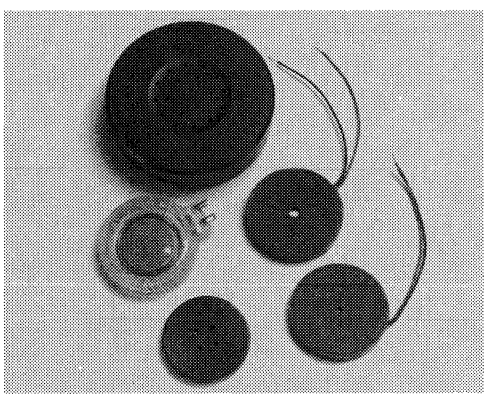




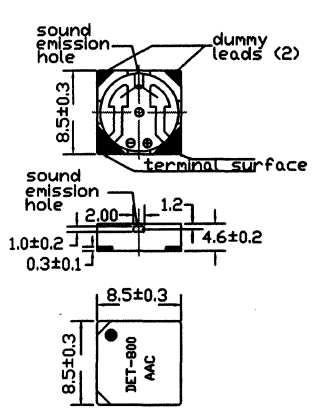
SMD ELECTRO-MAGNETIC TRANSDUCER - DET SIZE

Specifications:

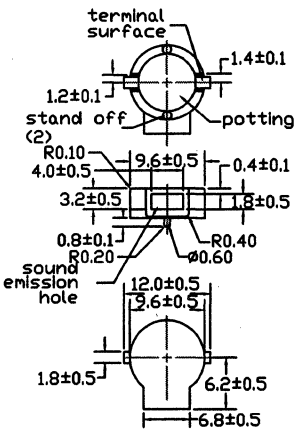
Type	DET 800	DET 900	DET 140	UNITS
Rated Voltage	3	1.5	1.5	V
Operating Voltage	1.5 ~ 4	1 ~ 2	1 ~ 2	V
Rated Current	Max. 80	Max. 70	Max. 80	mA
Coil Resistance	18	6.5	9	Ohms
Rated Frequency	2300	2700	3200	Hz
* Sound Output @ 10cm.	* Min. 87	* Min. 85	* Min. 85	dB
Operating Temperature	-30 ~ +60	-30 ~ +60	-30 ~ +60	°C
Storage Temperature	-40 ~ +85	-40 ~ +85	-40 ~ +80	°C
Weight	1	1	1	g

* Value at rated voltage and frequency (1/2 duty, square wave).

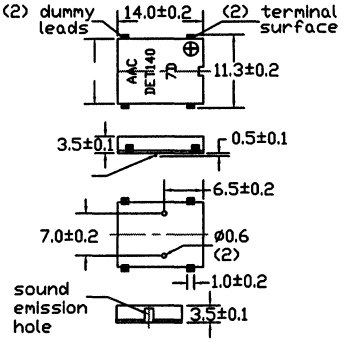
DET 800 Dimensions



DET 900 Dimensions



DET 140 Dimensions



Unit:mm

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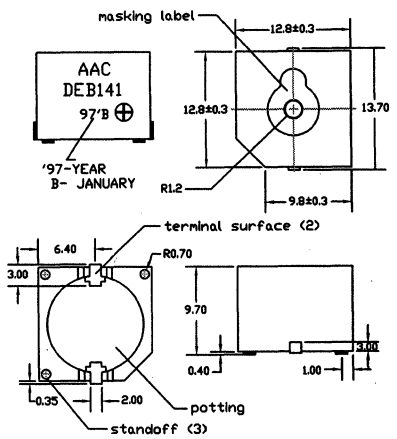
SMD ELECTRO-MAGNETIC BUZZER - DEB SIZE

Specifications:

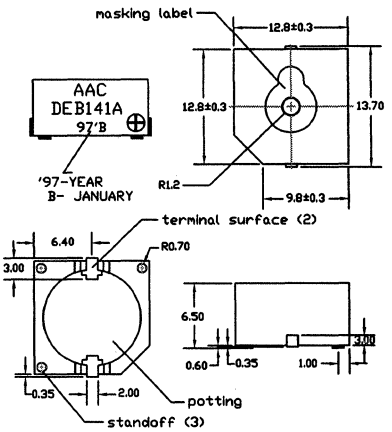
Type	DEB 140	DEB 141	DEB 142	DEB 140A	DEB 141A	DEB 142A	UNITS
Rated Voltage	1.5	5	12	1.8	5	12	V
Operating Voltage	1.4 ~ 3.0	4 ~ 7	8 ~ 16	1.6 ~ 3.0	3 ~ 6	8 ~ 16	V
Rated Current	Max. 20	Max. 25	Max. 15	Max. 20	Max. 25	Max. 15	mA
Response Time	Max. 50	Max. 50	Max. 50	Max. 50	Max. 50	Max. 50	m Sec
Rated Frequency	2400	2400	2400	2600	2600	2600	Hz
*Sound Output @ 10cm.	* Min. 85	* Min. 90	* Min. 90	* Min. 75	* Min. 82	* Min. 82	dB
Operating Temperature	-20 ~ +70	-30 ~ +85	-30 ~ +85	-20 ~ +70	-20 ~ +70	-20 ~ +70	°C
Storage Temperature	-30 ~ +80	-40 ~ +85	-40 ~ +85	-30 ~ +80	-30 ~ +80	-30 ~ +80	°C
Weight	2	2	2	2	2	2	g

* Value at rated voltage and frequency, 1/2 duty, square wave.

DEB 140, DEB 141, DEB 142 Dimensions



DEB 140A, DEB 141A, DEB 142A Dimensions



Unit:mm

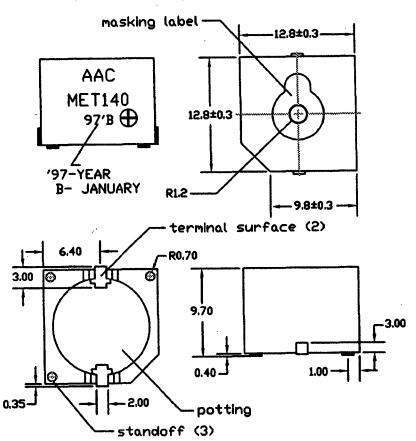
SMD ELECTRO-MAGNETIC TRANSDUCER (WASHABLE) - MET SIZE

Specifications:

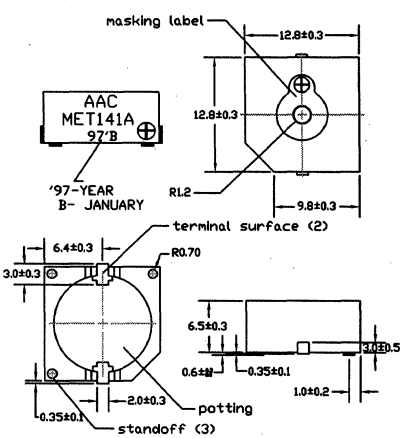
Type	MET 140	MET 141	MET 142	MET 140A	MET 141A	MET 142A	UNITS
Rated Voltage	1.5	5	12	1.5	5	12	V
Operating Voltage	1 ~ 3	4 ~ 7	8 ~ 16	1 ~ 3	4 ~ 7	8 ~ 16	V
Rated Current	Max. 30	Max. 40	Max. 40	Max. 30	Max. 40	Max. 40	mA
Coil Resistance	15	47	140	15	45	140	Ohms
Rated Frequency	2400	2400	2400	2400	2400	2400	Hz
* Sound Output @ 10cm.	* Min. 85	* Min. 90	* Min. 90	* Min. 85	* Min. 87	* Min. 88	dB
Operating Temperature	-30 ~ +85	-30 ~ +85	-30 ~ +85	-30 ~ +85	-30 ~ +85	-30 ~ +85	°C
Storage Temperature	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85	-40 ~ +85	°C
Weight	2	2	2	2	2	2	g

* Value at rated voltage (2400 HZ,1/2 duty, square wave).

MET 140, MET 141, MET 142 Dimensions



MET 140A, MET 141A, MET 142A Dimensions



Unit:mm

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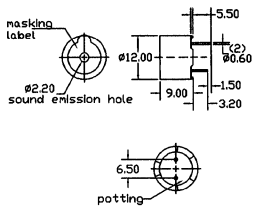
P.C. MOUNT ELECTRO-MAGNETIC TRANSDUCER (WASHABLE) - SET SIZE

Specifications:

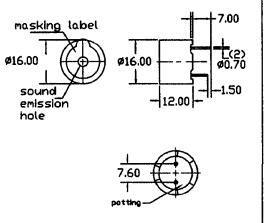
Type	SET 121A	SET 161G	SET 161F	SET 181	SET 251	UNITS
Rated Voltage	5	6	5	6	5	V
Operating Voltage	3 ~ 8	3 ~ 12	3 ~ 8	3 ~ 10	3 ~ 5	V
Rated Current	Max. 40	Max. 40	Max. 70	Max. 40	Max. 80	mA
Coil Resistance	45	45	28	60	27	Ohms
® Coil Impedance	@ 80		@ 210	@ 90	@ 38	Ohms
Rated Frequency	2400	2048			730	Hz
Reproduced Frequency			1700 ~ 2200	2000 ~ 2500 Min. 80		Hz
* Sound Output @ 10cm.	* Min. 85	* Min. 82	* Min. 86	* Min. 88	* Min. 85	dB
Operating Temperature	-40 ~ +85	-40 ~ +120	-40 ~ +90	-40 ~ +85	-40 ~ +85	°C
Storage Temperature	-40 ~ +85	-40 ~ +120	-40 ~ +95	-40 ~ +85	-40 ~ +85	°C
Weight	2	7	4	4	10	g

* Value at rated voltage and frequency (1/2 duty, square wave).
® Value at frequency, sine wave, measuring current 60uA.

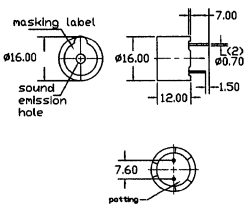
SET 121A Dimensions



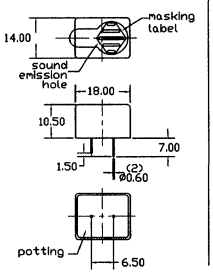
SET 161G Dimensions



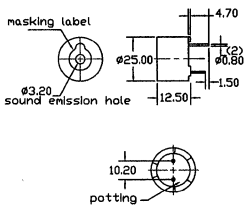
SET 161F Dimensions



SET 181 Dimensions



SET 251 Dimensions



Unit:mm

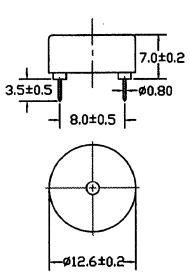
PIEZO CERAMIC AUDIO TRANSDUCER - PT SIZE
P.C. MOUNT PIEZO TRANSDUCER (WASHABLE) - SPT SIZE

Specifications:

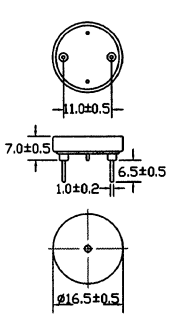
Type	PT 13	PT 17	PT 17B	PT 22	PT 30A	SPT 14	UNITS
Operating Voltage	3 ~ 25	3 ~ 30	3 ~ 30	3 ~ 30	3 ~ 30	1 ~ 30	V
Rated Current	Max. 3.0	Max. 1.0	Max. 1.0	Max. 1.0	Max. 3.0	Max. 1.0	mA
Capacitance	12000	15000	15000	15000	28000	14000	pF
Frequency Range	3000 ~ 5000	3000 ~ 5000	3000 ~ 5000	3000 ~ 5000	2000 ~ 4000	3500 ~ 6000	Hz
Resonant Frequency	4000	4000	4000	4000	2500	4000	Hz
* Sound Output @ 10cm.	* Min. 75	* Min. 80	* Min. 80	* Min. 82	* Min. 85	* Min. 80	dB
Operating Temperature	-20 ~ +100	-20 ~ +80	-20 ~ +80	-20 ~ +80	-20 ~ +100	-20 ~ +100	°C
Storage Temperature	-30 ~ +110	-20 ~ +85	-20 ~ +85	-20 ~ +85	-30 ~ +110	-30 ~ +110	°C
Weight	1	1.5	1	2	4	2	g

* Value at rated voltage and frequency square wave.

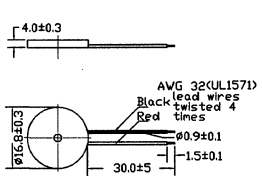
PT 13 Dimensions



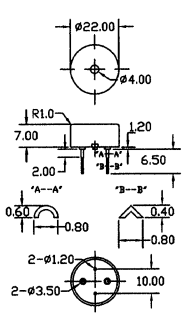
PT 17 Dimensions



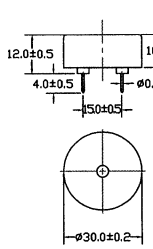
PT 17B Dimensions



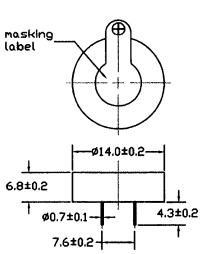
PT 22 Dimensions



PT 30A Dimensions



SPT 14 Dimensions



Unit:mm

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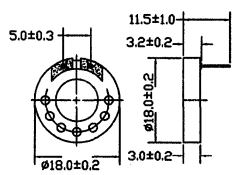
P.C. MOUNT MICRO MYLAR SPEAKER - DMS SIZE

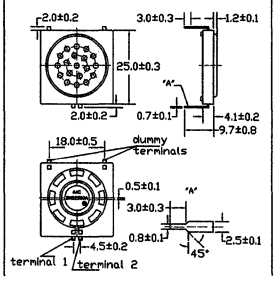
Specifications:

Type	DMS 1808P	DMS 2508	DMS 3616J	DMS 3808	DMS 4208	UNITS
Rated Input	0.1	0.15	.025	0.25	0.25	W
Maximum Input	0.15	0.30	0.5	0.50	0.50	W
Frequency Range	450 ~ 4000	500 ~ 6000	450 ~ 5000	250 ~ 5000	250 ~ 6000	Hz
Resonant Frequency	600	1100	550	300	300	Hz
Impedance @ 1kHz / 27mA	8	8	16	8	8	Ohms
Sound Output @ 10cm.	72 ± 3	78 ± 3	85 ± 3	83 ± 3	90 ± 3	dB
Operating Temperature	-20 ~ +60	-20 ~ +100	-20 ~ +60	-20 ~ +100	-20 ~ +100	°C
Storage Temperature	-20 ~ +75	-20 ~ +110	-20 ~ +75	-20 ~ +110	-20 ~ +110	°C
Weight	2	5	10	8	8	g

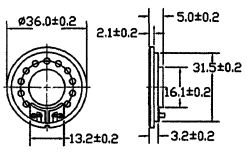
DMS 1808P Dimensions



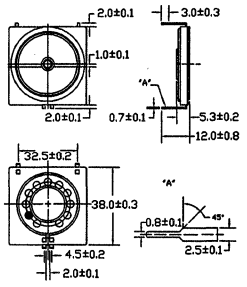
DMS 2508 Dimensions



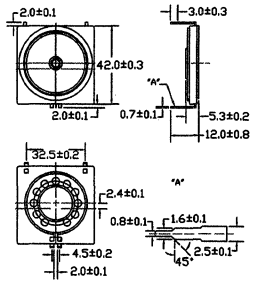
DMS 3616J Dimensions



DMS 3808 Dimensions



DMS 4208 Dimensions



Unit:mm

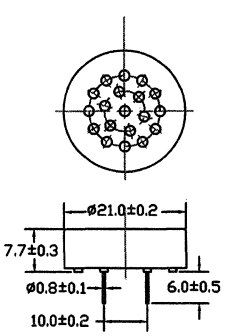
P.C. MOUNT SPEAKER TRANSDUCER - ST SIZE
SMD SPEAKER TRANSDUCER - DST SIZE

Specifications:

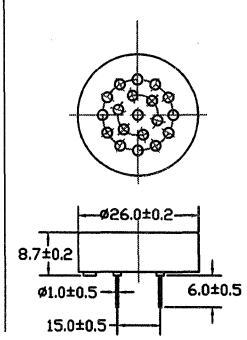
Type	ST 2108	ST 2608	ST 3008	ST 3208	DST 2308	UNITS
Rated Input	0.08	0.15	0.15	0.15	0.08	W
Maximum Input	0.15	0.2	0.2	0.2	0.15	W
Frequency Range	600 ~ 5000	500 ~ 4000	500 ~ 4000	500 ~ 4000	500 ~ 4000	Hz
Resonant Frequency	2000	1500	1200	1200	1500	Hz
Impedance @ 1kHz / 27mA	8	8	8	8	8	Ohms
* Sound Output @ 10cm.	75 ± 3	80 ± 3	80 ± 3	82 ± 3	78 ± 3	dB
Operating Temperature	-20 ~ +60	-20 ~ +60	-20 ~ +60	-20 ~ +60	-20 ~ +100	°C
Storage Temperature	-30 ~ +70	-30 ~ +70	-30 ~ +70	-30 ~ +70	-30 ~ +110	°C
Weight	2.5	5	10	12	6	g

* Value at rated voltage and frequency square wave.
Other impedance is available.

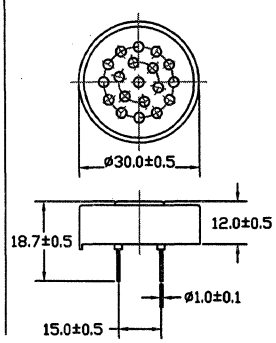
ST 2108 Dimensions



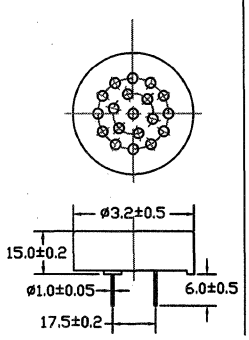
ST 2608 Dimensions



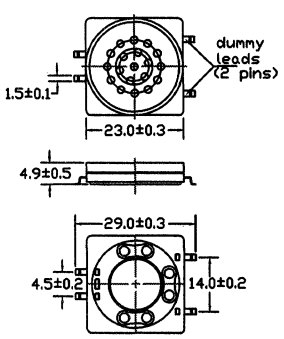
ST 3008 Dimensions



ST 3208 Dimensions



DST 2308 Dimensions



Unit:mm

MINIGLOSSARY BASIC CAPACITOR FORMULAS

I. Capacitance (farads)

English: $C = \frac{.224\,K\,A}{t_D}$

Metric: $C = \frac{.0884\,K\,A}{t_D}$

II. Energy stored in capacitors (Joules, watt-sec)

$E = \frac{1}{2}\,CV^2$

III. Linear charge of a capacitor (Amperes)

$I = C\frac{dV}{dt}$

IV. Total Impedance of a capacitor (ohms)

$Z = \sqrt{R_s^2 + (X_C - X_L)^2}$

Where Rs = ESR

V. Capacitive Reactance (ohms)

$X_C = \frac{1}{2\pi fC}$

VI. Inductive Reactance (ohms)

$X_L = 2\pi fL$

VII. Phase Angles:

Ideal Capacitors: Current leads voltage 90°
Ideal Inductors: Current lags voltage 90°
Ideal Resistors: Current in phase with voltage

VIII. Dissipation Factor

$DF = \tan\delta \text{ (loss angle)} = \frac{ESR}{X_c} = (2\pi fC)\,(ESR)$

IX. Power Factor

PF = Sine δ (loss angle) = Cos φ (phase angle)
PF = DF (when less than 10%)

X. Quality Factor (dimensionless)

$Q = \text{Cotan } \delta \text{ (loss angle)} = \frac{1}{DF}$

XI. Equivalent Series Resistance (ohms)

$ESR = (DF)\,(Xc) = (DF)\,(\frac{1}{2}\pi fC)$

XII. Power Loss (watts)

Power loss $= (2\pi fCV^2)\,(DF)$

XIII. KVA (Kilowatts)

$KVA = 2\pi fCV^2 \times 10^{-3}$

XIV. Temperature Characteristic (ppm/°C)

$TC = \frac{Ct - C_{25}}{C_{25}\,(T_t - 25)} \times 10^6$

XV. Cap Drift (%)

$C.D. = \frac{C_1 - C_2}{C_1} \times 100$

XVI. Reliability of Ceramic Capacitors

$\frac{L_o}{L_t} = \left(\frac{V_t}{V_o}\right)^x \quad \left(\frac{T_t}{T_o}\right)^\tau$

XVII. Capacitors in Series (current the same)

Any number: $\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} \cdots + \frac{1}{C_N}$

Two: $C_T = \frac{C_1\,C_2}{C_1 + C_2}$

XVIII. Capacitors in Parallel (voltage the same)

$C_T = C_1 + C_2 \cdots + C_N$

XIX. Aging Rate

A.R. = % Δ C/decade of time

XX. Decibels

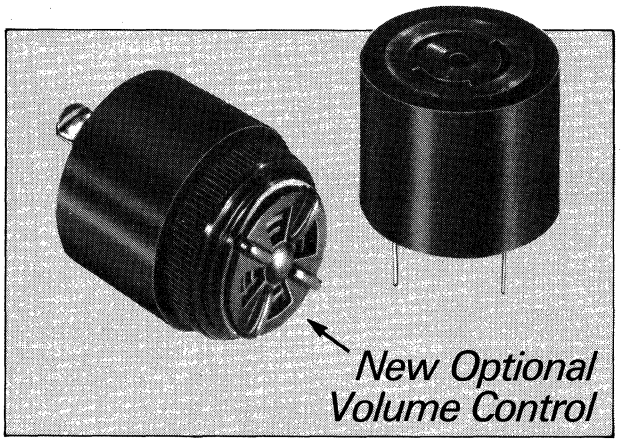
$db = 20 \log \frac{V_1}{V_2}$

Metric prefixes:

Pico	X 10^{-12}
Nano	X 10^{-9}
Micro	X 10^{-6}
Milli	X 10^{-3}
Deci	X 10^{-1}
Deca	X 10
Kilo	X 10^3
Mega	X 10^6
Giga	X 10^9
Tera	X 10^{12}

Symbols:

K	=	Dielectric Constant
A	=	Area of electrode overlap
t_D	=	Dielectric thickness
V	=	Voltage (volts)
t	=	time (hours)
R_S	=	Series Resistance (ohms)
f	=	frequency (Hertz)
L	=	Inductance (henries)
δ	=	Loss angle
ø	=	Phase angle
x+y	=	Exponent effect of voltage and temperature
L_O	=	Operating life (hours)
L_t	=	Test life (hours)
V_t	=	Test voltage (volts)
V_o	=	Operating voltage (volts)
T_t	=	Test temperature (°C)
T_o	=	Operating temperature (°C)



PIEZO ALARMS

from Floyd Bell Inc.

ULTRA SERIES

CASE STYLE	MODEL NUMBER	OPERATING VOLTAGE VDC Vac/dc*	TYPICAL SOUND PRESSURE dBa AT 2 FEET At min. V (2)	(A) V	TYPICAL OPER. CURRENT (mA) At min. V	At max. V	Terminations
ULTRA - CONTINUOUS TONE—FREQUENCY 2100±200Hz							
05	UC-05-515-P	5-15	96	108	35	100	P
09R	UC-09-515-Q	5-15	96	108	35	100	Q
09R	UC-09-515-S	5-15	96	108	35	100	S
09R	UC-09-515-W	5-15	96	108	35	100	W
19R	UC-19-535-Q	15-35*	98	108	35	100	Q
19R	UC-19-535-S	15-35*	98	108	35	100	S
ULTRA - INTERMITTENT TONE—FREQUENCY 2100±200Hz RATE (#): Slow (S): 1 Beep per sec. Medium (M): 3 Beeps per sec. Fast (F):6 Beeps per sec.							
05	UB-05-515-P(#)	5-15	96	108	35	100	P
09R	UB-09-515-Q(#)	5-15	96	108	35	100	Q
09R	UB-09-515-S(#)	5-15	96	108	35	100	S
09R	UB-09-515-W(#)	5-15	96	108	35	100	W
19R	UB-19-535-Q(#)	15-35*	98	108	35	100	Q
19R	UB-19-535-S(#)	15-35*	98	108	35	100	S
ULTRA - WARBLE TONE—CENTER FREQUENCY 2100±200Hz RATE (#): Slow (S): 0.8 cycles per sec. Fast (F):2.8 cycles per sec.							
05	UW-05-515-P(#)	5-15	96	108	35	100	P
09R	UW-09-515-Q(#)	5-15	96	108	35	100	Q
09R	UW-09-515-S(#)	5-15	96	108	35	100	S
09R	UW-09-515-W(#)	5-15	96	108	35	100	W
19R	UW-19-535-Q(#)	15-35*	98	108	35	100	Q
19R	UW-19-535-S(#)	15-35*	98	108	35	100	S
ULTRA - SIREN TONE RATE: 2.7 cycles per sec. **CENTER FREQUENCY 2100±200Hz**							
05	US-05-515-P	5-15	100	109	35	100	P
09R	US-09-515-Q	5-15	100	109	35	100	Q
09R	US-09-515-S	5-15	100	109	35	100	S
09R	US-09-515-W	5-15	100	109	35	100	W
19R	US-19-535-Q	15-35*	100	109	35	100	Q
19R	US-19-535-S	15-35*	100	109	35	100	S
ULTRA - WHOOP TONE RATE: 1.8 cycles per sec. **CENTER FREQUENCY 2100±200Hz**							
05	UO-05-515-P	5-15	100	109	35	100	P
09R	UO-09-515-Q	5-15	100	109	35	100	Q
09R	UO-09-515-S	5-15	100	109	35	100	S
09R	UO-09-515-W	5-15	100	109	35	100	W
19R	UO-19-535-Q	15-35*	100	109	35	100	Q
19R	UO-19-535-S	15-35*	100	109	35	100	S
ULTRA - STACCATO TONE RATE: 8 cycles per sec. **CENTER FREQUENCY 2100±200Hz**							
05	UT-05-515-P	5-15	100	109	35	100	P
09R	UT-09-515-Q	5-15	100	109	35	100	Q
09R	UT-09-515-S	5-15	100	109	35	100	S
09R	UT-09-515-W	5-15	100	109	35	100	W
19R	UT-19-535-Q	15-35*	100	109	35	100	Q
19R	UT-19-535-S	15-35*	100	109	35	100	S

All sound levels were specified with an "A" - weighted, ANSI, Type 2 sound meter at a distance of 2 feet (0.61m) on axis in free field. Siren, whoop and staccato tone units were specified with sound level meter responding to repetitive peaks. # When ordering, specify rate: Slow (S), Medium (M), or Fast (F)

Optional rotary shutter for volume control is available for all models with case style 07, 09 and 19. When ordering add "V" to case style number. Example: MC-V09-301-Q.

Now, built-in shutter-type volume control lets your customer adjust the sound level to suit his needs. This simple manual shutter provides variable attenuation up to 20 dBa typical.

CONTINUOUS TONE

•Indicates Recognized Component, Underwriters Laboratory

CASE STYLE	MODEL NUMBER	OPERATING VOLTAGE VDC *VAC	TYPICAL SOUND PRESSURE dBa AT 2 FEET At min. V	At max. V	TYPICAL OPERATING CURRENT (mA) At min. V	At max. V	Terminations
EXTRA LOUD CONTINUOUS TONE—FREQUENCY 2900±500Hz							
05	XC-05-212-P	2-12	82	103	8	65	P
•05	XC-05-330-P	3-30	82	103	6	70	P
09	XC-09-212-W	2-12	82	103	8	65	W
09	XC-09-212-Q	2-12	82	103	8	65	Q
09	XC-09-212-S	2-12	82	102	8	65	S
•09	XC-09-330-W	3-30	82	103	6	70	W
•09	XC-09-330-Q	3-30	82	103	6	70	Q
•09	XC-09-330-S	3-30	82	103	6	70	S
•19	XC-19-201-Q	*30-120	82	103		40	Q
•19	XC-19-301-Q	*130-220	82	103		40	Q
MEDIUM CONTINUOUS TONE—FREQUENCY 2900±500Hz							
02	MC-02-116-P	1-16	68	93	1	18	P
07	MC-07-116-W	1-16	68	93	1	18	W
07	MC-07-116-T	1-16	68	93	1	18	T
07	MC-07-116-Q	1-16	68	93	1	18	Q
07	MC-07-116-S	1-16	68	93	1	18	S
•09	MC-09-516-Q	5-16	85	95	2	20	Q
•09	MC-09-516-S	5-16	85	95	2	20	S
•09	MC-09-516-L	5-16	85	95	2	20	L
02	MC-02-130-P	1-30	68	95	1	13	P
07	MC-07-130-W	1-30	68	95	1	13	W
07	MC-07-130-T	1-30	68	95	1	13	T
07	MC-07-130-Q	1-30	68	95	1	13	Q
07	MC-07-130-S	1-30	68	95	1	13	S
•09	MC-09-530-Q	5-30	75	95	2	20	Q
•09	MC-09-530-S	5-30	75	95	2	20	S
•09	MC-09-201-Q	*30-120	68	95		40	Q
•09	MC-09-301-Q	*130-220	68	95		40	Q

INTERMITTENT TONE

When Ordering: Specify Fast, Medium or Slow Beep Rate.
Fast: 3 Beeps Per Second, **Medium:** 2 Beeps Per Second, **Slow:** 1 Beep Per Second

CASE STYLE	MODEL NUMBER	OPERATING VOLTAGE VDC *VAC	TYPICAL SOUND PRESSURE dBa AT 2 FEET At min. V	At max. V	TYPICAL OPERATING CURRENT (mA) At min. V	At max. V	Terminations
EXTRA LOUD BEEP—FREQUENCY 2900±500Hz							
05	XB-05-312-P	5-12	90	104	20	60	P
•05	XB-05-630-P	6-30	90	104	12	100	P
09	XB-09-312-W	5-12	90	104	20	60	W
09	XB-09-312-Q	5-12	90	104	20	60	Q
09	XB-09-312-S	5-12	90	104	20	60	S
•09	XB-09-630-W	6-30	90	104	12	100	W
•09	XB-09-630-Q	6-30	90	104	12	100	Q
•09	XB-09-630-S	6-30	90	104	12	100	S
•19	XB-19-201-Q	*30-120	90	104		50	Q
•19	XB-19-301-Q	*130-220	90	104		50	Q
MEDIUM BEEP TONE—FREQUENCY 2900±500Hz							
•05	MB-09-516-P	5-16	85	95	2	24	P
•09	MB-09-516-Q	5-16	85	95	2	24	Q
•09	MB-09-516-S	5-16	85	95	2	24	S
•09	MB-09-516-L	5-16	85	95	2	24	L
•05	MB-05-530-P	5-30	75	95	2	18	P
•09	MB-09-530-W	5-30	75	95	2	18	W
•09	MB-09-530-Q	5-30	75	95	2	18	Q
•09	MB-09-530-S	5-30	75	95	2	18	S
•19	MC-19-201-Q	*30-120	75	95		40	Q
•19	MC-19-301-Q	*130-220	75	95		40	Q

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Most Audio II alarms are UL recognized components

PIEZO ALARMS

CHIME TONE

When Ordering: Specify Chime Rate
Fast: 2 Chimes Per Second, **Moderate:** 1 Chime Per Second

CASE STYLE	MODEL NUMBER	OPERATING VOLTAGE VDC *VAC	TYPICAL SOUND PRESSURE dBa AT 2 FEET		TYPICAL OPERATING CURRENT (mA)		Terminations
			At min. V	At max. V	At min. V	At max. V	
CHIME TONE—FREQUENCY 2700±500Hz							
05	CH-05-525-P	5-25	70	90	6	66	P
09	CH-09-525-W	5-25	70	90	6	66	W
09	CH-09-525-Q	5-25	70	90	6	66	Q
09	CH-09-525-S	5-25	70	90	6	66	S
•19	CH-19-201-Q	*120	70	90		40	Q
•19	CH-19-301-Q	*220	70	90		40	Q

WARBLE TONE

WARBLE TONE—CENTER FREQUENCY 2700±500Hz							
•05	MW-05-616-P	5-16	80	95	8	18	P
•05	MW-05-550-P	15-36†	75	95	3	8	P
•09	MW-09-616-L	5-16	80	95	8	18	L
•09	MW-09-616-W	6-16	80	95	8	18	W
•09	MW-09-616-Q	6-16	80	95	8	18	Q
•09	MW-09-616-S	6-16	80	95	8	18	S
•09	MW-09-550-W	15-36†	75	95	3	8	W
•09	MW-09-550-S	15-36†	75	95	3	8	S
•09	MW-09-201-W	*40-120	75	95	3	8	W
•09	MW-09-201-S	*40-120	75	95	3	8	S
•09	MW-09-301-W	*140-220	75	95	3	8	W
•09	MW-09-301-S	*140-220	75	95	3	8	S

•Indicates Recognized Component, Underwriters Laboratory †Vac-Vdc

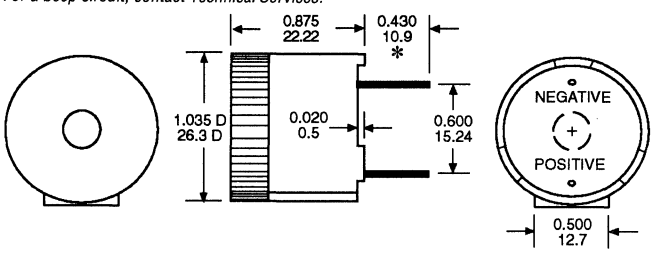
MODEL M-80 Breakthrough in Piezoelectric Alarms

The new M-80 is ideal for any application that requires super audibility, especially where enclosures or other design factors sharply attenuate the sound from the alarm. It's small size, just one-inch in diameter x 0.875-inch high, means it can fit inside tight spaces, but since it is 15 dB louder than anything else its size, it will be heard!

SPECIFICATIONS

Operating Voltage: 9-12 Vdc
Maximum Operating Current: 70 mA at 12V
Operating Frequency: 2700 Hz, ±500 Hz
Sound Pressure: At 12 V – 103 dB, ±5 dB (A) at 2'
At 9 V – 91 dB, ±5 dB (A) at 2'
Operating Mode: Continuous Tone
Operating Temperature: –20° C to +65° C
Storage Temperature: -40°C to +80°C
Surge Voltage: 20% over maximum rated voltage for less than 5 minutes
Termination: 2 PC pins 0.032" (0.8 mm) Dia., Brass Electro-tin plated
Positive Terminial — near flat
Construction Material: Case – Flame-retardant Noryl thermoplastic with a 94V-0 flame class rating, red
Potting – Epoxy, black

For a beep circuit, contact Technical Services.



FRONT VIEW SIDE VIEW REAR VIEW
DIMENSIONS IN: Inches / mm
TOLERANCES ARE ± 0.015 / 0.38
* ± 0.050 / 1.27

NOTE: 3 STANDOFFS ARE NOT ORIENTED TO PC PINS.

AudioLarm® II Series

Engineered alarms/exclusive design features

Cases molded from flame retardant engineering grade thermoplastic. Water-proof and shock-resistant solid-state electronics sealed in epoxy resin...100% inspected to ensure premium quality. Quality-made in U.S.A.

GENERAL SPECIFICATIONS

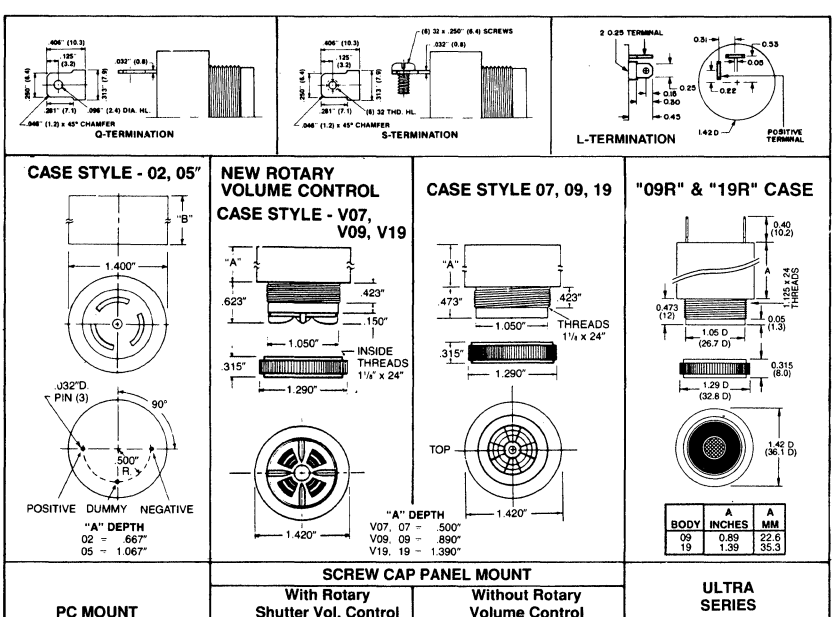
OPERATING TEMPERATURE: -30°C to +65°C.
STORAGE TEMPERATURE: -40°C to +85°C.
REVERSE VOLTAGE: Protected to the maximum operating voltage (some models may sound softly when connected to reverse polarity).
SURGE VOLTAGE: 20% over maximum rated voltage for less than 5 minutes.
LIFE EXPECTANCY: 10 years under normal operating conditions.

TERMINATIONS

W—Leads: 2 wires 24AWG (7 x 32) tinned copper vinyl insulated, 2" long, ¼" end stripped, color coded.
P—PC Pins: 3 PC pins 90° apart on a .500" R from center, .032" diameter.
T—.110 quick connect terminals: .110" width, .020 thickness, brass solder plated for push on attachment or direct solder.
Q—.250 quick connect terminals: .250" width, .033" thickness, brass electro-tin plated for push-on attachment or direct solder.
S—Screw terminals: 6/32 ¼" long stainless steel screw for wires with lug attachments.
L—.250" quick connect terminals oriented at right angles: .250" width, .033" thickness, brass electro-tin plated for push-on (quick connect) attachment.

TO ORDER—Arrange information into the format of the following Sample Model Number.

X B - 09 - 630 - Q (F)
CASE STYLE — TERMINATION — RATE (for Chime and Intermittent Tones only)



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speakers

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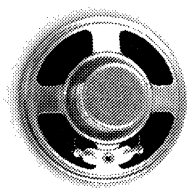
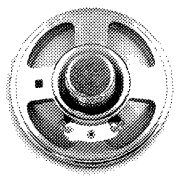
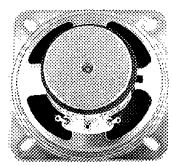
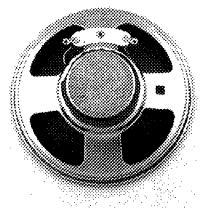
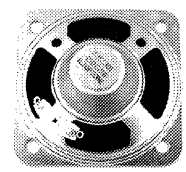

Alnico Magnet, Paper Cone Speaker

FRAME STYLE R: ROUND S: SQUARE P: PINCUSHION O: OVAL

MODEL NO.	SIZE		FRAME STYLE	RESONANT FREQ (HZ)	FREQ. RANGE	POWER(W) INPUT		MAGNET SIZE	MAGNET WEIGHT	DEPTH (M/M)
	INCH	M/M		±20%	(HZ)	NOM	MAX	(M/M)	(OZ)	
GA0381	1 1/2	38	R	700	fo-5K	0.1	0.2	13x10	0.35	16.8
GA0401	1 1/2	40	R	650	fo-5K	0.1	0.2	13x10	0.35	17.5
GA0451	1 3/4	45	R	600	fo-4K	0.1	0.2	13x10	0.35	18
GA0501	2	50	R	430	fo-4K	0.25	0.5	13x10	0.35	19.3
GA0506	2	50	S	430	fo-4K	0.25	0.5	13x10	0.35	19.3
GA0571	2 1/4	57	R	400	fo-4K	0.25	0.5	13x10	0.35	20
GA0571H	2 1/4	57	R	550	fo-6K	1	2	13x10	0.35	20
GA0576	2 1/4	57	S	400	fo-4K	0.25	0.5	13x10	0.35	20
GA0661	2 1/2	66	R	340	fo-4K	0.3	0.5	13x10	0.35	21.5
GA0666	2 1/2	66	S	340	fo-4K	0.3	0.5	13x10	0.35	21.5
GA0701	2 3/4	70	R	320	fo-4K	0.5	1	13x10	0.35	23.5
GA0771	3	77	R	250	fo-5K	1	2	13x10	0.35	24
GA0776	3	77	S	250	fo-5K	1	2	13x10	0.35	24
GA0876	3 1/4	87	S	180	fo-13K	1	2	13x10	0.35	32
GA0926	3 1/2	92	S	220	fo-8K	1	3	13x10	0.35	27.5
GA1006	4	100	S	180	fo-10K	2	3	13x12	0.42	37
GA0719	1 1/2x2 3/4	41x71	O	400	fo-17K	1	3	13x10	0.35	29
GA0729	2x3	48x72	O	420	fo-4K	0.5	1	13x10	0.35	25
GA0929	2 1/2x3 1/2	63x91	O	320	fo-12K	1	2	13x10	0.35	28
GA1009	2 3/4x4 1/4	68x106	O	260	fo-12K	2	3	13x12	0.42	32

Alnico, Ferrite Magnet, Mylar Cone Speaker

FRAME STYLE R: ROUND S: SQUARE P: PINCUSHION O: OVAL

GA0401M	1 1/2	40	R	550	fo-6K	0.2	0.3	13x10	0.35	17
GA0451M	1 3/4	45	R	500	fo-5K	0.2	0.3	13x10	0.35	17
GA0501M	2	50	R	440	fo-7K	0.25	0.5	13x10	0.35	19
GA0571M	2 1/4	57	R	400	fo-6K	0.25	0.5	13x10	0.35	18.5
GA0576M	2 1/4	57	S	400	fo-6K	0.25	0.5	13x10	0.35	18.5
GA0661M	2 1/2	66	R	340	fo-9K	0.5	1	13x10	0.35	21
GA0666M	2 1/2	66	S	340	fo-9K	0.5	1	13x10	0.35	21
GA0701M	2 3/4	70	R	310	fo-4K	0.5	1	13x10	0.35	22
GA0771M	3	77	R	250	fo-12K	1	2	13x10	0.35	25
GA0776M	3	77	S	250	fo-12K	1	2	13x10	0.35	25
GA0876M	3 1/4	87	S	220	fo-17K	1	2	13x10	0.35	32
GF0501M	2	50	R	430	fo-5K	0.25	0.5	13x10	0.58	18.2
GF0571M	2 1/4	57	R	400	fo-9K	0.25	0.5	32x18x6	0.58	18.5
GF0661M	2 1/2	66	R	340	fo-9K	0.5	1	32x18x6	0.58	22
GF0666M	2 1/2	66	S	340	fo-9K	0.5	1	32x18x6	0.58	22
GF0701M	2 3/4	70	R	310	fo-4K	1	2	32x18x6	0.58	22
GF0771M	3	77	R	280	fo-11K	1	2	32x18x6	0.58	24
GF0776M	3	77	S	280	fo-11K	1	2	32x18x6	0.58	24
GF0876M	3 1/4	87	S	520	fo-8K	12	15	60x32x8	2.8	33
GF1003M	4	100	S	250	fo-13K	3	5	45x22x8	1.7	36
GF1004M	4	100	S	260	fo-15K	6	10	55x25x8	3	37
GF1005M	5	100	S	---	fo-3K	15	20	70x32x10	5.3	42

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Ferrite Magnet, Paper Cone Speaker

FRAME STYLE R: ROUND S: SQUARE P: PINCUSHION O: OVAL

MODEL DEPTHSTYLE	SIZE FREQ (HZ)		FRAME RANGE	RESONANT INPUT	FREQ. SIZE	POWER(W) WEIGHT		MAGNET (M/M)		MAGNET
	INCH	M/M		±20%	(HZ)	NOM	MAX	(M/M)	(OZ)	
GF0501	2	50	R	430	fo-4K	0.25	0.5	32x18x6	0.58	17.5
GF0506	2	50	S	430	fo-4K	0.25	0.5	32x18x6	0.58	17.5
GF0571	2 1/4	57	R	400	fo-4K	0.25	0.5	32x18x6	0.58	18.5
GF0571H	2 1/4	57	R	480	fo-5K	1	2	32x18x6	0.58	18.5
GF0573	2 1/4	57	R	450	fo-12K	3	5	45x22x8	1.7	27.2
GF0576	2 1/4	57	S	400	fo-4K	0.25	0.5	32x18x6	0.58	18.5
GF0661	2 1/2	66	R	320	fo-4K	0.3	0.5	32x18x6	0.58	19.5
GF0666	2 1/2	66	S	320	fo-4K	0.3	0.5	32x18x6	0.58	19.5
GF0668	2 1/2	66	S	290	fo-16K	3	5	45x22x8	1.7	29
GF0668B	2 1/4	66	S	210	fo-20K	3	5	45x22x8	1.7	29
GF0701	2 3/4	70	R	320	fo-4K	0.5	1	32x18x6	0.58	21.5
GF0771	3	77	R	180	fo-10K	1	2	32x18x6	0.58	24
GF0776	3	77	S	180	fo-10K	1	2	32x18x6	0.58	24
GF0778	3	77	S	250	fo-23K	3	5	45x22x8	1.7	31
GF0876	3 1/4	87	S	200	fo-16K	2	4	45x22x8	1.7	32.5
GF0922	3 1/2	92	R	230	fo-5K	2	3	39x22x7	1	32
GF0927	3 1/2	92	S	230	fo-5K	2	3	39x22x7	1	32
GF1003	4	102	S	160	fo-12K	3	5	45x22x8	1.7	36.2
GF1004	4	102	S	145	fo-17K	6	10	55x25x8	2.6	36.5
GF1004H	4	110	S	110	fo-15K	20	40	60x32x10	3	49.2
GF1007C	4	100	P	125	fo-23K	10	15	70x32x10	5.3	47.5
GF1103	4 1/2	114	P	75	fo-16K	25	30	70x32x8	5	50.5
GF1201	5	120	P	125	fo-13K	3	5	45x22x8	1.7	44
GF1202	5	120	P	115	fo-13K	6	10	60x32x10	3	47
GF1202B	5	120	P	88	fo-14K	20	30	60x32x8	2.8	45
GF1205B	5	120	P	103	fo-20K	10	20	70x32x10	5.3	49
GF1207	5	137	P	160	fo-8K	5	10	60x32x8	2.85	31.5
GF1301	5 1/4	134	P	100	fo-10K	6	10	60x32x10	3.6	46
GF1302	5 1/4	134	P	95	fo-16K	15	25	70x32x10	5.3	49
GF1602	6 1/2	156	P	110	fo-10K	6	10	60x32x10	3	54.5
GF1603	6 1/2	156	P	85	fo-14K	15	25	70x32x10	5.3	58.8
GF1603B	6 1/2	165	R	90	fo-16K	8	10	70x32x10	5.3	70
GF1605	6 1/2	165	R	60	fo-13K	20	30	70x32x10	10	73
GF2001	8	205	R	75	fo-18K	10	20	70x32x10	5.3	66
GF2002	8	205	R	65	fo-12K	20	30	80x40x15	10	83
GF2002H	8	205	R	55	fo-8K	40	50	80x40x15	10	83
GF2005	8	205	R	62	fo-8K	50	80	100x40x15	13.5	84
GF2503	10	256	R	50	fo-8K	25	40	80x40x15	10	104
GF2504	10	256	R	45	fo-6K	80	100	100x60x20	20	110
GF3001	12	305	R	70	fo-10K	25	50	80x40x15	10	107
GF3002	12	305	R	30	fo-6K	60	90	100x60x20	20	130

Ferrite Magnet, Low Leakage Flux Speaker

FRAME STYLE R: ROUND S: SQUARE P: PINCUSHION O: OVAL

GF0729	1 3/4x2 3/4	48x72	O	400	fo-5K	0.5	1	32x18x6	0.58	24
GF0901	2x3 1/2	50x90	O	250	fo-15K	3	5	45x22x8	1.7	35
GF1259	3x5	77x125	O	145	fo-20K	3	5	45x22x8	1.7	37
GF1561	4x6	95x156	O	140	fo-10K	3	5	45x22x8	1.7	43
GF1562	4x6	103x156	O	135	fo-13K	6	10	60x32x8	2.8	39
GF0668TV	2 1/2	66	S	220	fo-20K	2	4	39+32	1.6	34
GF0701TV	2 3/4	70	S	150	fo-20K	3	5	35+39	1.75	42
GF0777TV	3	77	S	160	fo-20K	5	8	39+39	2	45
GF0779TV	3	77	S	120	fo-20K	5	8	45+60	4.5	44
GF0901TV	2x3 1/2	50x90	O	200	fo-20K	3	5	32+39	1.6	43
GF0923TV	3 1/2	92	S	160	fo-13K	6	10	45+39	2.7	42
GF1007TV	4	100	S	140	fo-16K	15	25	60+45	4.5	48
GF1205TV	5	120	S	120	fo-15K	15	20	55+45	5.3	55
GF1259TV	3x5	77x125	O	180	fo-13K	3	5	39+32	1.6	43

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
A/D acrylonitrile butadiene-styrene
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AFC audio frequency control
AFT automatic filter test
ALGOL algorithmic language
AM a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
ASIC application specific IC
ATE automatic test equipment
ATG automatic test generation
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility syste

C
CAD computer-aided design
CAE computer-aided engineering
CAM computer-aided manufacture
CAMAC computer-automated measurement and control
CAPP computer-aided process planning
CAT computer-aided test
CATV cable television or community antenna television
CCC (leaded) ceramic chip carriers
CCD computer-controlled display
CERMET ceramic metal element
CIE computer-integrated engineering
CIM computer-integrated manufacturing
CLCC ceramic leadless chip carriers
CMOS complementary metal-oxide semiconductor
Comm. communications
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DBMS data base management system
DC direct current
DFT design for testability
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DRAM dynamic RAM
DTL diode transistor logic

E
EDA electronic design automation
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EIA Electronic Industries Association
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM erasable programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide FET
CMIP commn management information protocol
GPIB general purpose interface bus
GPS global positioning system

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement, and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IAB Internet Activities Board
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared
ISDN integrated services digital network
ISO International Standards Organization

J
JEDEC Joint Electronic Device Engineering Council
JFET junction FET
JMOS junction MOS

K
kHz kilohertz (10^3 hertz)
KSR keyboard send /receive

L
LAN local area network
LC (filters) inductance/capacitance
LCC leaded chip carrier
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
µF microfarad
MHz megahertz
MIC microwave IC
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor FET
MOSIGT metal oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM national instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator
OSI open systems interconnection

P
PAL programmable array logic
PC printed circuit
PCB printed circuit board
PCM pulse code modulation
PCS plastic clad silica
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLCC plastic leaded chip carrier
PLL phased lock loop
PPI plan position indicator
PROM programmable ROM
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon-controlled switch
SDA source & detector assemblies
SGMP simple gateway monitoring protocol
SIDAC bidirectional voltage-triggered switch
SIMM single in-line memory module
SIP single in-line package
SMD surface mount device
SMT surface mount technology
SNMP simpole network management protocol
SO small outline
SOIC small outline IC
SOT small outline transistor
SSI small scale integration
SSR solid-state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCE thermal coefficient of expansion
TXCO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAN value-added network
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency (30 kHz to 300 MHz)
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

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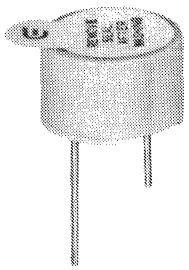
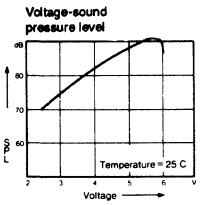
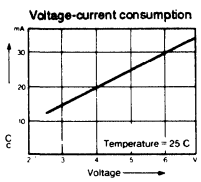
MICRO BUZZERS—MEB SERIES WITH BUILT-IN OSCILLATING CIRCUIT

MEB-12C-5







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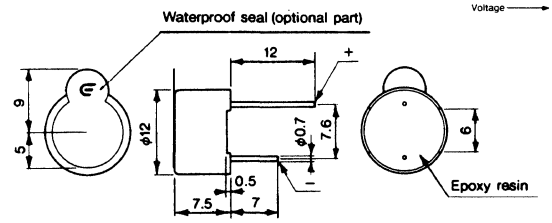
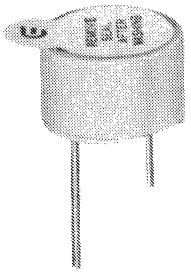
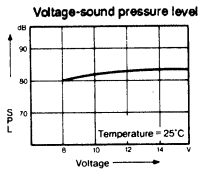


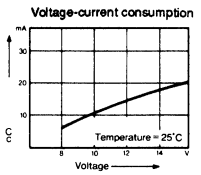
■ SPECIFICATIONS *3V Available

Rated voltage	(VDC)	5 *	Operating temperature	−20°C ~ +80°C
Rated current	(mA)	25 (at 5V)	Pin polarity (+)	Long pin
Sound pressure level	(dB)	min. 80 (at 5 VDC) typ. 87 (at 10cm)	Pin polarity (−)	Short pin
Operating voltage range	(VDC)	3 ~ 6	Net weight (grs.)	1.6

MEB-12B-12







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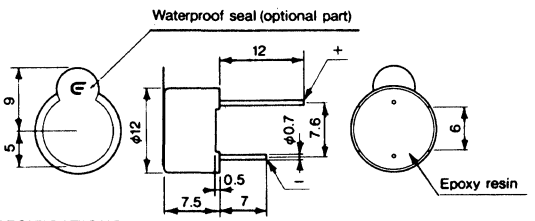
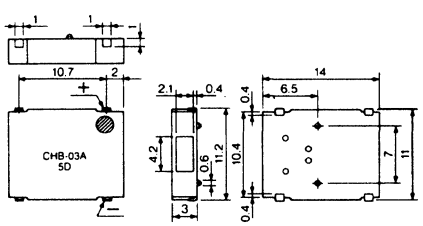


■ SPECIFICATIONS

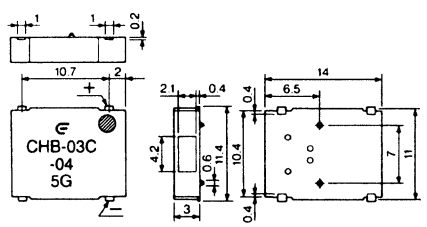
Rated voltage	(VDC)	12	Operating temperature	−10°C ~ +60°C
Rated current	(mA)	15 (at 12V)	Pin polarity (+)	Long pin
Sound pressure level	(dB)	min. 75 (at 12 VDC) typ. 85 (at 10m)	Pin polarity (−)	Short pin
Operating voltage range	(VDC)	8 ~ 16	Net weight (grs.)	1.6

LOW PROFILE, SURFACE MOUNT SOUND GENERATOR – CHB SERIES

■ CHB-03A/B/C

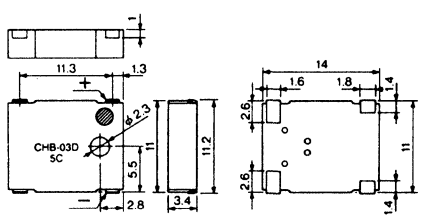


■ CHB-03C-04

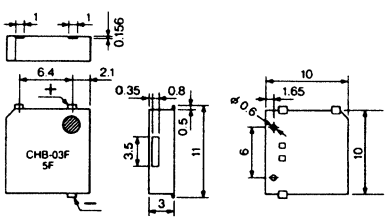


Part No.	Rated current*1 V	Average maximum rated current mA	Average sound pressure @10 cm dB(A)	Driving frequency Hz	Direct current resistance Ω
CHB-03A	1.5	60	91	2700	9.5
CHB-03B	3	70	93	2700	18
CHB-03C	5	80	94	2700	40
CHB-03C-04	5	80	94	2700	40
CHB-03D	5	80	95	2730	40
CHB-03E	1.5	60	89	2700	8.5
CHB-03F	3.6	80	90	2700	25
CHB-04D	3	80	91	3000	18
CHB-04H	5	80	93	2500	32

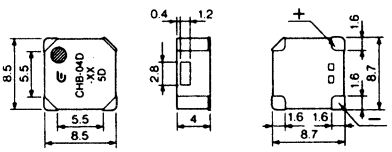
■ CHB-03D



■ CHB-03E/04F



■ CHB-04D/04H



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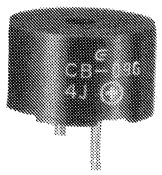
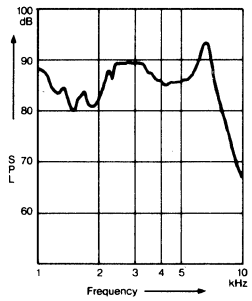
SMALL SIZE MAGNETIC SOUND GENERATORS—CB SERIES

CB-09GP

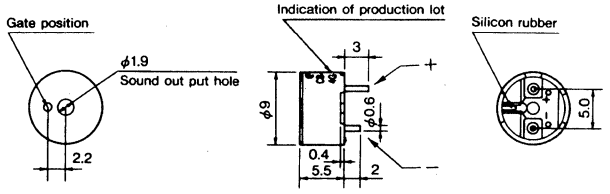
■ FREQUENCY CHARACTERISTICS





Connection Leads: P, W

■ OUTLINE DRAWING

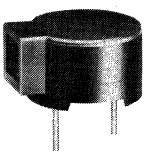


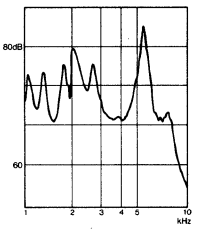
■ SPECIFICATIONS

Rated voltage	(VDC)	5	Direct current resistance	(Ω)	25
Average current consumption	(mA)	max. 100	Inductance	(mH)	1.2
Sound pressure	(dB)	min. 85 typ. 90 (at 10cm)	Operating voltage range	(VDC)	1.1 ~ 6.0
Resonance frequency	(Hz)	2,700	Net weight	(gr.)	0.7

CB-12QP-1/3*

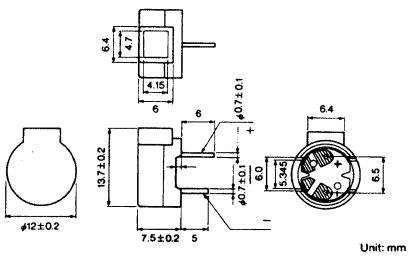
■ FREQUENCY CHARACTERISTICS





Connection Leads: P

■ OUTLINE DRAWING



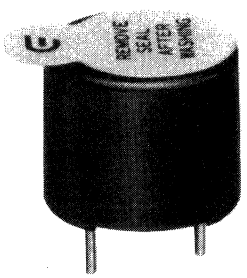
■ SPECIFICATIONS

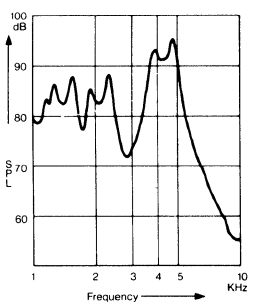
Rated voltage	(VDC)	1.5	Direct current resistance	(Ω)	42
Average current consumption	(mA)	max. 10	Inductance	(mH)	6.2
Sound pressure	(dB)	min. 70 typ. 76 (at 10cm)	Operating voltage range	(VDC)	1.0 ~ 2.0
Resonance frequency	(Hz)	2,048	Net weight	(gr.)	2

*For CB-12QP-3 Spec. Please Call GPE

CB-12TP

■ FREQUENCY CHARACTERISTICS





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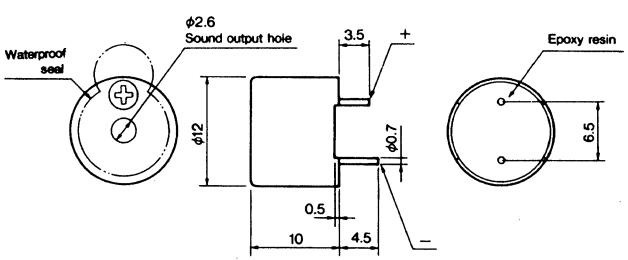
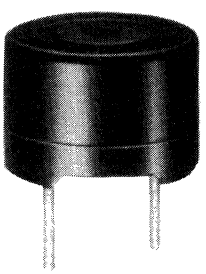


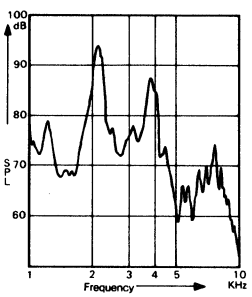
■ SPECIFICATIONS

Rated voltage	(VDC)	1.5	DC resistance	(Ω)	51
Average current consumption	(mA)	max. 8.5	Inductance	(mH)	3.8
Sound pressure level	(dB)	min. 85 typ. 89 (at 10cm)	Operating voltage range	(VDC)	1.1 ~ 1.7
Resonance frequency	(Hz)	4,096	Net weight	(grs.)	2

CB-12GP

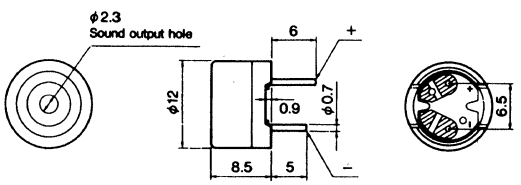
■ FREQUENCY CHARACTERISTICS





Connection Leads: P, W, N

■ OUTLINE DRAWING



MORE ON NEXT PAGE →

■ SPECIFICATIONS

Rated voltage	(VDC)	1.5	DC resistance	(Ω)	17
Average current consumption	(mA)	max. 24	Inductance	(mH)	1.8
Sound pressure level	(dB)	min. 85 typ. 90 (at 10cm)	Operating voltage range	(VDC)	1.1 ~ 1.7
Resonance frequency	(Hz)	2,048	Net weight	(grs.)	2

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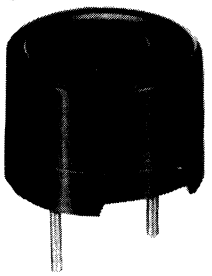
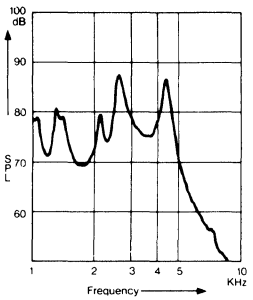
SMALL SIZE MAGNETIC SOUND GENERATORS—CB SERIES

CB-12CP



■ FREQUENCY CHARACTERISTICS



Connection Leads: P, W, N

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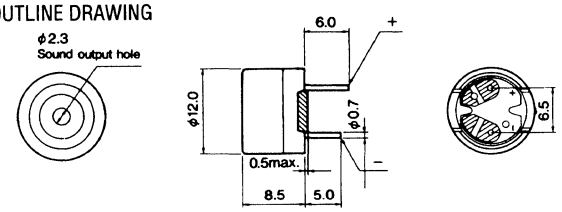
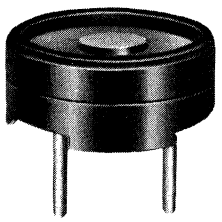


■ SPECIFICATIONS * 2048 Hz AVAILABLE

Rated voltage	(VDC)	1.5	DC resistance	(Ω)	42
Average current consumption	(mA)	max. 10	Inductance	(mH)	6.2
Sound pressure level	(dB)	min. 80 typ. 83 (at 10cm)	Operating voltage range	(VDC)	1.1 ~ 1.7
Resonance frequency	(Hz)	4,096*	Net weight	(grs.)	2

CB-12EP



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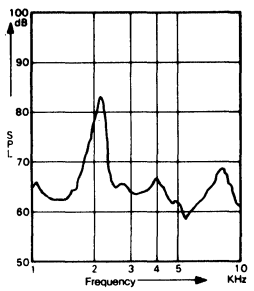
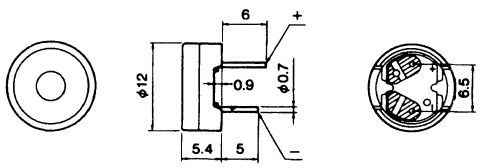


Connection Leads: P, W, N

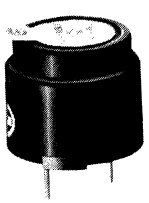
■ OUTLINE DRAWING



■ SPECIFICATIONS

Rated voltage	(VDC)	1.5	DC resistance	(Ω)	42
Average current consumption	(mA)	max. 10	Inductance	(mH)	6.2
Sound pressure level	(dB)	min. 70 typ. 77 (at 10cm)	Operating voltage range	(VDC)	1.1 ~ 1.7
Resonance frequency	(Hz)	2,048	Net weight	(grs.)	1.8

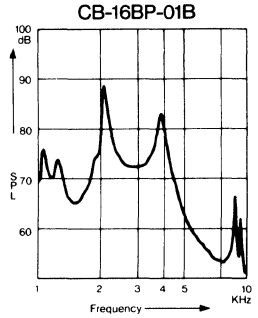
CB-16BP-01B
CB-16BP-06B
CB-16BP-12B



Washable Connection Leads: P

■ FREQUENCY CHARACTERISTICS

CB-16BP-01B



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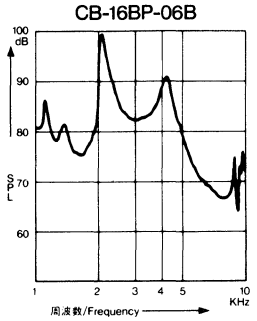

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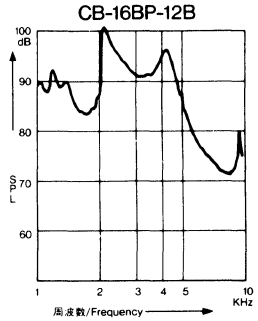


■ SPECIFICATIONS

Rated voltage	(VDC)	1.5	Direct current resistance	(Ω)	30
Average current consumption	(mA)	max. 6.8	Inductance	(mH)	6.4
Sound pressure	(dB)	min. 80 typ. 87 (at 10cm)	Operating voltage range	(VDC)	1.0 ~ 3.0
Resonance frequency	(Hz)	2,048	Net weight	(grs.)	5.0

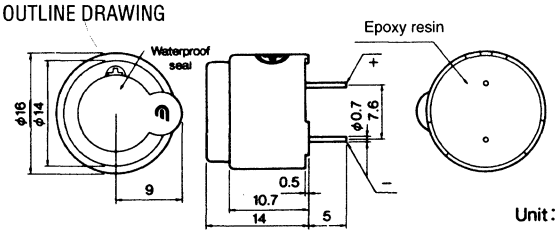
■ SPECIFICATIONS

Rated voltage	(VDC)	6.0	Direct current resistance	(Ω)	50
Average current consumption	(mA)	max. 24	Inductance	(mH)	8.6
Sound pressure	(dB)	min. 85 typ. 96 (at 10cm)	Operating voltage range	(VDC)	4.0 ~ 9.0
Resonance frequency	(Hz)	2,048	Net weight	(grs.)	5.0

■ SPECIFICATIONS

Rated voltage	(VDC)	12	Direct current resistance	(Ω)	115
Average current consumption	(mA)	max. 24	Inductance	(mH)	15
Sound pressure	(dB)	min. 85 typ. 96 (at 10cm)	Operating voltage range	(VDC)	6.0 ~ 18.0
Resonance frequency	(Hz)	2,048	Net weight	(grs.)	5.0

■ OUTLINE DRAWING



Unit: mm

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

← MORE ON PREVIOUS PAGE

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ELECTRONIC BUZZERS

FEATURES

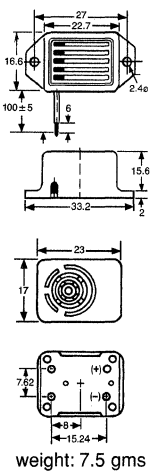
- Solid state reliability and long life
- Loud, rich sound
- No RF "Make & Break"noise
- 1.5 to 24VDC and 48VDC
- Easy to install
- Frequency: 400Hz ± 50Hz
- Low pitch
- Wide temperature ranges

APPLICATIONS

- Timers • Controls
- Computer Peripherals
- Automatic Warning
- Monitor Indicators
- Test Apparatus
- Intercoms

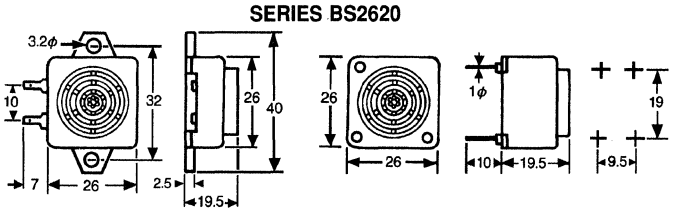
PART NUMBER	RATED VOLTAGE (VDC)	OPERATING VOLTAGE (VDC)	MAX. CURRENT (mA)	SOUND OUTPUT	TERMINAL TYPE	FREQUENCY	OPERATING TEMPERATURE
BS2316L-01	1.5	1.3-2	25	75 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BS2316L-03	3	2-5	25	75 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BS2316L-06	6	4-9	25	75 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BS2316L-09	9	6-15	25	75 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BS2316L-12	12	9-20	25	75 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BS2316L-24	24	10-27	25	75 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BS2316P-06-C	6	4-8	35	80 @ 30cm dB	4 Pins	400 ± 50Hz	-40° to +70°C
BS2316P-09-C	9	6-12	35	80 @ 30cm dB	4 Pins	400 ± 50Hz	-40° to +70°C
BS2316P-12-C	12	8-16	35	80 @ 30cm dB	4 Pins	400 ± 50Hz	-40° to +70°C
BS2316P-24-C	24	16-27	35	80 @ 30cm dB	4 Pins	400 ± 50Hz	-40° to +70°C
BS2620FV-03	3	2-4	70	75 @ 100cm dB	2 Fast-on	400 ± 50Hz	-40° to +70°C
BS2620FV-06	6	4-8	70	75 @ 100cm dB	2 Fast-on	400 ± 50Hz	-40° to +70°C
BS2620FV-12	12	8-16	60	75 @ 100cm dB	2 Fast-on	400 ± 50Hz	-40° to +70°C
BS2620FV-24	24	20-28	60	75 @ 100cm dB	2 Fast-on	400 ± 50Hz	-40° to +70°C
Low Current Trigger Models (1mA @ Rated Voltage)							
BS2620PH-03-C	3	2-4	30	75 @ 100cm dB	4 Pins	400 ± 50Hz	-40° to +70°C
BS2620PH-06-C	6	4-8	30	75 @ 100cm dB	4 Pins	400 ± 50Hz	-40° to +70°C
BS2620PH-12-C	12	8-16	20	75 @ 100cm dB	4 Pins	400 ± 50Hz	-40° to +70°C
BS2620PH-24-C	24	20-28	20	75 @ 100cm dB	4 Pins	400 ± 50Hz	-40° to +70°C
BR2818L-01	1.5	1.3-2	35	80 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BR2818L-03	3	2-5	35	80 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BR2818L-06	6	4-9	35	80 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BR2818L-09	9	6-15	35	80 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BR2818L-12	12	9-20	35	80 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BR2818L-24	24	20-28	35	85 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C
BR2818L-48	48	30-54	35	85 @ 30cm dB	2 Leadwires	400 ± 50Hz	-40° to +70°C

SERIES BS2316



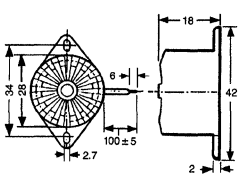
weight: 7.5 gms

SERIES BS2620



weight: 15 gms

SERIES BR2818



weight: 18 gms

Surface Mount Electro-Acoustic Transducers

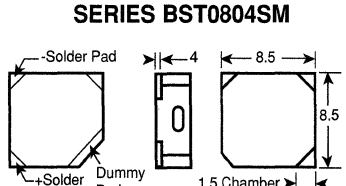
Small and lightweight, these Intervox devices are perfect for use in cellular phones, pocket pagers, scanners and any limited space application. Combined with their obvious size and weight advantages, they provide the Sound Pressure Levels (SPL) of conventional devices.

Designed for large scale production, these units are packaged tape and reel or in sleeves for automated re-flow processes.

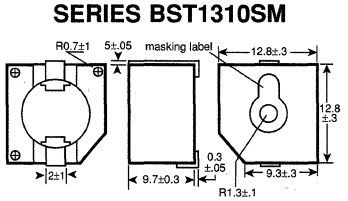
PART NUMBER	RATED VOLTAGE (VDC)	OPERATING VOLTAGE (VDC)	MAX. CURRENT (mA)*	COIL RESISTANCE (Ohms)	SLP OUTPUT (dB) @ 10cm (Typical)*	RESONANT FREQUENCY (Hz)	OPERATING TEMP. RANGE °C
BST0804SM-03	3	2.5-6.5	100	15±5	85dB	2300Hz	-30° to +60°
BST1310SM-05	5	4-7	40	47	90dB	2400Hz	-20° to +70°
BST1310SM-05-C	5	4-7	30	Not applicable w/ built-in circuit	85dB	2300±300Hz	-40° to +70°
BST1403SM-01	1.5	1.2-1.7	80	9±2	85dB	3200Hz	-10° to +50°

*Value Applying Rated Voltage (2,048Hz ½ Duty, Square Wave)

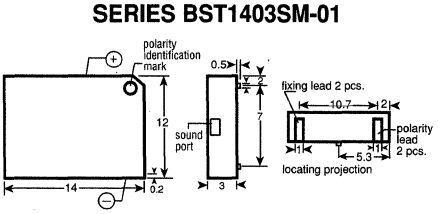
SERIES BST0804SM



SERIES BST1310SM



SERIES BST1403SM-01



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ELECTRO ACOUSTIC TRANSDUCERS

PART NUMBER	RATED VOLTAGE (VDC)	OPERATING VOLTAGE (VDC)	MAX. CURRENT (mA)	SOUND OUTPUT*	COIL RESISTANCE (Ohms)	COIL IMPEDANCE (Ohms)**	TERMINAL TYPE	FREQUENCY	OPERATING TEMPERATURE
BRT0907P-01	1.5	1-2	80	80dB@10cm	5.5±1	9.5	2 Pins	3100Hz	-20° to + 60°C
BRT1206P-01	1.5	1-2	10	70dB@10cm	50	140	2 Pins	2048Hz	-20° to + 60°C
BRT1207P-01-SEHA	1.5	1-2	70	80dB@10cm	6.5	16	2 Pins	2048Hz	-20° to + 60°C
BRT1207P-01-SEHB	1.5	1-2	70	75dB@10cm	6.5	22	2 Pins	2731Hz	-20° to + 60°C
BRT1207P-01-SEHC	1.5	1-2	10	70dB@10cm	15	40	2 Pins	2048Hz	-20° to + 60°C
BRT1209L-01	1.5	1-2	30	80dB@10cm	16	40	2 Leadwires	2048Hz	-20° to + 60°C
BRT1209P-01	1.5	1-2	30	80dB@10cm	16	40	2 Pins	2048Hz	-20° to + 60°C
BRT1209L-01-50	1.5	1-2	10	80dB@10cm	50	140	2 Leadwires	2048Hz	-20° to + 60°C
BRT1209P-01-50	1.5	1-2	10	80dB@10cm	50	140	2 Pins	2048Hz	-20° to + 60°C
BRT1209PF-01	1.5	1-3	40	75dB@10cm	15	55	2 Pins	2400Hz	-40° to + 85°C
BRT1209PF-06	5	4-8	40	85dB@10cm	50	80	2 Pins	2400Hz	-40° to + 85°C
BRT1209PF-12	12	7-15	40	85dB@10cm	140	240	2 Pins	2400Hz	-40° to + 85°C
BRT1209PF-05-RA	5	4-8	40	85dB@10cm	50	80	2 Pins	2400Hz	-40° to + 85°C
BRT1209P-01-C	1.5	1.2-3	30	70dB@10cm	Not Applicable for Types with Built-in Drive Circuit		2 Pins	2500Hz	-20° to + 70°C
BRT1209P-06-C	5	4-8	30	80dB@10cm			2 Pins	2300Hz	-20° to + 70°C
BRT1209P-12-C	12	7-15	30	80dB@10cm			2 Pins	2300Hz	-20° to + 70°C
BRT1612P-12	12	6-15	50	85dB@10cm	135±20	210	2 Pins	1700-2200Hz	-40° to +90°C
BRT1615P-01	1.5	1-3	12	80dB@10cm	30	80	2 Pins	2048Hz	-20° to + 70°C
BRT1615P-06	6	3-12	40	85dB@10cm	50	110	2 Pins	2048Hz	-20° to + 70°C
BRT1615P-12	12	6-18	40	85dB@10cm	115	200	2 Pins	2048Hz	-20° to + 70°C
BRT1615P-01-C	1.5	1.2-2	20	75dB@10cm	Not Applicable for Types with Built-in Drive Circuit		2 Pins	2300Hz	-20° to + 70°C
BRT1615P-06-C	6	4-7	30	85dB@10cm			2 Pins	2200Hz	-20° to + 70°C
BRT1615P-12-C	12	8-16	30	85dB@10cm			2 Pins	2200Hz	-20° to + 70°C
BST1811P-06	6	3-10	40	85dB@10cm	60±9	90	2 Pins	2000-2500Hz	-30° to + 85°C
BRT2513P-06	5	3-5	80	85dB@10cm	27±4	38	2 Pins	730Hz	-40° to + 85°C

*Value Applying Rated Voltage (2,048Hz ½ Duty, Square Wave)

**Value Applying (2,048Hz, Sine Wave, Measuring Current 60μA

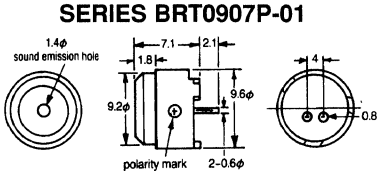
FEATURES

- Extremely small and lightweight
- Dependability and long life
- No electronic noise due to mechanical contact
- As small as 9.2mm
- Low voltage–as little as 1.5VDC
- Resonant frequencies as low as 1000Hz
- Wide temperature ranges

APPLICATIONS

- Pocket Pagers • Alarm Clocks
- Digital Clocks • Counters
- Calculators • Monitors • Scanners
- Typewriters • Cameras • Beepers
- Computers–PC and Laptop

SERIES BRT0907P-01



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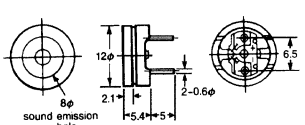
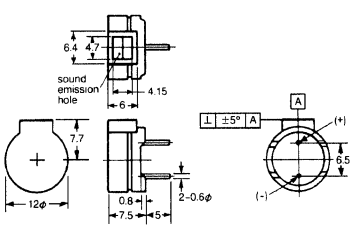
SERIES BRT1206P-01



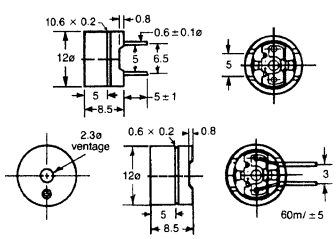
weight: 2 gms

SERIES BRT1207P-SEH



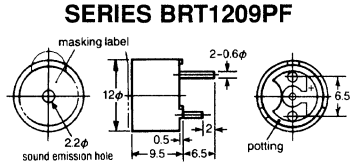
weight: 2 gms

SERIES BRT1209



weight: 2 gms

SERIES BRT1209PF

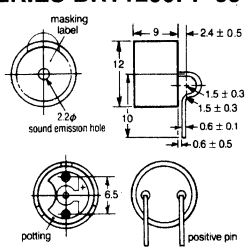


weight: 2 gms

SERIES BRT1209-C

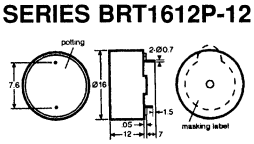
Same as BRT1209-PF but with 7.6mm pin spacing.

SERIES BRT1209PF-05-RA



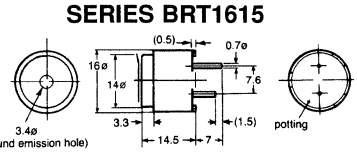
weight: 2 gms

SERIES BRT1612P-12



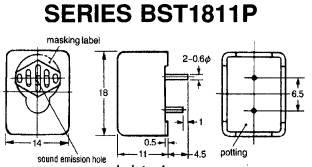
weight: 7 gms

SERIES BRT1615



weight: 7 gms

SERIES BST1811P



weight: 4 gms

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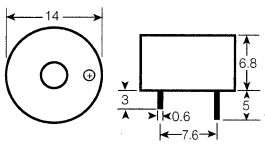
PIEZO ELECTRICS

FEATURES
- SPL output–75 to 115dB
- 9, 12, 24 VDC
- Low profile, compact design
- Distinctive tone
- Consistent, high reliability
- Long operating life
- Low power consumption
- Variety of frequencies
- Lightweight

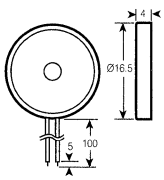
APPLICATIONS
- Fire & Burglary Alarms
- Smoke & Gas Detectors
- Home Appliances • Fans
- Conveyors • Medical Instruments
- Keyboards • Chimes • Modems
- Auto Backup Warning
- Dashboard Gauge Alerts
- Vending Machines
- Fish Finders • Toys & Games
- Industrial Equipment

SERIES BRP1407P-20



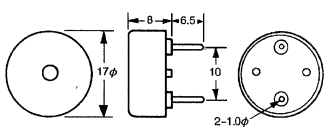
weight: 1 gm

SERIES BRP1704L-30



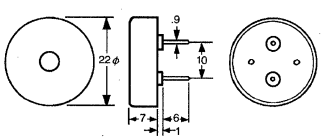
weight: 1 gm

SERIES BRP1708P-30



weight: 2.5 gms

SERIES BRP2207P-30

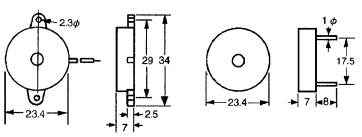


weight: 3 gms

PIEZO ELECTRICS – *EXTERNAL DRIVE*

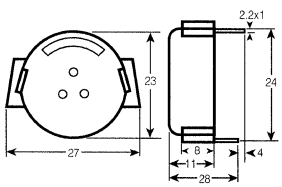
PART NUMBER	RESONANT FREQUENCY (Hz)	ELECTROSTATIC CAPACITY (PF)	MAX INPUT VOLTAGE	TERMINAL TYPE	OPERATING TEMPERATURE	SOUND PRESSURE LEVEL
BRP1407P-20	4096Hz	10000 ± 30%	20Vp-p	2 Pins	-20˚ to +70˚C	80dB@10cm 5Vp-p
BRP1704L-30	4000 ± 1000	10000 ± 30%	30Vp-p	2 Leadwires	-20˚ to +60˚C	80dB@10cm 9Vp-p
BRP1708P-30	4500 ± 500	8000 ± 30%	30Vp-p	2 Pins	-20˚ to +60˚C	95dB@30cm 10Vp-p
BRP2207P-30	4000 ± 500	12000 ± 30%	30Vp-p	2 Pins	-40˚ to +120˚C	95dB@30cm 10Vp-p
BRP2407L-30 BRP2407P-30	5600 ± 600 5600 ± 600	10000 ± 30% 10000 ± 30%	30Vp-p 30Vp-p	2 Leadwires 2 Pins	-20˚ to +60˚C -20˚ to +60˚C	90dB@30cm 10Vp-p 90dB@30cm 10Vp-p
BRP2711P-30	5600 ± 600	10000 ± 30%	30Vp-p	2 Pins	-20˚ to +60˚C	90dB@30cm 10Vp-p
BRP3005L-30	4500 ± 500	20000 ± 30%	30Vp-p	2 Leadwires	-20˚ to +60˚C	95dB@30cm 10Vp-p
BRP3008P-30 BRP3008P-30-LF	4600 ± 500 2800 ± 500	20000 ± 30% 20000 ± 30%	30Vp-p 30Vp-p	2 Pins 2 Pins	-20˚ to +60˚C -20˚ to +60˚C	90dB@10cm 5Vp-p 95dB@ 10cm 30Vp-p
BSP3206FV-30	3000 ± 500	16000 ± 30%	30Vp-p	2 Fast-On	-20˚ to +60˚C	95dB@30cm 10Vp-p

SERIES BRP2407



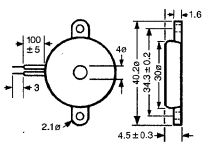
weight: 3 gms

SERIES BRP2711P-30



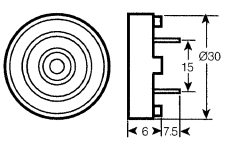
weight: 6 gms

SERIES BRP3005



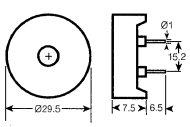
weight: 4.5 gms

SERIES BRP3008P-30



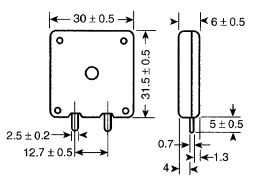
weight: 5 gms

SERIES BRP3008P-30-LF



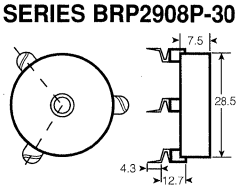
weight: 5 gms

SERIES BSP3206



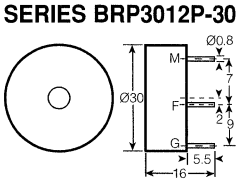
weight: 6 gms

SERIES BRP2908P-30



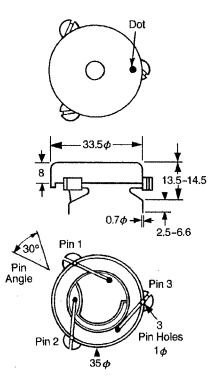
weight: 3.2 gms

SERIES BRP3012P-30



weight: 5 gms

SERIES BRP3408P-30

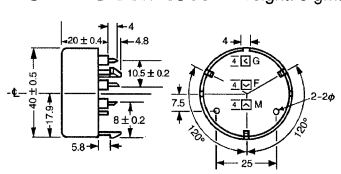


weight: 4 gms

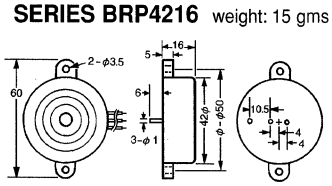
PIEZO ELECTRICS – *SELF DRIVE*

PART NUMBER	RESONANT FREQUENCY (Hz)	ELECTROSTATIC CAPACITY (PF)	MAX INPUT VOLTAGE	TERMINAL TYPE	OPERATING TEMPERATURE	SOUND PRESSURE LEVEL
BRP2908P-30	3500 ± 500	25000 ± 30%	30Vp-p	3 Pins	-20˚ to +70˚C	85dB@10cm 12Vp-p
BRP3012P-30	3600 ± 500	25000 ± 30%	30Vp-p	3 Pins	-20˚ to +60˚C	88dB@10cm 12Vp-p
BRP3408P-30	2500 ± 500	25000 ± 30%	30Vp-p	3 Pins	-20˚ to +60˚C	95dB@30cm 15Vp-p
BRP4016P-30	3200 ± 500	30000 ± 30%	30Vp-p	3 Pins	-20˚ to +60˚C	95dB@30cm 9Vp-p
BRP4216L-30 BRP4216P-30	3000 ± 500 3000 ± 500	25000 ± 30% 25000 ± 30%	30Vp-p 30Vp-p	3 Leadwires 3 Pins	-20˚ to +60˚C -20˚ to +60˚C	85dB@1M 15Vp-p 85dB@1M 15Vp-p

SERIES BRP4016P weight: 6 gms



SERIES BRP4216 weight: 15 gms



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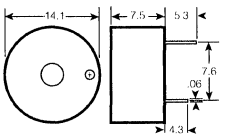
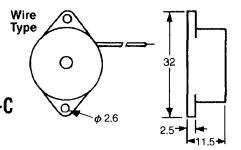
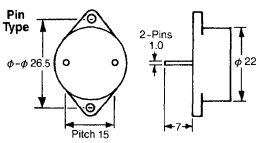
PIEZO ELECTRICS *with Internal Circuitry @ 30cm dB*

SERIES BRP1408P-12-CS
weight: 1 gm

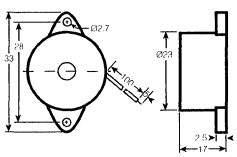


SERIES BRP2212L-12-C
weight: 4 gms

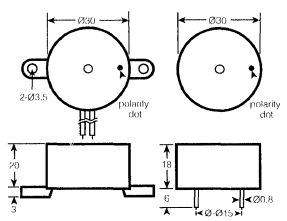




SERIES BRP2317L-12-C
weight: 5 gms



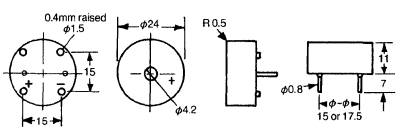
SERIES BRP3018
weight: 10.5 gms



PART NUMBER	RATED VOLTAGE (VDC)	OPERATING VOLTAGE (VDC)	MAX. CURRENT (mA)	SOUND OUTPUT LEVEL	TERMINAL TYPE	TONE MODE PULSE/SECOND	FREQUENCY	OPERATING TEMPERATURE
BRP1408P-12-CS	12	3-16	7	80dB@30cm	2 Pins	Continuous	4000 ± 500Hz	-40° to +120°C
BRP2211P-12-CS	12	3-15	4.5	75dB@100cm	2 Pins	Continuous	4000 ± 500Hz	-40° to +120°C
BRP2212L-12-C	12	3-15	4.5	90dB@30cm	2 Leadwires	Continuous	4000 ± 500Hz	-10° to +60°C
BRP2317L-12-C	12	3-16	8	90dB@30cm	2 Leadwires	Continuous	3700 ± 500Hz	-20° to +60°C
BRP2411P-12-CFS*	12	3-15	10	90dB@30cm	2 Pins	Continuous	3700 ± 500Hz	-40° to +120°C
BRP2416P-12-C	12	3-20	10	85dB@30cm	2 Pins	Continuous	2800 ± 500Hz	-20° to +70°C
BRP2416P-12-CFS*	12	3-20	10	85dB@30cm	2 Pins	Continuous	2800 ± 500Hz	-20° to +70°C
BRP3018L-12-C	12	3-15	10	90dB@30cm	2 Leadwires	Continuous	2000 ± 500Hz	-10° to +60°C
BRP3018P-12-C	12	3-15	10	90dB@30cm	2 Pins	Continuous	2000 ± 500Hz	-10° to +60°C
BRP3025L-12-C	12	1.5-16	15	95dB@30cm	2 Leadwires	Continuous	3500 ± 500Hz	-20° to +60°C
BRP3025L-24-C	24	1.5-28	20	95dB@30cm	2 Leadwires	Continuous	3500 ± 500Hz	-20° to +60°C
BRP4222T-24-C	24	1-28	15	85dB@30cm	2 Lugs	Continuous	2900 ± 500Hz	-20° to +60°C
BRP4526L-12-C	12	1-13	35	105dB@30cm	2 Leadwires	Continuous	2900 ± 500Hz	-20° to +60°C
BRP4526P-12-C	12	1-13	35	105dB@30cm	2 Pins	Continuous	2900 ± 500Hz	-20° to +60°C
BRP4535S-12-C	12	1-16	30	100dB@30cm	2 Screw Lugs	Continuous	2900 ± 500Hz	-20° to +60°C
BRP4535S-24-C	24	1-28	15	90dB@30cm	2 Screw Lugs	Continuous	2900 ± 500Hz	-20° to +60°C
BRP4535S-12-CP	12	4-16	20	90dB@30cm	2 Screw Lugs	Intermitt: 0.8-1.2	2900 ± 500Hz	-20° to +60°C
BRP4535S-24-CP	24	4-28	22	80dB@30cm	2 Screw Lugs	Intermitt: 0.8-1.2	2900 ± 500Hz	-20° to +60°C
BRP4535S-12-CP1	12	4-16	20	90dB@30cm	2 SCrew Lugs	Intermitt: 4-6	2900 ± 500Hz	-20° to +60°C
BRP4535S-24-CP1	24	4-28	22	80dB@30cm	2 Screw Lugs	Intermitt: 4-6	2900 ± 500Hz	-20° to +60°C
BRP4535S-24-CD	24	4-28	30/20	85/80dB@30cm	3 Screw Lugs	Cont/Interm: 0.8-1.2	2900 ± 500Hz	-20° to +60°C

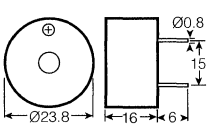
*Indicates Wave Solderable & Washable

SERIES BRP2411P-12-CFS



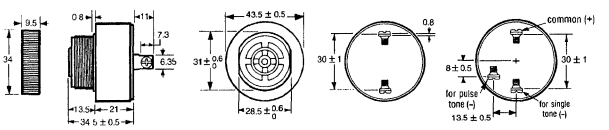
weight: 4 gms

SERIES BRP2416P-12-C



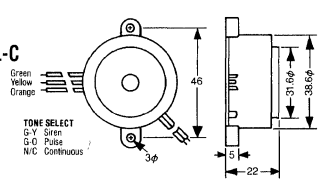
weight: 5 gms

SERIES BRP4535
weight: 7.5 gms

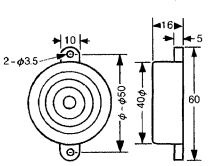


SOUNDERS *Internal Circuitry (100dB or Greater @ 1 Meter [100cm])*

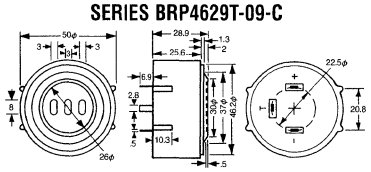
SERIES BRP3922L-C



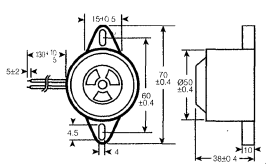
SERIES BRP4016



SERIES BRP4629T-09-C

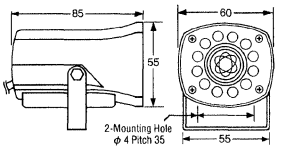


SERIES BRP5038L

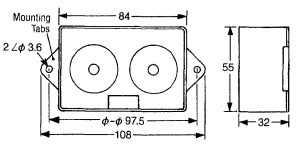


PART NUMBER	RATED VOLTAGE (VDC)	OPERATING VOLTAGE (VDC)	MAX. CURRENT (mA)	SOUND OUTPUT LEVEL	TERMINAL TYPE	TONE MODE PULSE/SECOND	FREQUENCY	OPERATING TEMPERATURE
BRP3922L-12-CT3	12	6-15	95	107dB@1M	5 Leadwires	3 Tone	2800Hz	-20° to +70°
BRP3922L-24-CT3	24	6-28	85	109dB@1M	5 Leadwires	3 Tone	2800Hz	-20° to +70°
BRP4016L-12-C	12	3-24	18	100dB@1M	2 Leadwires	Continuous	2800 ± 300Hz	-20° to +60°
BRP4016L-12-CP	12	3-24	18	100dB@1M	2 Leadwires	Intermitt: 1-1	2800 ± 300Hz	-20° to +60°
BPS4228L-12-C	12	6-15	90	107dB@1M	2 Leadwires	Siren	2800Hz	-20° to +70°
BPS4228L-24-C	24	6-28	50	109dB@1M	2 Leadwires	Siren	2800Hz	-20° to +70°
BPS4358L-12-C		6-12	160	105dB@1M	2 Leadwires	Siren	2500 - 3000Hz	-20° to +70°
BRP4629T-09-C	9	5-13	70	105dB@1M	3 Lugs	Continuous	2000 - 3000Hz	-20° to +65°
BRP5038L-12-C	12	1.5-16	45	105dB@30cm	2Leadwires	Continuous	3200 ± 500Hz	-20° to +60°
BRP5038L-12-CP	12	3-16	45	105dB@30cm	2 Leadwires	Intermitt: 0.8-1.2	3200 ± 500Hz	-20° to +60°
BRP5038L-12-CP1	12	3-16	45	105dB@30cm	2Leadwires	Intermitt: 2-3	3200 ± 500Hz	-20° to +60°
BRP5038L-12-CD	12	6-16	65	105dB@30cm	3 Leadwires	Dual	3200 ± 500Hz	-20° to +60°
BPS6055L-12-C	12	6-12	350	115dB@1M	2 Leadwires	Siren	2500 - 3000Hz	-20° to +70°
BPS8432L-12-C	12	6-15	85	105dB@1M	2 Leadwires	Continuous	2500 - 2800Hz	-20° to +70°
BPS8432L-24-C	24	6-28	45	105dB@1M	2 Leadwires	Continuous	2500 - 2800Hz	-20to +70°
BPS9234S-12-C	12	6-15	300	115dB@1M	Screw	3-Tone	2800Hz	-20° to +70°
BPS9234S-24-C	24	6-28	150	115dB@1M	Screw	Cont., Siren or Pulse	2800Hz	-20° to +70°

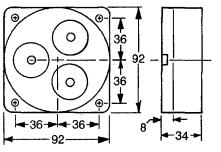
SERIES BPS6055L



SERIES BPS8432L



SERIES BPS9234S



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MINIATURE SPEAKERS

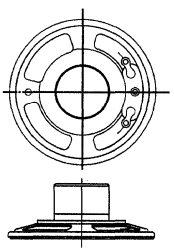
General Purpose *Alnico Magnets*

FEATURES • Miniature and sub-miniature sizes • Low profile • Alnico, ferrite, samarium cobalt magnets • Paper and mylar cones • 4 to 100 ohms impedance • Round and square types • Standard and P.C. mounting

APPLICATIONS • Computer Peripherals • Modems • Telephones • Security • Electronic Timers • Chimes • Recorders • Clocks • Intercoms

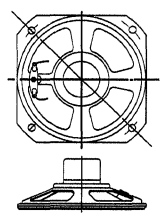
Round Metal Frame Types

PART NUMBER	RATED POWER (watts) Nom.	Max.	VOICE COIL IMPEDANCE (Ohms)	RESONANT FREQUENCY (Hz)	FREQUENCY RESPONSE (Hz)	MAGNET WEIGHT (Ounces)	FRAME DEPTH (mm)	FRAME DIAMETER (mm)	NET WEIGHT (Ounces)
S150RA	0.1	0.2	8 ± 15%	500 ± 100	Fo~5200	0.35	15.8	38.0	0.79
S200RA	0.2	0.5	8 ± 15%	450 ± 90	Fo~4500	0.35	19.1	50.0	1.39
S225RA	0.2	0.5	8 ± 15%	400 ± 90	Fo~4500	0.35	20.0	57.0	1.45
S250RA	0.2	0.3	8 ± 15%	330 ± 90	Fo~5000	0.35	21.0	66.0	1.55
S275RA	0.3	0.6	8 ± 15%	280 ± 90	Fo~5000	0.35	21.8	70.0	1.62
S300RA	0.25	0.5	8 ± 15%	250 ± 90	Fo~5000	0.35	23.2	77.0	1.71
S350RA	0.5	1.0	8 ± 15%	190 ± 40	Fo~12000	0.36	27.2	92.0	2.04
S400RA	0.5	1.0	8 ± 15%	180 ± 40	Fo~20000	0.36	35.1	102.0	2.40



Square Metal Frame Types

PART NUMBER	RATED POWER (watts) Nom.	Max.	VOICE COIL IMPEDANCE (Ohms)	RESONANT FREQUENCY (Hz)	FREQUENCY RESPONSE (Hz)	MAGNET WEIGHT (Ounces)	FRAME DEPTH (mm)	FRAME DIAMETER (mm)	NET WEIGHT (Ounces)	MOUNTING DIMENSIONS DIA. (mm)
S200SA	0.1	0.2	8 ± 15%	450 ± 90	Fo~5000	0.35	18.0	50.5	1.46	56.5
S250SA	0.5	0.8	8 ± 15%	350 ± 50	Fo~5000	0.35	21.4	66.5	1.65	73.5
S300SA	0.25	0.5	8 ± 15%	250 ± 50	Fo~5000	0.35	25.0	77.0	1.98	85.5
S350SA	0.5	1.0	8 ± 15%	190 ± 38	Fo~12000	0.35	27.0	92.0	2.12	103.0
S400SA	0.5	1.0	8 ± 15%	180 ± 36	Fo~20000	0.35	33.6	102.0	5.29	115.0



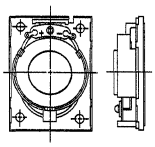
All of the above speakers are supplied with paper cones and alnico magnets. On a special order basis, these speakers can be supplied with mylar cones, ferrite or rare earth magnets, and a variety of voice coil impedances. The most common impedances are 4, 16, 32, 45, and 100 ohms.

Shielded Low Leakage Types *For Computer and TV Applications, etc.*

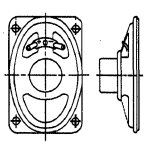
Oval Frame Types Standard Voice Coil Impedance 8 Ohms ± 15%

PART NUMBER	RATED POWER (watts) NOM.	MAX.	RESONANT FREQUENCY (Hz)	FREQUENCY RESPONSE (Hz)	MAGNET TYPE	MAGNET WEIGHT (Ounces)	FRAME DEPTH (mm)	FRAME DIAMETER (mm)	NET WEIGHT (Ounces)	MOUNTING DIMENSIONS DIA. (mm)
S11X16VN	1.0	2.0	350 ± 20%	Fo~12000	Rare Earth	0.06	11.8	31.1 x 42.6	0.42	22.5 x 34
S15X25VA	2.0	5.0	280 ± 20%	Fo~15000	Alnico	0.41	29.8	40 x 70	1.90	33.4 x 63.4
S20X35VFS-2W	2.0	3.0	200 ± 20%	Fo~20000	Ferrite	1.16	37.5	50 x 90	4.23	40 x 75
S20X35VFS-5W	5.0	7.0	200 ± 20%	Fo~20000	Ferrite	1.82	41.6	50 x 90	6.66	42.5 x 75

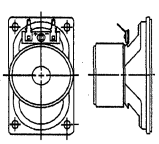
S11X16VN



S15X25VA



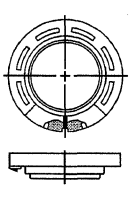
S20X35VFS



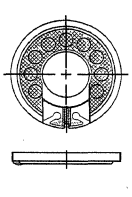
Micro-Miniature Low Profile *Height Less Than 6.5mm*

Round Plastic Frame Types Standard Voice Coil Impedance 8 Ohms ± 15%

PART NUMBER	RATED POWER (watts) NOM.	MAX.	CONE MATERIAL	RESONANT FREQUENCY (Hz)	FREQUENCY RESPONSE (Hz)	MAGNET TYPE	FRAME DEPTH (mm)	FRAME DIAMETER (mm)	NET WEIGHT (Grams)
S100RMFL	0.1	0.2	Mylar	650 ± 20%	Fo~4800	Ferrite	5.6	25	6.0
S125RMFL	0.1	0.2	Mylar	670 ± 20%	Fo~5000	Ferrite	6.0	29	8.2
SR800RMS	0.1	0.2	Mylar	850 ± 20%	Fo~7000	Rare Earth	4.0	20	1.7
S100RMSS	0.1	0.2	Mylar	530 ± 20%	Fo~5000	Rare Earth	4.0	28	2.9
S125RMSS	0.2	0.3	Mylar	500 ± 20%	Fo~6000	Rare Earth	4.0	30	2.9
S150RMSS	0.1	0.2	Mylar	420 ± 20%	Fo~6000	Rare Earth	3.9	36	4.2
S150RMSS-R2W	0.2	0.3	Mylar	460 ± 20%	Fo~5000	Rare Earth	3.9	36	4.2
S160RMSS	0.2	0.4	Mylar	430 ± 20%	Fo~4000	Rare Earth	4.3	40	5.2



Ferrite



Rare Earth

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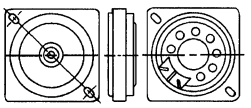
MINIATURE SPEAKERS

Micro-Miniature Low Profile *Height Less Than 6.5mm*

Square Plastic Frame Types Standard Voice Coil Impedance 8 Ohms ± 15%

PART NUMBER	RATED POWER (watts) NOM.	MAX.	CONE MATERIAL	RESONANT FREQUENCY (Hz)	FREQUENCY RESPONSE (Hz)	MAGNET TYPE	FRAME DEPTH (mm)	FRAME DIAMETER (mm)	NET WEIGHT (Grams)	MOUNTING DIMENSIONS DIA. (mm)
S125SLA	0.2	0.3	Mylar	860 ± 20%	Fo~6000	Rare Earth	4.5	32 x 32	3.6	37.5
S150SLA	0.2	0.3	Mylar	460 ± 20%	Fo~5000	Rare Earth	4.5	40 x 40	5.8	46.6
S150SLA-R5W	0.5	1.0	Mylar	550 ± 20%	Fo~10000	Rare Earth	4.8	40 x 40	9.0	47.0

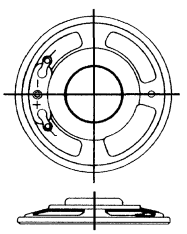


These speakers are available, on a special order basis, in a variety of voice coil impedances. The most common impedances are 4, 16, 32, 45 & 100 ohms.

Sub-Miniature Low Profile *Height More Than 6.5mm*

Round Metal Frame Types Standard Voice Coil Impedance 8 Ohms ± 15%

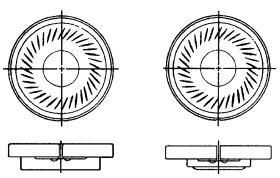
PART NUMBER	RATED POWER (watts) NOM.	MAX.	CONE MATERIAL	RESONANT FREQUENCY (Hz)	FREQUENCY RESPONSE (Hz)	MAGNET TYPE	FRAME DEPTH (mm)	FRAME DIAMETER (mm)	NET WEIGHT (Grams)
S150RLS	0.1	0.2	Paper	700 ± 20%	Fo~5000	Rare Earth	8.0	38	10.4
S150RL-R2W	0.25	0.5	Paper	540 ± 20%	Fo~4000	Rare Earth	8.2	40	10.4
S175RL	0.1	0.2	Paper	470 ± 20%	Fo~4500	Rare Earth	8.3	44.5	11.8
S200RL	0.25	0.5	Paper	450 ± 20%	Fo~4500	Rare Earth	9.0	50	12.8
S200RL-R2W	0.25	0.5	Paper	480 ± 20%	Fo~4000	Rare Earth	8.8	50	12.8
S225RL	0.3	0.5	Paper	400 ± 20%	Fo~4800	Rare Earth	9.6	57	14.8
S225RL-R3W	0.3	0.5	Paper	390 ± 20%	Fo~3800	Rare Earth	9.7	57	14.8



Round Plastic Frame Types Standard Voice Coil Impedance 8 Ohms ± 15%

PART NUMBER	RATED POWER (watts) NOM.	MAX.	CONE MATERIAL	RESONANT FREQUENCY (Hz)	FREQUENCY RESPONSE (Hz)	MAGNET TYPE	FRAME DEPTH (mm)	FRAME DIAMETER (mm)	NET WEIGHT (Grams)
SR800RMF	0.1	0.2	Mylar	680 ± 20%	Fo~5500	Ferrite	8.9	20	7.4
S100RMF	0.1	0.2	Mylar	750 ± 20%	Fo~4500	Ferrite	8.8	27	7.6
S125RMF	0.1	0.2	Mylar	710 ± 20%	Fo~4000	Ferrite	8.5	29	8.2
S150RMF	0.1	0.2	Mylar	250 ± 20%	Fo~5500	Ferrite	9.5	40	16.0
S150RMFS	0.1	0.2	Mylar	540 ± 20%	Fo~4000	Ferrite	8.3	38	18.2

Ferrite Rare Earth

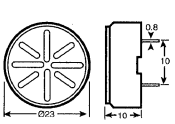


PC Mount

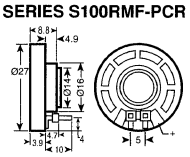
Round Plastic Frame Types
Standard Voice Coil Impedance 8 Ohms ± 15%

PART NUMBER	RATED POWER (watts) NOM.	MAX.	CONE MATERIAL	RESONANT FREQUENCY (Hz)	FREQUENCY RESPONSE (Hz)	MAGNET TYPE	FRAME DEPTH (mm)	FRAME DIAMETER (mm)	NET WEIGHT (Grams)	TERMINATION & SPACING
SR900R-PC	0.1	0.2	Mylar	850 ± 20%	Fo~3500	Rare Earth	10.0	23	3.6	2 Pin - 10mm
S100RMF-PCR	0.1	0.2	Mylar	670 ± 20%	Fo~7000	Rare Earth	8.8	27	7.8	2 Pin - 5mm
S110R-PC	0.15	0.2	Mylar	1000 ± 20%	Fo~5500	Rare Earth	12.0	30	10.0	2 Pin - 15mm
S125R-PC	0.15	0.2	Mylar	1100 ± 20%	Fo~4000	Rare Earth	15.0	32	12.9	2 Pin - 17.5mm

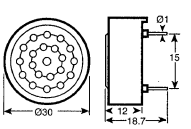
SERIES SR900R-PC



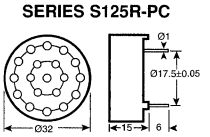
SERIES S100RMF-PCR



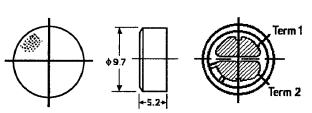
SERIES S110R-PC



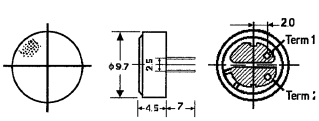
SERIES S125R-PC



ELECTRET CONDENSER MICROPHONES



PAD



PIN

Omnidirectional

PART NUMBER	FIG	SENSITIVITY (0dB=V/ubar, 1KHz)	FREQUENCY RANGE	OPERATING VOLTAGE Std.	Max.	CURRENT CONSUMPTION Max.	SENSITIVITY REDUCTION	S/N RATIO	PHYSICAL SIZE (mm)
MEO-96PD-01-603	PAD	-60±3dB	20~16,000Hz	1.5V	10V	0.3mA	within -3dB @ 1V	>60dB	9.7 x 6.7
MEO-96PN-01-603	PIN	-60±3dB	20~16,000Hz	1.5V	10V	0.3mA	within -3dB @ 1V	>60dB	9.7 x 6.7
MEO-65PD-02-623	PAD	-62±3dB	20~20,000Hz	2.0V	10V	0.5mA	within -3dB @ 1.5V	>58dB	6.0 x 5.2
MEO-65PN-02-623	PIN	-62±3dB	20~20,000Hz	2.0V	10V	0.5mA	within -3dB @ 1.5V	>58dB	6.0 x 5.2
MEO-64PD-02-643	PAD	-64±3dB	20~16,000Hz	2.0V	10V	0.5mA	within -3dB @ 1.5V	>58dB	6.0 x 3.5
MEO-95PD-01-603	PAD	-60±3dB	20~16,000Hz	1.5V	10V	0.3mA	within -3dB @ 1.1V	>60dB	9.7 x 5.2
MEO-95PN-01-603	PIN	-60±3dB	20~16,000Hz	1.5V	10V	0.3mA	within -3dB @ 1.1V	>60dB	9.7 x 5.2

Unidirectional

MEU-95PD-01-674	PAD	-67±4dB	100~16,000Hz	1.5V	10V	0.5mA	within -3dB @ 1V	>58dB	9.7 x 5.2
MEU-65PD-02-704	PAD	-70±4dB	100~12,000Hz	2.0V	10V	0.5mA	within -3dB @ 1.5V	>55dB	6.0 x 5.2

Noise Cancelling

MEC-95PD-01-744	PAD	-74±4dB	100~10,000Hz	1.5V	10V	0.5mA	within -3dB @ 1V	>58dB	9.7 x 5.2

INTERNATIONAL ELECTRO-MAGNETICS, INC.
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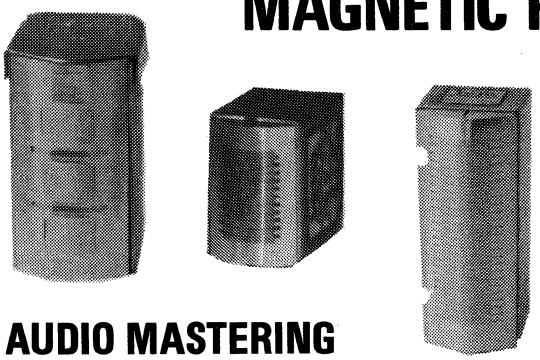
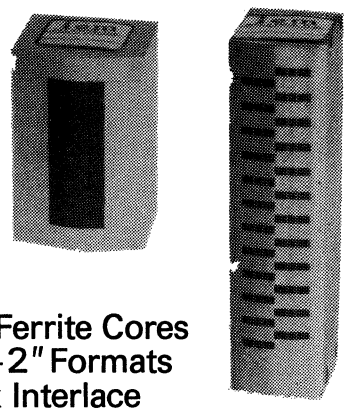
MAGNETIC RECORDING HEADS



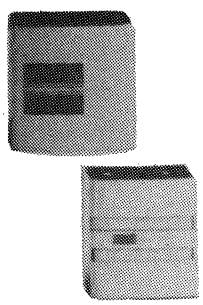
AUDIO MASTERING

- Tape and Film
- Standard Replacement
- Instrumentation Quality
- Custom Formats



ERASE

- Dual Gap Ferrite Cores
- Cassette—2" Formats
- MultiTrack Interlace
- Full Track 1" Video

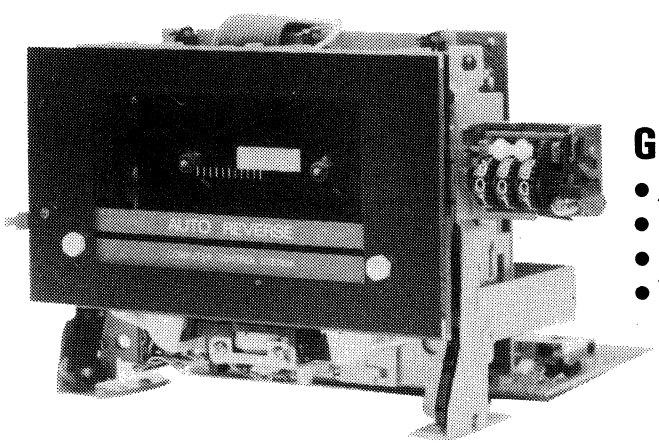


TIME CODE

- NeoPilot, FM, SMPTE
- Audio and Video
- Erase with Time Code
- High Wear Construction

MAGNETIC STRIPE

- High Wear Sendust
- High Coercivity
- Read/Write Combination



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HEAD REPAIR SERVICE

- Electrical Test
- Microscopic Inspection
- Optical Alignment
- 24 Hour Turnaround

MINIGLOSSARY
BASIC ASCII CODE

				b7	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
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Control Character Representations

NUL	Null
SOH	Start of Heading (CC)
STX	Start of Text (CC)
ETX	End of Text (CC)
EOT	End of Transmission (CC)
ENQ	Enquiry (CC)
ACK	Acknowledge (CC)
BEL	Bell
BS	Backspace (FE)
HT	Horizontal Tabulation (FE)
LF	Line Feed (FE)
VT	Vertical Tabulation (FE)
FF	Form Feed (FE)
CR	Carriage Return (FE)
SO	Shift Out
SI	Shift In
DLE	Data Link Escape (CC)
DC1	Device Control 1
DC2	Device Control 2
DC3	Device Control 3
DC4	Device Control 4
NAK	Negative Acknowledge (CC)
SYN	Synchronous Idle (CC)
ETB	End of Transmission Block (CC)
CAN	Cancel
EM	End of Medium
SUB	Substitute
ESC	Escape
FS	File Separator (IS)
GS	Group Separator (IS)
RS	Record Separator (IS)
US	Unit Separator (IS)
DEL	Delete

(CC) Communication Control
(FE) Format Effector
(IS) Information Separator

Special Graphic Characters

SP	Space
!	Exclamation Point
|	Logical OR
"	Quotation Marks
#	Number Sign
$	Dollar Sign
%	Percent
&	Ampersand
'	Apostrophe
(	Opening Parenthesis
)	Closing Parenthesis
*	Asterisk
+	Plus
,	Comma
-	Hyphen (Minus)
.	Period (Decimal Point)
/	Slant
:	Colon
;	Semicolon
<	Less Than
=	Equals
>	Greater Than
?	Question Mark
@	Commercial At
[	Opening Bracket
\	Reverse Slant
]	Closing Bracket
^	Circumflex
¬	Logical NOT
_	Underline
`	Grave Accent
{	Opening Brace
¦	Vertical Line (This graphic is stylized to distinguish it from Logical OR)
}	Closing Brace
~	Tilde

ISL PRODUCTS INTERNATIONAL LTD.

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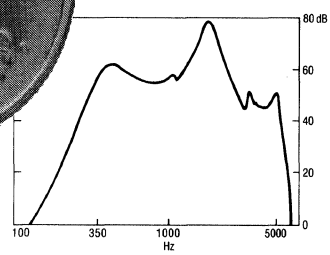

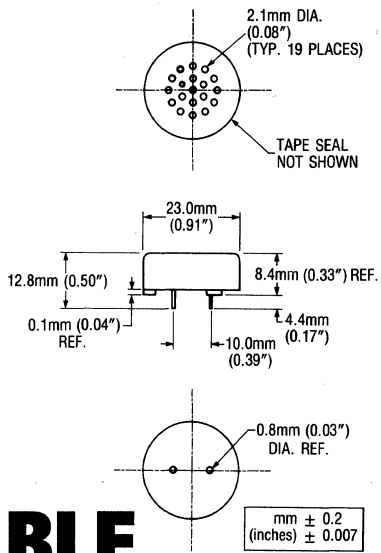

THE WAVESOLDERABLE MINIATURE SPEAKER FOR PC BOARDS

The ISL-8032VT adds voice or music to modems, laptops, telecommunications, toys, games...

Offering a 350 Hz to 5,000 Hz audio frequency response, this speaker can withstand wavesoldering temperatures of 245°C for 10 seconds or 260°C for 5 seconds plus chlorinated-solvent cleaning up to 10 minutes. It has a composite plastic body, epoxy bottom seal and foil-tape top seal and meets EIA/IS-49 Test Ta, Method 1A, 10 ±1 second.

SPECIFICATIONS

Usable frequency response: 350-5,000 Hz
Housing: Valox, UL94V-2
Impedance @ 1 kHz: 8 ohm ±15%
Resonant frequency: 2,000 Hz ±20%
Recommended operating power: 0.08 watts
Maximum input: 0.15 watts
Maximum throughput: 142 mA
Sound pressure level: 81 dB ±3 dB measured at 10 cm with a 1 kHz, 0.89 V input signal
Operating temperature range: -20 to +60°C
Storage temperature range: -30 to +70°C
Maximum processing temperature: 260°C up to 5 seconds; 240°C up to 10 seconds

ISL Products International Ltd., is an engineering/manufacturing company with facilities in New York and the Far East.

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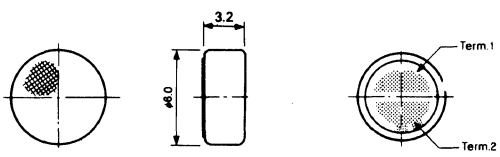
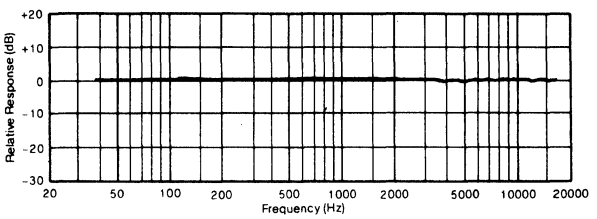
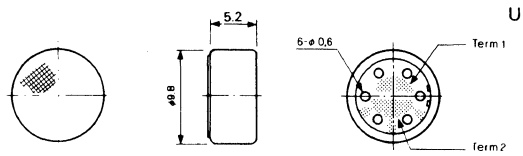
- Dynamic Elements as well as hand held • Wireless Systems • Noise Cancellation
- Custom designed for volume users • Microphone Accessories

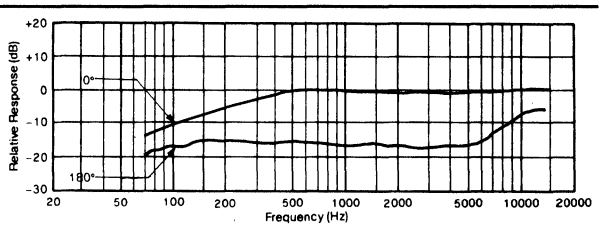
OD-80B





UD-200B



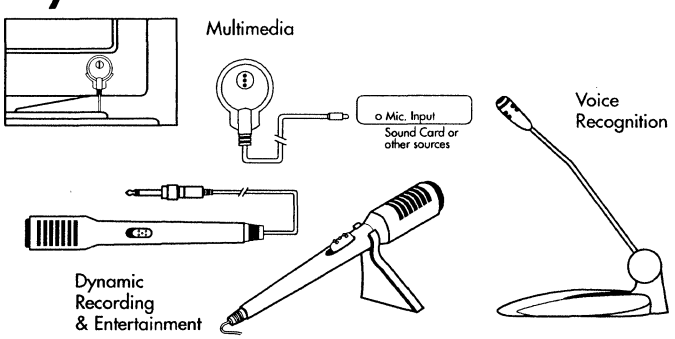


Specifications	*OD-80B*	*UD-200B*
Sensitivity:	-45±4dB (0dB = 1V/Pa, 1kHz)	-46dB to -38dB±3dB
Impedance:	Low impedence	Low impedence
Directivitity:	Omnidirectional	Uni-directional
Frequency range:	20-16,000Hz	100-16,000Hz
Max. operational voltage:	9V	9V
Standard operational voltage:	3V	3V
Current consumption:	max. 0.5mA	max. 0.8mA
Sensitivity reduction:	Within -3dB at 1.5V	Within -3dB at 1.5V
S/N ratio:	More than 58dB	More than 60dB

Case Sizes (mm)	
Diameter	Height
9.8	10.0
	6.7
	5.2
	4.5
6.0	5.2
	3.2
	2.7

Sensitivites: . . . . -35db to 70db
Terminations: . . . Solder Dots / PC Pins
Leaded

Dynamic Elements and Hand Held



Applications

1. Telephone and telephone answering devices
2. Built-in microphones for tape recorders
3. Intercoms
4. Modems for computers
5. Completed microphones for recording, testing, and monitoring
6. Hearing aids
7. sonic controlled toys and sensors
8. Others
   - Multi-Media
   - Voice Recognition
   - Boom Mics and Headset Combinations

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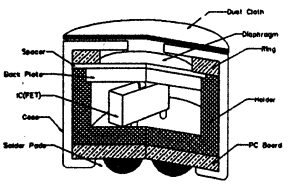
JEMA offers a broad range of high performance microphones designed for almost any sensitivity and application. Our microphones provide the best possible performance in each usage range, even in adverse conditions.

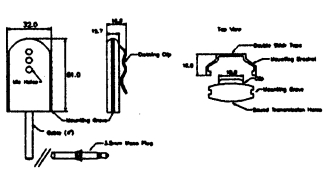


Omnidirectional Electret Condenser Microphone Cartridges: Sensitivity Ranges -36/-38 to -50dB (0dB=1V/pa at 1kHz)

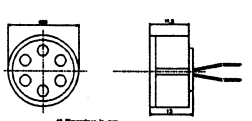
JEMA Model No.	Top Sensitivity -36 to...	Frequency Range	Operating Voltage Std/Max	Current Consumption	Output Impedance	S/N Ratio	Physical Size (mm)	Directivity
JMS	-50dB ±3dB	50-12,000	2.0v/10v	0.5mA	1.7 ohms ±30%	>58dB	Dia. 6.0 x 3.6	Omni
JMS-27, JMS-27P	-50dB ±3dB	50-12,000	2.0v/10v	0.5mA	1.7 ohms ±30%	>58dB	Dia. 6.0 x 2.7	Omni
JMT-JMP	-50dB ±2dB	30-16,000	4.5v/10v	0.8mA	2.2 ohms ±30%	>60dB	Dia. 9.4 x 6.5	Omni
JMT-H, JMP-H	-50dB ±2dB	30-16,000	1.5v/10v	0.3mA	1.0 ohms ±30%	>60dB	Dia. 9.4 x 6.5	Omni
JMT-7, JMP-7	-46dB ±2dB	30-16,000	4.5v/10v	0.8mA	2.2 ohms ±30%	>60dB	Dia. 9.7 x 6.5	Omni
JMT-7H, JMP-7H	-46dB ±2dB	30-16,000	1.5v/40v	0.3mA	1.0 ohms ±30%	>60dB	Dia. 9.7 x 6.5	Omni
JMT-45, JMP-45	-46dB ±2dB	30-16,000	4.5v/10v	0.8mA	2.2 ohms ±30%	>60dB	Dia. 9.7 x 6.5	Omni
JMT-45H, JMP-45H	-46dB ±2dB	30-16,000	1.5v/10v	0.3mA	1.0 ohms ±30%	>60dB	Dia. 9.7 x 4.5	Omni
JMT-50, JMP-50	-46dB ±2dB	30-16,000	4.5v/10v	0.8mA	2.2 ohms ±30%	>60dB	Dia. 9.7 x 5.0	Omni
JMT-50H, JMP-50H	-46dB ±2dB	30-16,000	1.5v/10v	0.3mA	1.0 ohms ±30%	>60dB	Dia. 9.7 x 5.0	Omni

Dynamic Microphone Cartridges

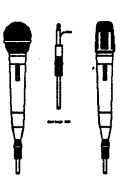
Model	JDM-143	JDM-107	JDM-103	JDM-102
Directional Characteristics	Omni-Directional	Omni-Directional	Omni-Directional	Omni-Directional
Frequency Response	80-10,000Hz	80-10,000Hz	80-12,000Hz	80-12,000Hz
Impedance	300 ohms	300 ohms	600 ohms	600 ohms
Sensitivity	-78dB ±3dB	-78dB ±3dB	-72dB ±3dB	-70dB ±3dB
Dimensions (mm)	26 x 13	22 x 17	29 x 23.5	29 x 39
Weight	19g	21g	30g	35g



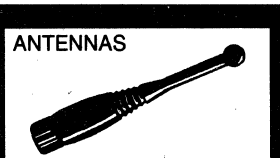
Computer Multimedia Applications

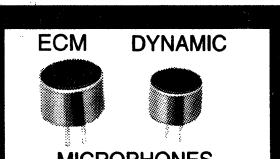


JDM-143 Cartridge



Complete Assemblies





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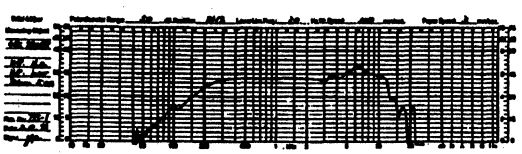
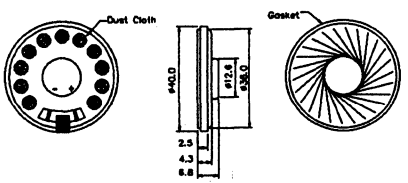
Impedance Made To Your Specification

JEMA Model No.	Size Dia mm	Height/ Depth mm	Impedance	Resonant Frequency Hz	Frequency Range Hz(fo-)	Sensitivity dB(±3dB)	Power Nom mW	Input Max mW	Magnet Size mm	N.W. gr
JP-101N	10	7.8	32	200	4K	108	10	20	5 x 1.5	0.6
JP-131N	13.6	6.5	32	260	2K	108	10	30	6.5 x 1.5	1.8
JP-151N	14.7	6.2	32	240	6K	108	10	20	6.5 x 1.5	1.4
JDY2032D18C	20	2.2	32	-	5K	106	10	-	9.5 x 0.5	2
JDY2008D03	20	3	8	-	5K	100	50	-	8 x 1	2.4
JP-20NT	20	3	8	700	4.4K	95	200	300	7.5 x 1	2.2
JDY2016D	20	3	16	-	7K	98	50	-	8 x 1	2.3
JDY20200D	20	3	200	470	3K	96	100	-	8 x 1	2.3
JR-204-32	20	3.3	32	750	3.4K	74	75	150	6.5 x 1.2	1.3
JP-T23N	23	5.5	8	320	20K	89	100	200	9.5 x 1.5	3
JP-23N	23	5.5	32	630	6.4K	110	100	200	9.5 x 1.5	2.8
JDY23032A	23	5.8	32	650	8K	112	10	20	9.5 x 1.5	4.4
JP-23NG	23	7.6	32	400	3.5K	120	40	100	9.5 x 1.5	4.2
JP-23NW	23	7.6	32	250	3K	121	30	70	9.5 x 1.5	3.8
JP-27N	27	5.8	32	330	4K	118	40	100	9.5 x 1.5	4.2
JP-272NW	27	7	32	240	2K	120	30	70	12.5 x 1.5	6
JP-T27F	27	7.7	8	500	20K	82	100	200	12 x 3.8	5.8
JP-T28NL	28	4	8	480	5K	88	100	200	9.5 x 1.5	2.8
JDY2808A20	28	4.55	8	470	5K	80	100	200	9.5 x 1.5	6
JP-283NT	28	5.6	8	350	20K	80	300	500	9.5 x 1.5	4.6



All speakers available from 4Ω-1000Ω



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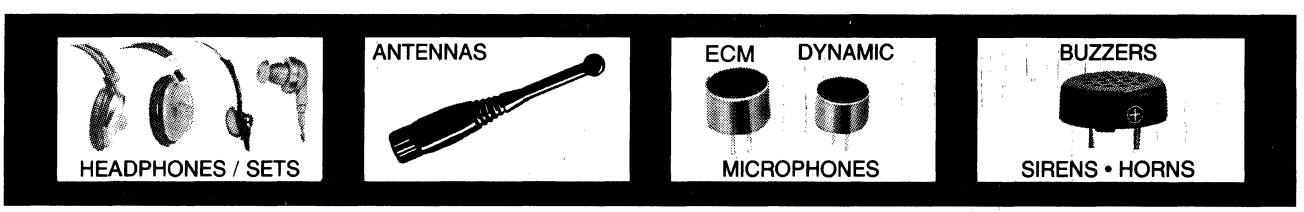

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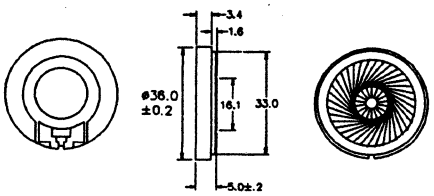
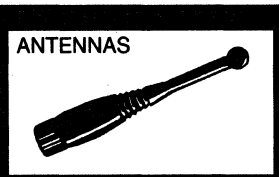
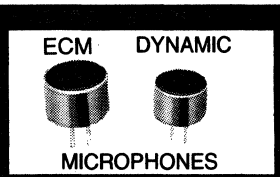


Impedance Made To Your Specification

JEMA Model No.	Size Dia mm	Height/ Depth mm	Impedance	Resonant Frequency Hz	Frequency Range Hz(fo-)	Sensitivity dB(±3dB)	Power Nom mW	Input Max mW	Magnet Size mm	N.W. gr
JP-282N	28	5.9	32	130	3K	115	30	100	12.5 x 1.5	4.8
JP-28N	28	6.8	32	230	2.4K	120	30	100	9.5 x 1.5	4.6
JP-29F	29	6.8	8	580	4K	90	100	200	20.8 x 3	8.2
JUMF-29A	29	7	8	800	2K	74	100	200	17.5 x 3	-
JP-291F'	29	7	8	750	14K	92	100	200	20.8 x 3	9.4
JDY3032B	30	5.1	32	250	20K	80	20	40	12.5 x 1.5	7
JP-30NT	30	5.3	8	500	9K	84	200	300	9.5 x 1.5	5.6
JP-30F	30	7.8	32	180	2.5K	108	30	70	12 x 3.8	7
JP-362N	36	5	200	380	6K	92	100	200	12.5 x 1.5	5.8
JDY3016AB	36	5.6	16	600	3.5K	80	100	200	9.5 x 1.5	7
JP-363N	36	6	200	140	2K	118	30	100	12.5 x 1.5	6.2
JR-36-8B-51B	36	4.3	8	560	7K	84	400	800	12.5 x 1.25	8
JDY4008A	40	6	8	500	5K	83	100	200	9.5 x 1.5	9
JDY4008BL-1	40	6.8	8	460	3.5K	82	1W	1.5W	12.5 x 1.5	10
JDY4008F-1	40	8.8	8	400	10K	73	200	300	27 x 3	17
JUMS-4408	44	7.1	8	450	9K	83	1W	1.5W	12.5 x 1.5	10
JDY4508B05	45	10.1	8	520	5K	84	.75W	1.5W	12.5 x 1.5	11
JDY50300BB	50	8.6	300	450	7K	81	100	200	12.5 x 1.5	12
JUMS-5032A	50	-	32	500	5K	88±2dB	200	500	13 x 10	50
JF22C01	57	18.4	8	400	4.5K	84	200	400	-	59.4
JF25C04	66	19.8	8	350	5K	86	300	500	-	63.3
JF27C01	70	20.8	8	330	5K	86	400	600	-	66.3
JF30C08M-3	77	25.6	8	200	10K	86	2W	2.5	-	82.1
JF33C04	87	29.5	8	250	10K	86	2W	4W	-	122.6
JF35C07	92	31	8	180	10K	85	2W	4W	-	122.8
JF40C25	102	36.5	8	160	10K	87	2W	4W	-	222
JF40C29	102	51.5	8	80	15K	86	5W	8W	-	406.6
JF50C08-1	120	43.3	8	115	12K	85	3W	5W	-	232.8
JF65C04-1	165	59.7	8	90	10K	87	5W	8W	-	420.8
JF80C03-1	200	68.2	8	70	10K	88	5W	8W	-	584.7

HEADPHONES / SETS





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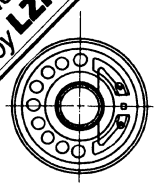

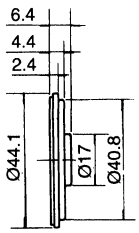

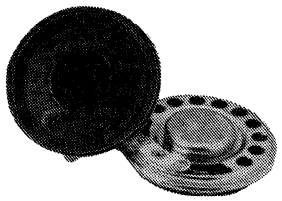

Part No.	DIA.	Magnet Size	Coil Imp.	Input Power	Freq. Response
C12M388	38m/m	12.5×1.5mm	8 ohm	0.1W	F_o-8000Hz
C12M408	40m/m	12.5×1.5mm	8 ohm	0.1W	F_o-8000Hz
C12M458	45m/m	12.5×1.5mm	8 ohm	0.1W	F_o-5500Hz
C12M508	50m/m	12.5×1.5mm	8 ohm	0.2W	F_o-6000Hz
C12M578	57m/m	12.5×1.5mm	8 ohm	0.2W	F_o-7500Hz

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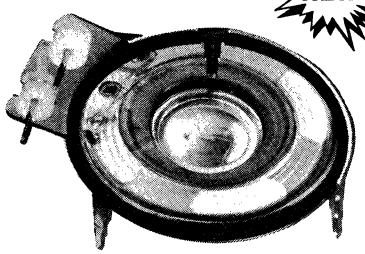
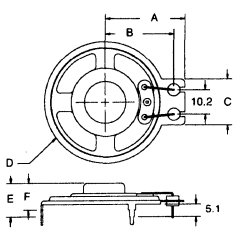
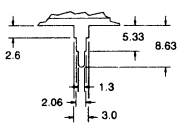
OG SERIES: ROUND SHAPE, METAL FRAME

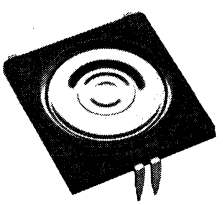


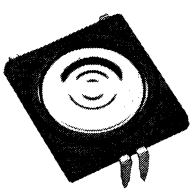


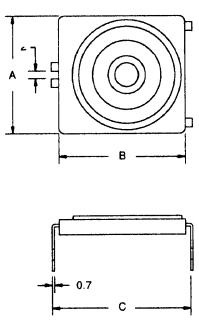


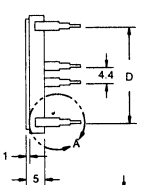
MODEL	A	B	C	D	E	F
OG38PC	26.4	21.8	19.6	38	13.7	10.9
OG50PC	33	28.0	19.1	50	14.0	11.0

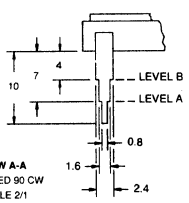
RC SERIES: RECTANGULAR SHAPE, PLASTIC FRAME

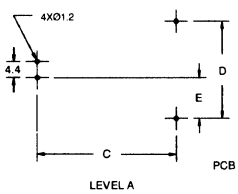


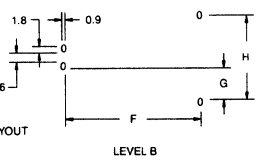












MODEL	A	B	C	D	E	F	G
35RC05PC	32	35	38.3	26.6	37.4	24.8	9.3
43RC05PC1 43RC05PC2	40	43	46.3	32.6	45.4	30.8	12.3

Dimensions: mm

Model No.	Shape	Cone Type	Power		Nominal Diameter	Resonant Frequency	Frequency Range	Total Height	Total Weight
			Nominal	Max.					
OG38PCMC5	Round	Mylar	0.3	0.5	38 mm	700 Hz	F_o5000 Hz	8.7 mm	12 gr
OG50PCMC5	Round	Mylar	0.3	0.5	50 mm	450 Hz	F_o5000 Hz	9.2 mm	16 gr
27 RML	Round	Mylar	0.1	0.15	27 mm	550 Hz	F_o4500 Hz	9.5 mm	5 gr
35RC05PC	Rectangular	Mylar	0.2	0.3	32x 35	800 Hz	F_o3500 Hz	5 mm	5.6 gr
43RC05PC1	Rectangular	Mylar	0.2	0.3	40 x 43	580 Hz	F_o3500 Hz	5 mm	7.8 gr
43RC05PC2	Rectangular	Mylar	0.2	0.3	40 x 43	600 Hz	F_o3500 Hz	5 mm	7.2 gr

NOTES: (1) Standard Models are 8 OHMS Impedance. Other values are available upon request. Custom speakers/assemblies also available upon request.
(2) Total height is measured without the PC Board pins.

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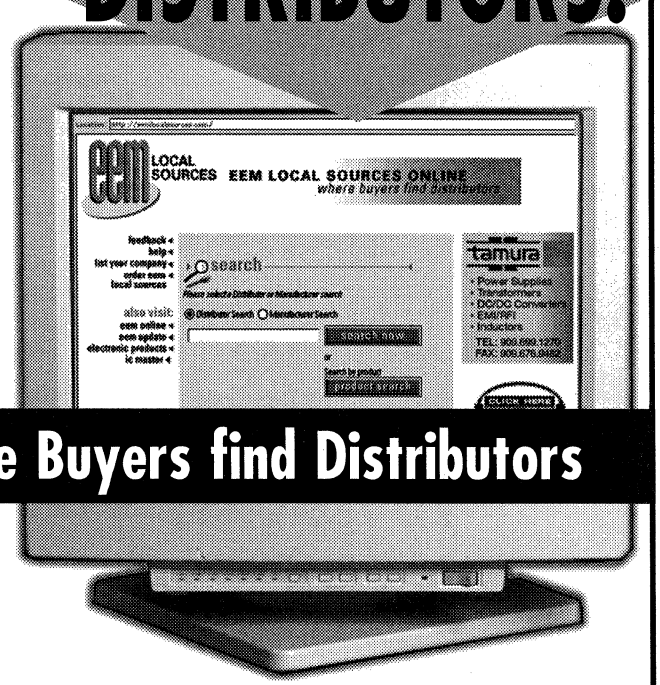

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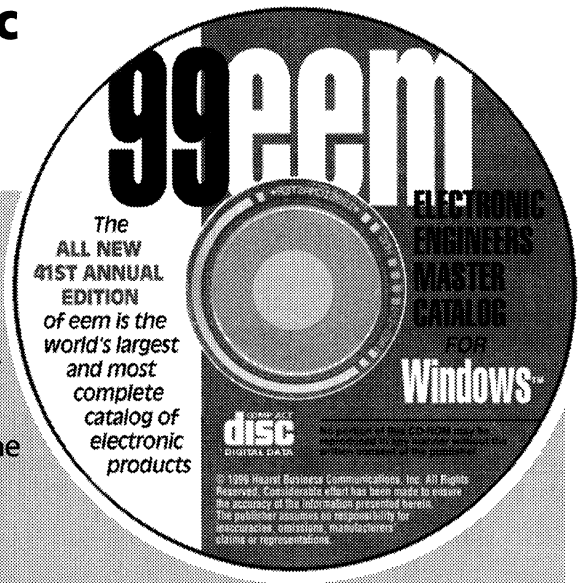

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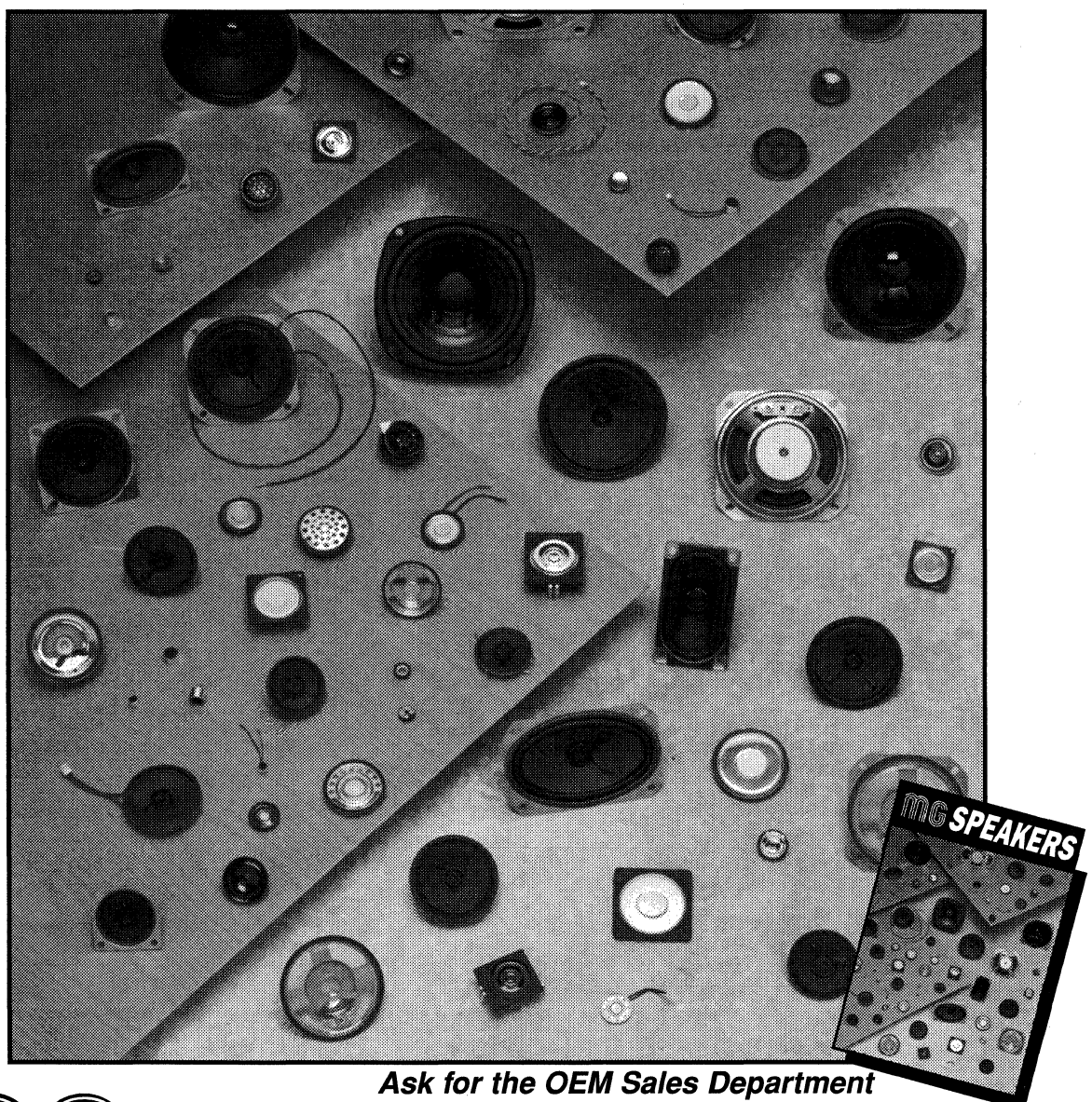

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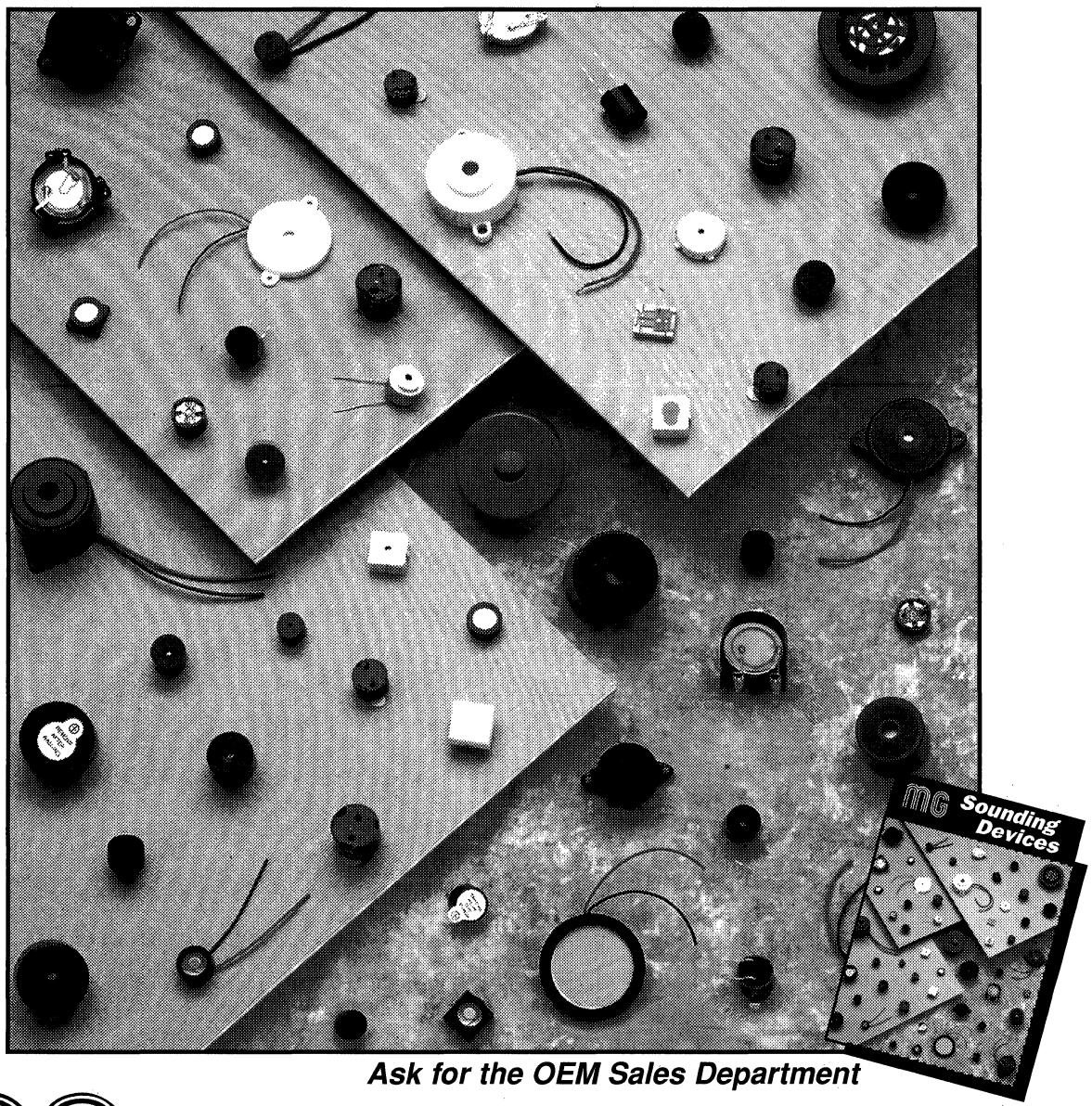

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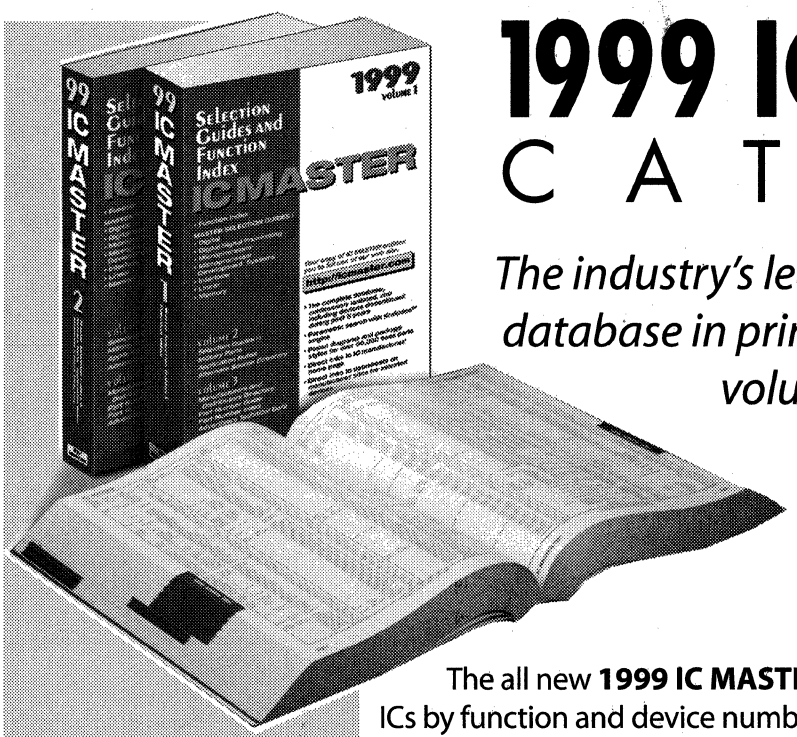

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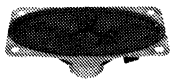
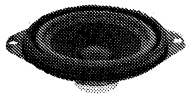
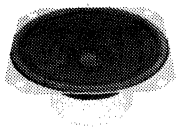
SDC22S/SDC22F
SDC3S/ EN3F



740F08-SH
900F08-SH
SDC35S, A231S



A32F
EN32F
50FF08-SH



SDC4S

JN5FD

Specifications

Model	Size/Shape	Shielded Magnet Weight/ Ounces	Cone Edge Material	Program Watts	RMS Watts	Mounting Diameter Inches	Depth Inches	Rated Impedance (Ohms)	Frequency Response	Sensitivity 1 Watt, 1 Meter
50FF08-SH	2" Football	.7 Ferrite	Cloth	6	3	2-3/8	1-3/8	8	200-20KHz	84
SDC22S	2-1/2" Square	2.5 Ferrite	Paper	10	5	2-15/16	1-9/16	8	260-10KHz	89
SDC22F	2-1/2" Square	2.5 Ferrite	Foam	10	5	2-15/16	1-11/16	8	150-13KHz	86
740F08-SH	1-3/4" x 2-3/4" Oval	.7 Ferrite	Cloth	8	4	1-5/16 x 2-1/2	1-5/16	8	250-20KHz	86
A231S	2" x 3" Oval	.53 Alnico	Paper	8	4	1-1/2" x 2-7/32	1-1/8	8	400-10KHz	86
900F08-SH	2" x 3-1/2" Oval	1.22 Ferrite	Cloth	8	4	1-9/16 x 2-15/16	1-3/4	8	200-20KHz	84
EN3F	3" Square	.41 Neodymium	Foam	16	8	3-3/8	1-3/32	8	100-13KHZ	87
SDC3S	3" Square	2.5 Ferrite	Paper	10	5	3-3/8	1-5/8	8	250-10KHz	92
A32F	3-1/2" Square	.53 Alnico	Foam	8	4	3-7/8	1-11/32	8	100-10KHz	86
EN32F	3-1/2" Football	.41 Neodymium	Foam	12	6	3-7/8	1-3/8	8	140-13KHz	88
SDC35S	3 x 5" Oval	2.5 Ferrite	Paper	10	5	2-9/16 x 3-9/16	1-29/32	8	200-10KHz	93
SDC4S	4" Square	2.5 Ferrite	Paper	10	5	4-11/16	1-13/16	8	140-10KHz	90
JN5FD	4-1/2" Round	.98 Neodymium	Cloth	30	15	4-11/16	1-15/16	8	60-12KHz	93

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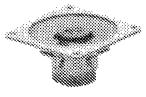

A2WP
A2RWP (Round)
AC2RWP (Round)

AC22WP
DC22WP
AC3WP/ DC3WP

DC32WP

DC4WP

EC5WP
Full Range

JC8WP
Full Range

Specifications

Model	Size/Shape	Magnet Weight Ounces	Program Watts	RMS Watts	Mounting Diameter Inches	Depth Inches	Rated Impedance	Frequency Response	Sensitivity 1 Watt, 1 Meter
A2WP	2" Square	.53 Alnico	6	3	2-3/8	15/16	8	450 to 4KHz	82 dB
A2RWP	2" Round	.53 Alnico	6	3	-	15/16	8	450 to 4KHz	82 dB
AC2RWP	2" Round	.70 Ferrite	6	3	-	7/8	8	450 to 4KHz	82 dB
AC22WP	2-1/2" Square	.70 Ferrite	8	4	2-15/16	1-1/8	8	300 to 6KHz	84 dB
DC22WP	2-1/2" Square	2.5 Ferrite	8	4	2-15/16	1-5/32	8	300 to 6KHz	88 dB
AC3WP	3" Square	.70 Ferrite	8	4	3-3/8	1-3/16	8	250 to 7KHz	83 dB
DC3WP	3" Square	2.5 Ferrite	8	4	3-3/8	1-7/32	8	250 to 7KHz	87 dB
DC32WP	3-1/2" Square	2.5 Ferrite	8	4	3-7/8	1-5/16	8	195 to 7KHz	91 dB
DC4WP	4" Square	2.5 Ferrite	8	4	4-11/16	1-13/32	8	180 to 6KHz	93 dB
EC5WP	4" Pin Cushion	3.0 Ferrite	12	6	4-11/16	1-23/32	8	120 to 8KHz	92 dB
JC8WP	8" Round	10.0 Ferrite	30	15	7-5/8	1-13/16	8	50 to 8KHz	94 dB

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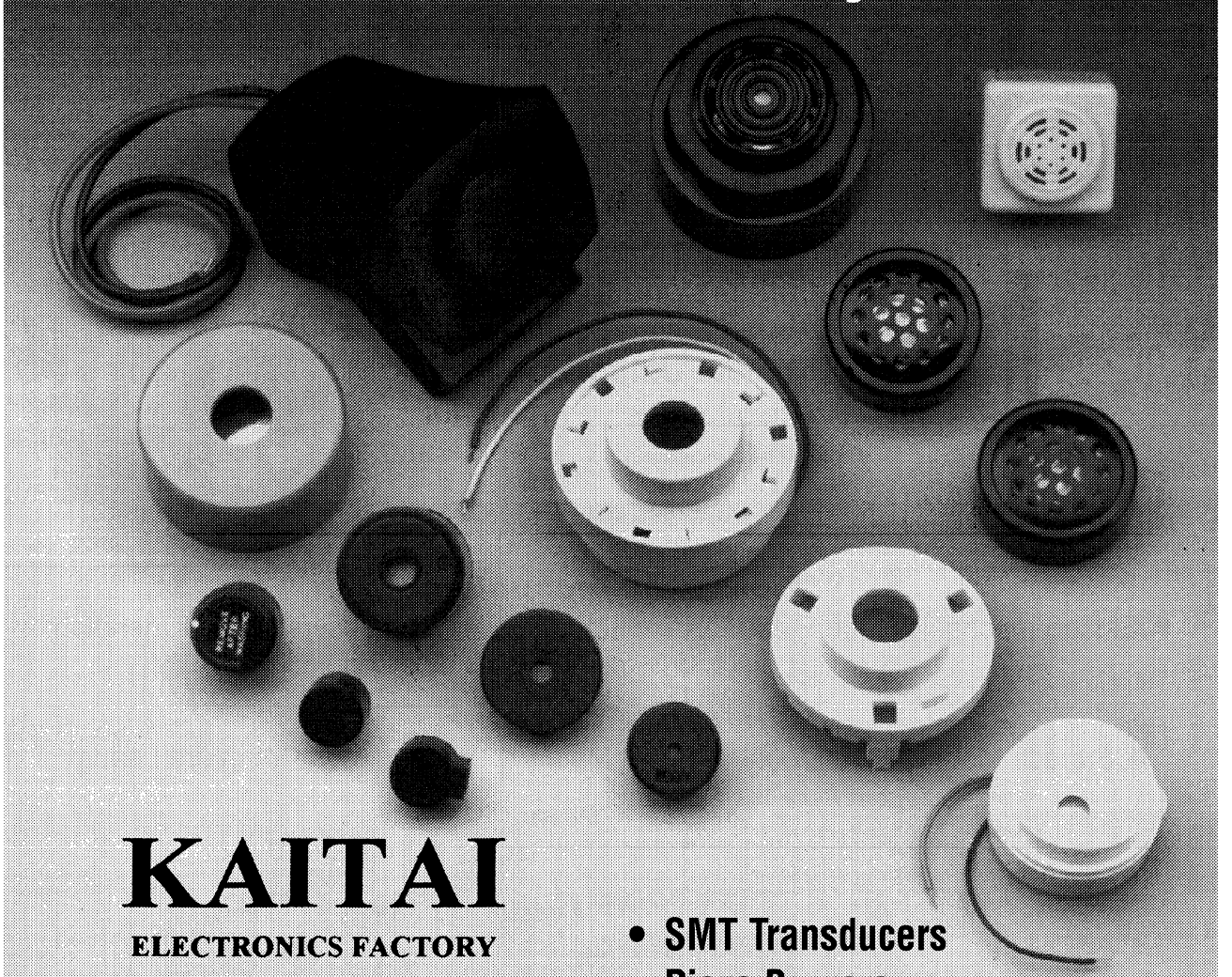

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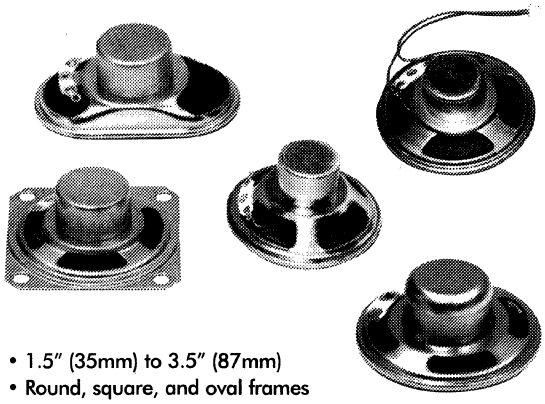

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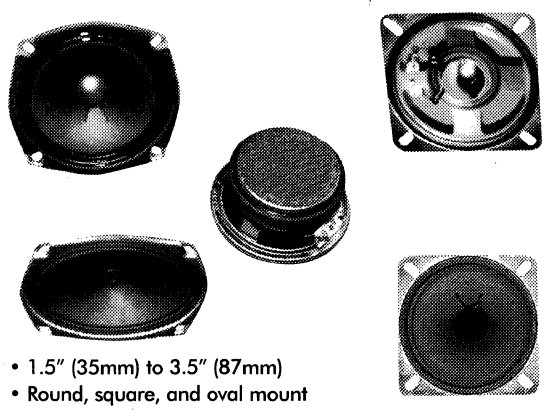

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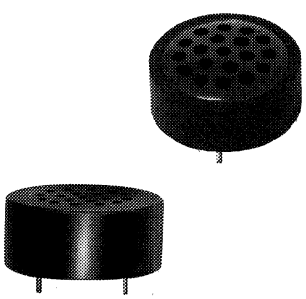

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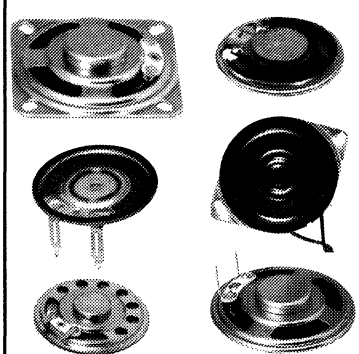

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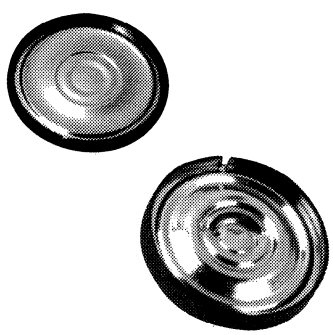

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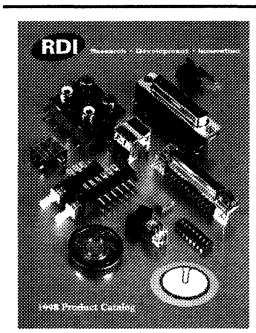

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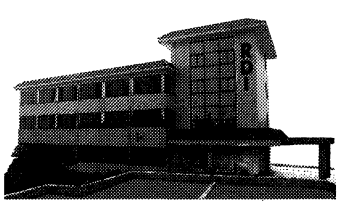

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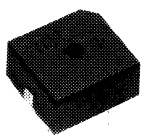
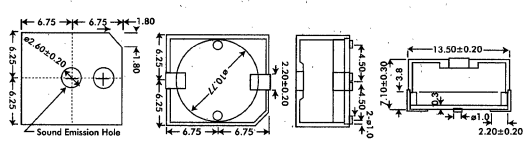
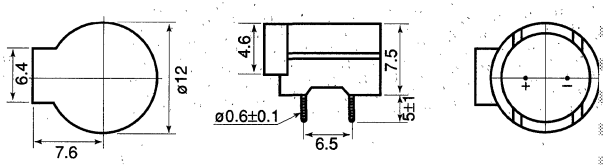




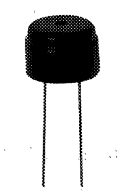
DMT-1206-SMT SPECIFICATIONS

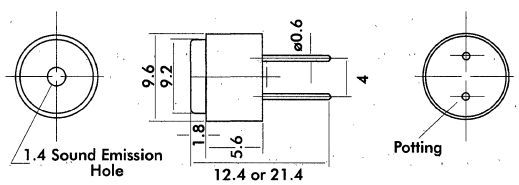
Rated Voltage (V)	6
Operating Voltage (V)	4 ~ 8
† Rated Current (mA)	MAX 50
Coil Impedance	16 or 22
Current Resistance (Ω)	47Ω, nominal
† Sound Output at 10cms (dB)	85
Resonant Frequency (Hz)	2200
Operating Temperature (°C)	-20° to +60°
Storage Temperature(°C)	-30° to +70°
Weight	3 grams



DMT-11RP SPECIFICATIONS

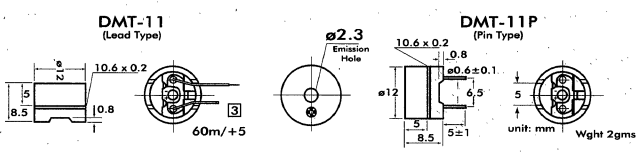
Rated Voltage (V)	1.5
Operating Voltage (V)	1 ~ 2
† Rated Current (mA)	MAX 70
Coil Impedance	16 or 22
Current Resistance (Ω)	6.5±1.0
† Sound Output at 10cms (dB)	min. 80 or 85
Resonant Frequency (Hz)	2731
Operating Temperature (°C)	-20° to +60°
Storage Temperature(°C)	-30° to +70°
Weight	2 grams





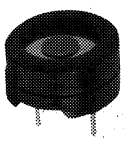
DMT-09 SPECIFICATIONS

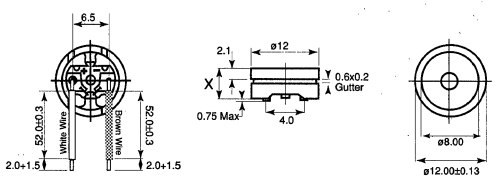
Rated Voltage (V)	1.5
Operating Voltage (V)	1 ~ 2
† Rated Current (mA)	MAX 80
¥ Coil Resistance	15 or 50
Coil Impedance	15 or 50
Current Resistance (Ω)	5.5±1.0
† Sound Output at 10cms (dB)	Min. 80
Resonant Frequency (Hz)	2731
Operating Temperature (°C)	-20° to +60°
Storage Temperature(°C)	-30° to +70°
Weight	1 gram



DMT-11 SPECIFICATIONS

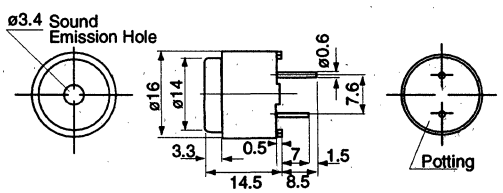
Rated Voltage (V)	1.5
Operating Voltage (V)	1 ~ 2
† Rated Current (mA)	MAX 30
¥ Coil Resistance	15 or 50
Coil Impedance	
Current Resistance (Ω)	
† Sound Output at 10cms (dB)	80
Resonant Frequency (Hz)	2048
Operating Temperature (°C)	-10° to +60°
Storage Temperature(°C)	
Weight	2 grams





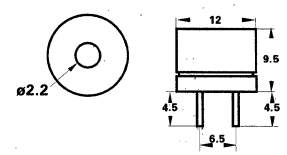
DMT-11B SPECIFICATIONS

Rated Voltage (V)	1.5
Operating Voltage (V)	1 ~ 2
† Rated Current (mA)	MAX 30
¥ Coil Resistance (Ω)	15±4.5
Coil Impedance	40
† Sound Output at 10cms (dB)	Min. 70
Resonant Frequency (Hz)	2,048
Operating Temperature (°C)	-20° to +60°
Storage Temperature(°C)	-30° to +70°
Weight	2 grams



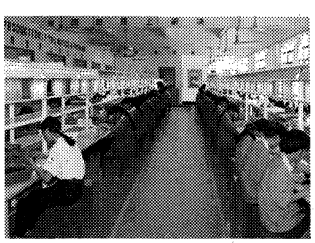
DMT-16 SPECIFICATIONS

Type	1606	1612
Rated Voltage (V)	6	12
Operating Voltage (V)	3~12	6~18
† Rated Current (mA)	MAX 40	
Current Resistance (Ω)	50	115
† Sound Output at 10cms (dB)	Min. 85	
Resonant Frequency (Hz)	2,048	
Temperature Range(°C)	-20° to +70°	
Weight	5 grams	



DMT-12 SPECIFICATIONS

Type	1206	1212
Rated Voltage (V)	6	12
Operating Voltage (V)	4~8	7~12
† Rated Current (mA)	MAX 40	
Current Resistance (Ω)	50	115
† Sound Output at 10cms (dB)	Min. 85	
Resonant Frequency (Hz)	2,200	
Temperature Range(°C)	-40° to +85°	
Weight	2 grams	



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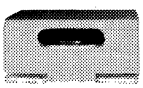
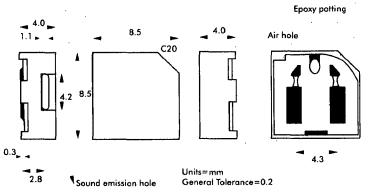
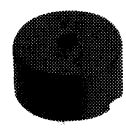
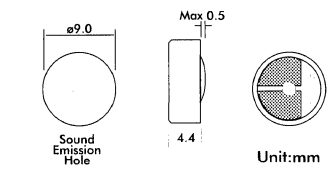




DMT-8503C SPECIFICATIONS*

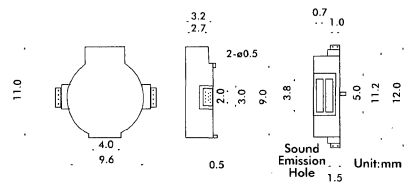
Rated Voltage DC (V)	3 Vp-p
Operating Voltage (V)	2~5 Vp-p
Current Consumption **	70 mA max
S.P.L. @ 30cm/12VDC (dB min) ***	83
Coil Resistance	15±2Ω
Resonant Frequency (±500 Hz)	2,731
Operating Temperature	-20°C to +60°C
Weight	1 gram





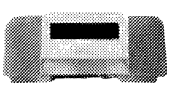
DMT-9SMK-427-03 SPECIFICATIONS*

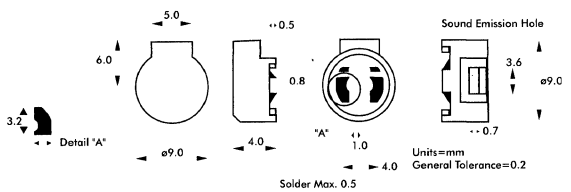
Rated Voltage DC (V)	3 Vp-p
Operating Voltage (V)	2~5 VDC
Current Consumption **	80 mA max
S.P.L. @ 30cm/12VDC (dB min) ***	82
Coil Resistance	25Ω
Resonant Frequency (±500 Hz)	2,731
Operating Temperature	-20°C to +60°C
Weight	1 gram



DMT-9SQC-327-03 SPECIFICATIONS *

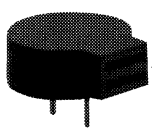
Rated Voltage DC (V)	3 Vp-p
Operating Voltage (V)	2~5 VDC
Current Consumption **	80 mA max
S.P.L. @ 30cm/12VDC (dB min) ***	82
Coil Resistance	25Ω
Resonant Frequency (±500 Hz)	3,200
Operating Temperature	-25°C to +65°C
Weight	1 gram

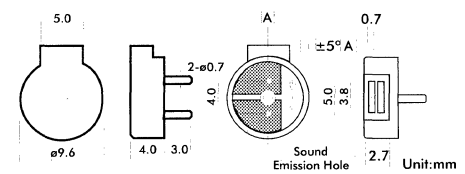




DMT-9005B SPECIFICATIONS *

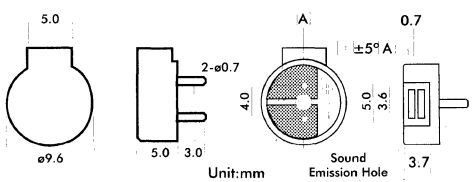
Rated Voltage DC (V)	3 Vp-p
Operating Voltage (V)	2~5 Vp-p
Current Consumption **	70 mA max
S.P.L. @ 30cm/12VDC (dB min) ***	83
Coil Resistance	15±2Ω
Resonant Frequency (±500 Hz)	2,730
Operating Temperature	-30°C to +85°C
Weight	1 gram





DMT-9SEH-427-03 SPECIFICATIONS *

Rated Voltage DC (V)	3 Vp-p
Operating Voltage (V)	2~5 VDC
Current Consumption **	80 mA max
S.P.L. @ 30cm/12VDC (dB min) ***	82
Coil Resistance	25Ω
Resonant Frequency (±500 Hz)	2,731
Operating Temperature	-20°C to +60°C
Weight	1 gram



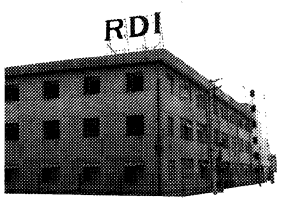
DMT-9SEH-527-03 SPECIFICATIONS *

Rated Voltage DC (V)	3 Vp-p
Operating Voltage (V)	2~5 Vp-p
Current Consumption **	80 mA max
S.P.L. @ 30cm/12VDC (dB min) ***	82
Coil Resistance	25Ω
Resonant Frequency (±500 Hz)	2,731
Operating Temperature	-20°C to +60°C
Weight	1 gram

* Also available in 1.5 volt and 5 volt versions (3 volt specifications are shown).

** Applying rated voltage (square wave, 1/2 duty, resonant frequency).

*** Distance at 10 cm (applying rated voltage, square wave, 1/2 duty, Resonant Frequency).



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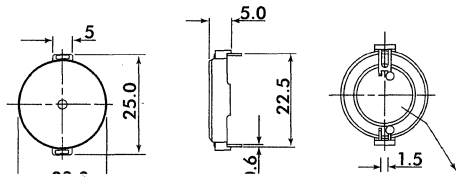
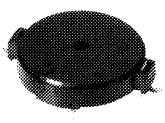
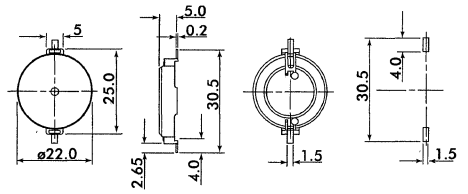


REP-1108 SPECIFICATIONS

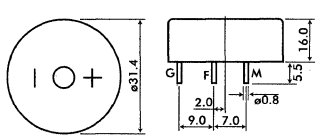
Oscillating Frequency (±500 Hz)	4,100
Operating Voltage (V)	50
S.P.L. @ 30cm/12VDC (dB min)	80
Current Consumption @ 12VDC(mA max)	7
Capacitance (±30%pF)	18,000
10Vp-p sq wave (dB min)	@2.4 KHz





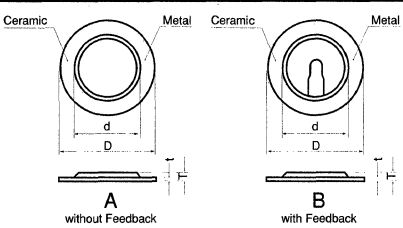
REP-2222 SPECIFICATIONS

Resonant Frequency (±500 Hz)	3,200
Operating Voltage (V)	3 ~ 20
S.P.L. @ 30cm/12VDC (dB min)	75
Current Consumption @ 12VDC(mA max)	12
Weight	6.0 grams



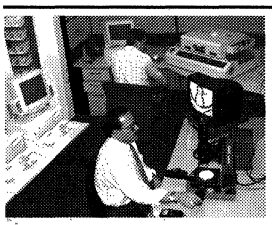
REP-1172 SPECIFICATIONS

Oscillating Frequency (±500 Hz)	3,600
Operating Voltage (V)	3 ~ 30
S.P.L. @ 30cm/12VDC (dB min)	88
Current Consumption @ 12VDC(mA max)	10
Weight	5 grams



PIEZO ELECTRIC CERAMIC ELEMENT

Model No	Resonant Frequency (KHz)	Resonant Impedance	Capacity (pF)±30% (max.)(Ω)	Dimensions (mm) D	D	T	t	Plate Material
DMZ - 1249 - 0B0	4.9±1.0	500	15,000	12.0	9.0	0.12	0.05	A-BRASS
DMZ - 1249 - 1B0	4.9±1.0	1000	12,000	12.0	9.0	0.12	0.05	B-BRASS
DMZ - 1558 - 0B0	5.8±0.5	500	10,000	15.0	10.0	0.23	0.10	A-BRASS
DMZ - 2038 - 0B0	3.8±0.5	200	25,000	20.0	15.0	0.28	0.15	A-BRASS
DMZ - 2038 - 1B0	3.8±0.5	350	17,000	20.0	15.0	0.28	0.15	B-BRASS
DMZ - 2064 - 0B0	6.4±0.5	200	12,000	20.0	15.0	0.43	0.20	A-BRASS
DMZ - 2064 -1B0	6.4±0.5	300	10,000	20.0	15.0	0.43	0.20	B-BRASS
DMZ - 2130 - 0B0	3.0±0.5	800	17,000	21.0	15.0	0.23	0.10	A-BRASS
DMZ - 2130 - 1B0	3.0±0.5	800	17,000	21.0	15.0	0.23	0.10	B-BRASS



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- Low profiles down to 17.5 mm.
- Round, square, pincushion & oval frames.
- PC mount or solder terminals.

Mylar Cone (Waterproof)
- 0.78" (20 mm) to 4.0" (100 mm) diameter.
- Low profiles down to 4.0 mm.
- Round & square frames.
- PC mount or solder terminals.

Samarium Cobalt
- 0.78" (20 mm) to 2.0" (50 mm).
- Low profiles down to .14" (3.7 mm).
- Round and square frames.

Tweeter & Super Thin
- 1 1/2" (40 mm) to 2" (50 mm) diameter.
- Low profiles down to 7.2 mm.
- Weights as low as 0.05 oz.
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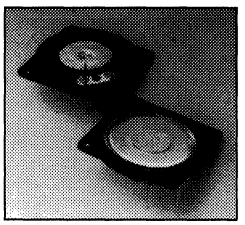

- Water-resistant mylar cones.
- ABS plastic frames.
- Samarium cobalt magnets.
- PC mount or solder terminals.
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- Frequency response of 40Hz to 2.6KHz.
- Standard impedances of 4 ohms to 100 ohms.

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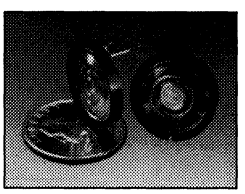
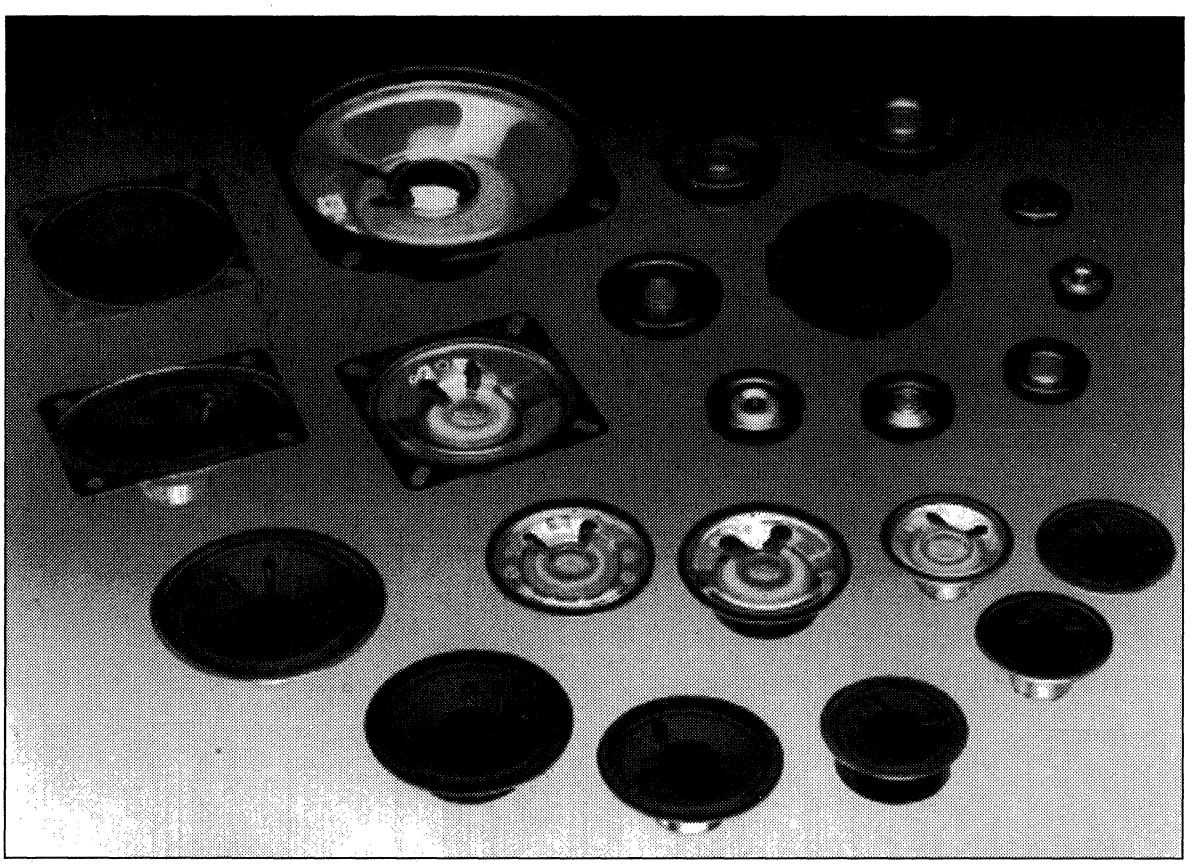


- Water-resistant mylar cones.
- ABS plastic frames.
- Samarium cobalt magnets.
- PC mount or solder terminals.
- Diameters of 20, 23, 25, 27, 28, 29 or 30 mm.



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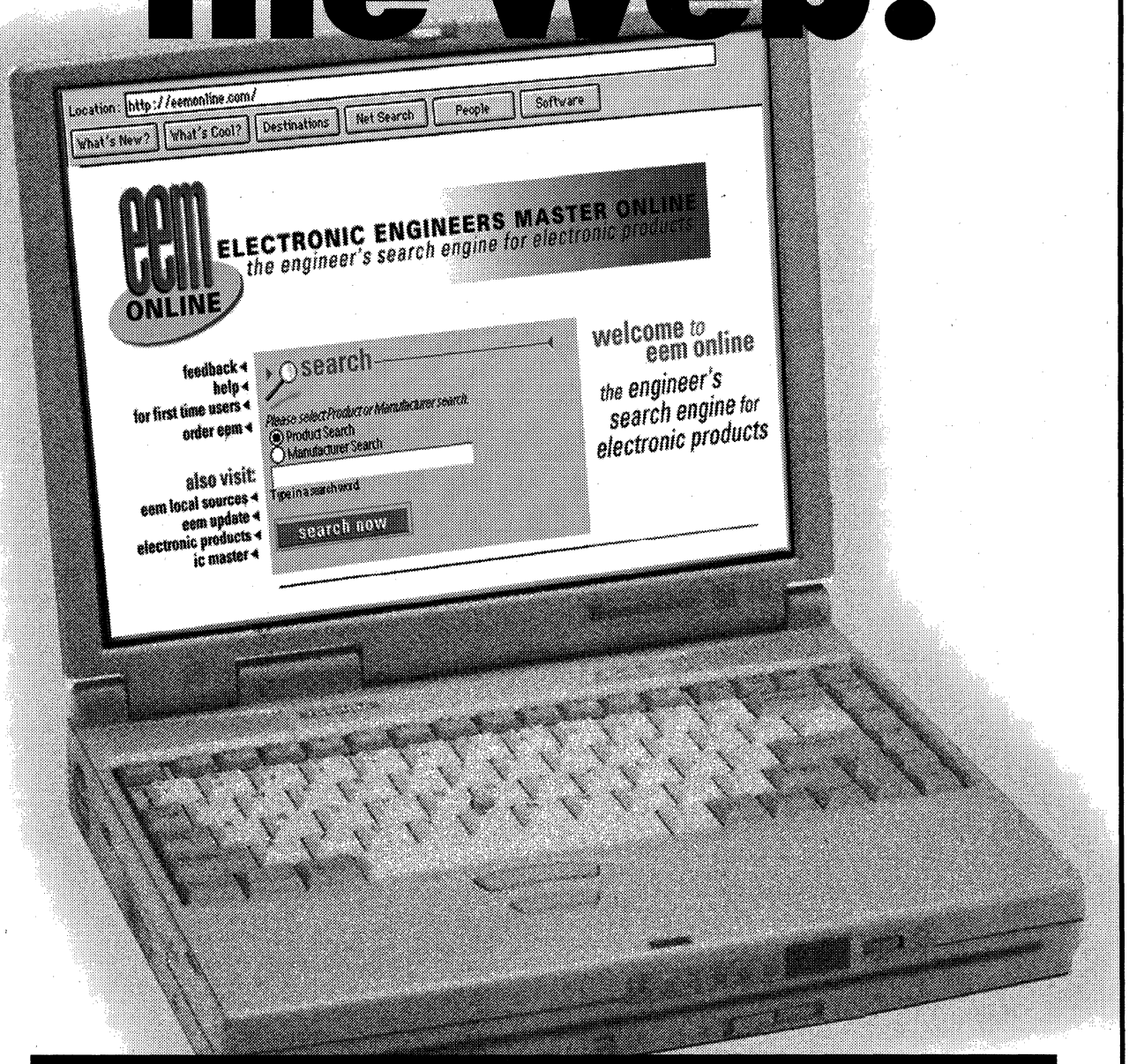

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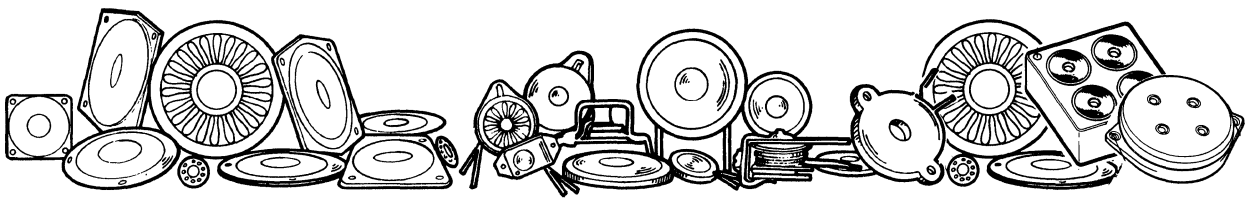

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914-736-3500 • Fax: 914-736-3656

E-MAIL: mail@aero-comm.com
WEBSITE: www.aero-comm.com
19516 Amaranth Drive, Germantown, MD 20874
Phone: 301.540.0700 FAX: 301.540.5743

AeroComm, Inc.
A Wireless Systems Company

30 Years of Wireless for Commercial and Military Communications

NEW IN 1998!

8-CHANNEL BOOSTER AMPS
SmartBooster handles more channels than previous systems -- theirs or ours!
SEE SYSTEMS INTEGRATION SECTION 4100!

SYNTHESIZED ULTRA-Q
Cost-effective solution to paging & cellular transmission interference on MAS & other systems.
SEE RF FILTERS SECTION 2750!

VIDEO RXs & TXs
L-Band & S-Band, VHF & UHF receivers and transmitters, synthesized or crystal controlled.
SEE OUR RADIOS ON THE NEXT PAGE !

New RF Telemetry Modules

Our new RF modules provide the user with state-of-the-art telemetry that interfaces with FSK, MSK, GMSK, and video data modulation formats.

Features:

FCC Type Accepted
12 Volt Operation
Narrowband FM
Wideband FM
HF, VHF, UHF
Low Current Drain Receiver
Serviceable (Std Components)
Analog, Manchester, AFSK
Modulation (User Transparent)
AeroComm Guarantee of Reliability
Variety of Mechanical Configurations
100% Continuous Duty Cycle

RF Transmitters and Receivers

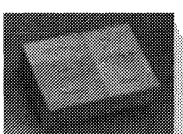
Video Tx and Rx
Meets or Exceeds EIA RS-316
High Speed Telemetry Data
GaAs FET Technology
Rugged and Compact
Surface Mount Design
Adaptable to Full Duplex, Half-Duplex or Simplex

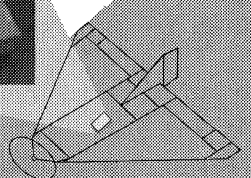
RF Telemetry continued on next page...

AeroComm's turnkey wireless products: we design, build, install, and service our equipment.

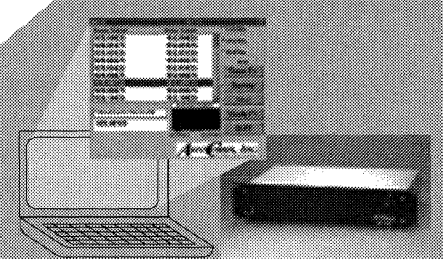
AeroComm, Inc. engineers and produces a wide range of wireless devices as we have for over 30 years. We continue to design and develop solutions to our own needs, and are proud to make them available for use in the industry.

Wireless products including:





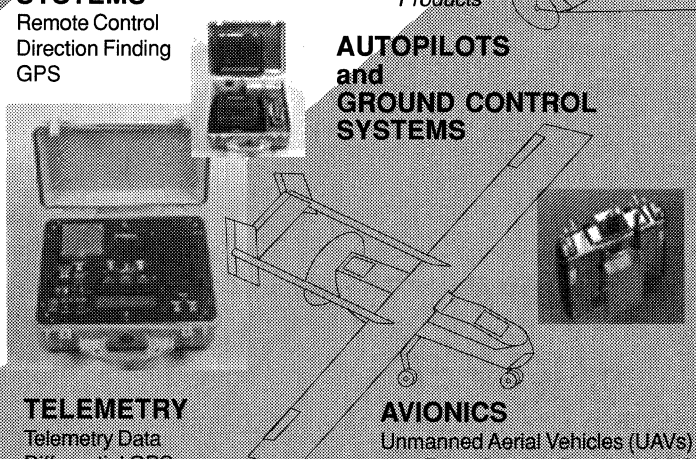
Avionics Products



Ultra-Q Filters
See Section 2750

WIRELESS DELIVERY SYSTEMS
Remote Control
Direction Finding
GPS

AUTOPILOTS and GROUND CONTROL SYSTEMS

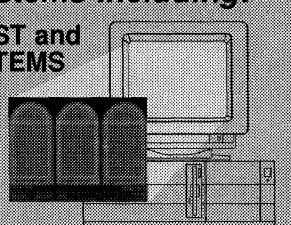


TELEMETRY
Telemetry Data
Differential GPS

AVIONICS
Unmanned Aerial Vehicles (UAVs)
Low Earth Orbiting Satellites (LEOs)
PAN, TILT, ZOOM
Long Range Video

Wireless systems including:

REBROADCAST and TUNNEL SYSTEMS
Tunnel-Linc
DAIs
CBAs
CBCs
See Section 4100



MULTIPLE ADDRESS SYSTEMS
Wireless Communications Networks
See Section 2200

BOOSTER AMPS
VHF / UHF
Channelized
SmartBooster
See Section 4100

. . . and we're not just wireless:
POWER LINE CARRIERS
for trains and subways

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Phone: 301.540.0700 FAX: 301.540.5743

AeroComm, Inc.
A Wireless Systems Company

30 Years of Wireless for Commercial and Military Communications

RF TELEMETRY MODULES

NEW! *Synthesized* VHF & UHF,
NEW! *Synthesized* S-BAND & L-BAND

HF, VHF, and UHF

APPLICATIONS:

Unmanned Aerial Vehicles (UAVs)
Low Earth Orbiting Satellites (LEOS)
Long Range Video
Autopilots
Avionics
Remote Control
Direction Finding with GPS
Radio Controlled Delivery Systems
Security and Surveillance

FEATURES:

VHF & UHF TRANSMITTERS

Power Levels:	0.1,1,10 Watts
Frequency Stability:	± 0.0005%
Temperature Range:	- 30°C to + 60°C
Data Bandwidth (analog):	300 Hz to 5 KHz
Data Bandwidth (digital):	TTL / CMOS

VHF & UHF RECEIVERS

Sensitivity:	-115dBm
Bandwidth:	+7.5 KHz
Image Rejection:	>100dB

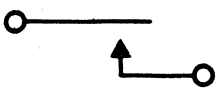
* Transmitter size: 3.5" x 3.2" x 2.5" (Left)
Receiver size: 6.5" x 5.15" x 1.75" (Right)

COMMON SPECIFICATIONS	VHF & UHF	UHF (MAS)	L-BAND & S-BAND
Frequency Range (Crystal select or synthesized):	131-512 MHz	806-960 MHz	1500-2300 MHz
Frequency Stability:	± 0.0005%	± 0.00015%	± 0.0005%
Output/Input Impedance:	50	50	50
Emission Type:	15F2-16F9	25 F2,9,50 F9,100 F9,200 F9	Video/Hi-speed Data
Audio Response/Baseband Width:	300 Hz-3 KHz	300 Hz-3 KHz	10 Hz to 6 MHz
Duty Cycle:	Continuous	Continuous	Continuous
Power Supply (Vdc):	10.5 to 15.5	10, 11, or 12	10 to 32
Weight:	12 ozs.	12 ozs.	<2 LBs
Size:	6.2" x 4.3" x 1"	6.2" x 4.3" x 1"	*(Shown above)
Connectors - RF Output:	BNC	SMA (Female)	SMA (Female)
Channel Spacing:	6.25 KHz	12.5 KHz	1 MHz
TRANSMITTERS			
RF Power Output (min) @ 12.5V:	2, 5 or 10 Watts	2 & 5 Watts	2 & 10 Watts
Spurious & Harmonics:	43+10 log Po	43+10 log Po	60dBc
Data Bandwidth (analog):	n/a	n/a	Video subcarrier
Infinite Load VSWR:	No Damage	No Damage	No Damage
Input Impedance (analog):	10K	10K	75 ohms
Modulation Sensitivity:	100mV rms/3KHz	100mV rms/3KHz	3V / MHz
Power Supply Current Typical @ 12.5Vdc:	0.4A @ 2 Watts 1A @ 5 Watts 2A @ 10 Watts	0.4A @ 2 Watts 1A @ 5 Watts (plus oven)	0.8A @ 2 Watts 2.2A @ 10 Watts
Power Supply Current (standby):	<1mA	<1mA	n/a
RECEIVERS			
Sensitivity - 12dB Sinad:	0.25uV	0.50uV	-92dBm
20dB Quieting:	0.50-0.60uV	0.80uV	-96dBm
Spurious & Image Rejection:	>70dBc	>60dBc	>70dBc
Adjacent Channel Rejection:	>80dBc	>80dBc	n/a
Modulation Acceptance (min):	± 7 KHz	± 7 KHz	±10 MHz
3rd Order Intermodulation:	+10dBm	+15dBm	+30dBm
Field Strength (RSSI):	0-5V	0-5V	0-5V
Receiver Audio or Video Output Level:	0-1.5Vpp (adj)	0-1.5Vpp (adj)	0.1Vpp
Power Supply Current - Audio / Digital:	20mA (max)	50mA (max)	300mA
Noise Figure:	n/a	n/a	<2dB

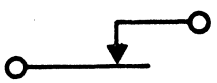
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE - CONSULT FACTORY FOR COMPLETE SPECIFICATIONS ON PRODUCTS

MINIGLOSSARY
RELAY CONTACT FORMS

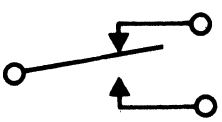
A
Make
SPST-NO



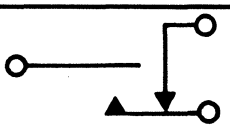
B
Break
SPST-NC



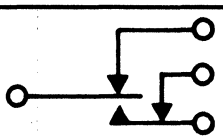
C
Break, Make
(Transfer)
SPDT



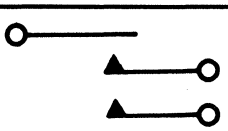
D
Make, Break
(Continuity
Transfer)



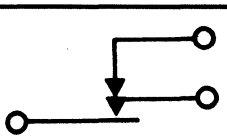
E
Break,
Make,
Break



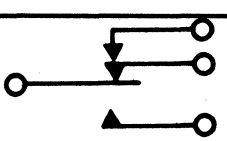
F
Make,
Make



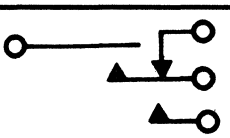
G
Break,
Make



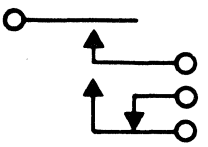
H
Break,
Break,
Make



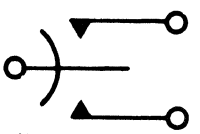
I
Make,
Break,
Make



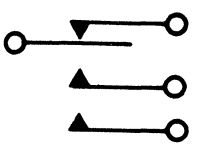
J
Make,
Make,
Break



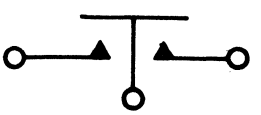
K
Center off
SPDT



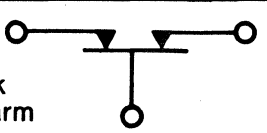
L
Break,
Make,
Make



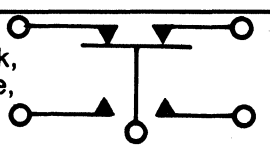
U
Double
make
Contact
on arm



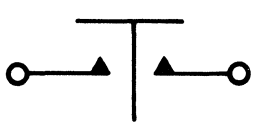
V
Double break
Contact on arm



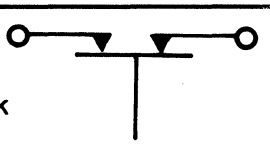
W
Double break,
Double make,
Contact
on arm



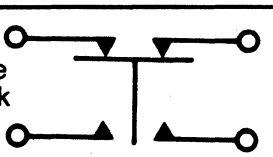
X
Double
make



Y
Double break



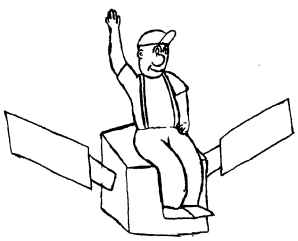
Z
Double make
Double break
SPDT-DB



DATACHRON

Manufacturers of Precision Time and Frequency Sources and Related Equipment

At nearly all facilities where data is collected the need exists to time tag the data for the purpose of its correlation and indexing. Datachron manufactures equipment to satisfy the simplest to the most sophisticated time tagging and frequency correlation needs.

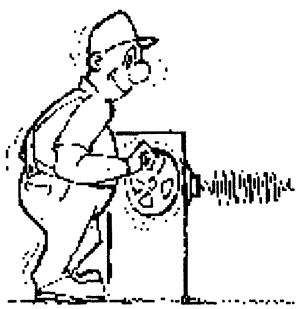


GPS Receivers:

Used to extract precise time and/or frequency information from the GPS signal. The GPS frequency is used to discipline an internal oscillator with a resultant accuracy of up to 100 nanoseconds. Units are available in rack mount, portable and board level configurations. Position data is also provided. Outputs include display of time and position, time codes, precision frequencies, pulse rates and computer interfaces.

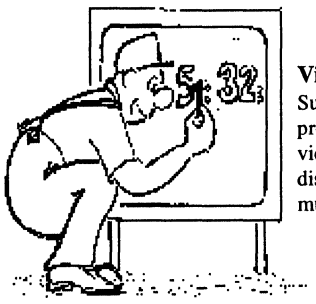
Time Code Translators:

Used when you need to read time previously recorded on magnetic tape. These units operate in forward or reverse directions and at high and low tape speeds. Numerous output options facilitate the input of tape time to your computer or data system.



Time Code Generators:

The source of real or countdown timing signals. These units can be manually synchronized or synchronized to a more stable reference via a serial time code or an integral **GPS Receiver**. Outputs available include serial time codes, pulse rates, reference frequencies and direct computer interfaces. Datachron time code generators come in various shapes and sizes ranging from cards to miniature airborne to rack mount units.

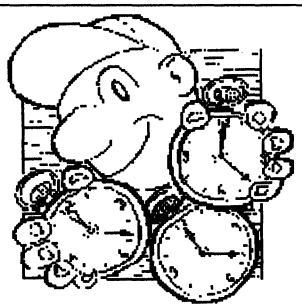


Video Character Inserters:

Superimpose time and other operator programmed data into a composite video signal for recording or direct display on a monitor. Single and multiple channel units are available.

Distribution Amplifiers:

We offer an extensive library of distribution modules and chassis for the distribution and receipt of timing, frequency and data signals.

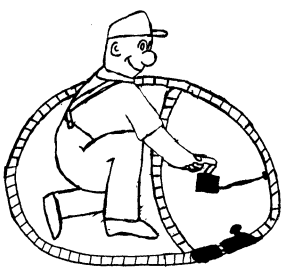


Timing Systems:

We have furnished complete timing systems for a number of applications. These have ranged from redundant sources of timing and frequency signals to countdown/real time systems which control the firing of, and data collection from, vehicles on a high speed test track.

Remote Displays:

Both time and data displays are available ranging in character height from 0.5 to over 3 inches. The displays come in rack, wall and ceiling mount configurations.



Matrix Switches:

These solid state switches are used to connect each of up to 100 time or data inputs to one or more of 100 outputs. Both local and remote control of the matrix configuration is provided. A Windows based control program is available for remote control. Various matrix sizes can be furnished.

The personnel at Datachron possess extensive experience in designing and producing time, frequency and switching equipment. Whether it be through utilization of our standard units or the development of a special unit or system, we can meet your needs and would welcome the opportunity to work with you.

DATACHRON

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Website: www.datachroninc.com • E-mail: time@datachroninc.com

1999 IC MASTER CD-ROM
for Windows

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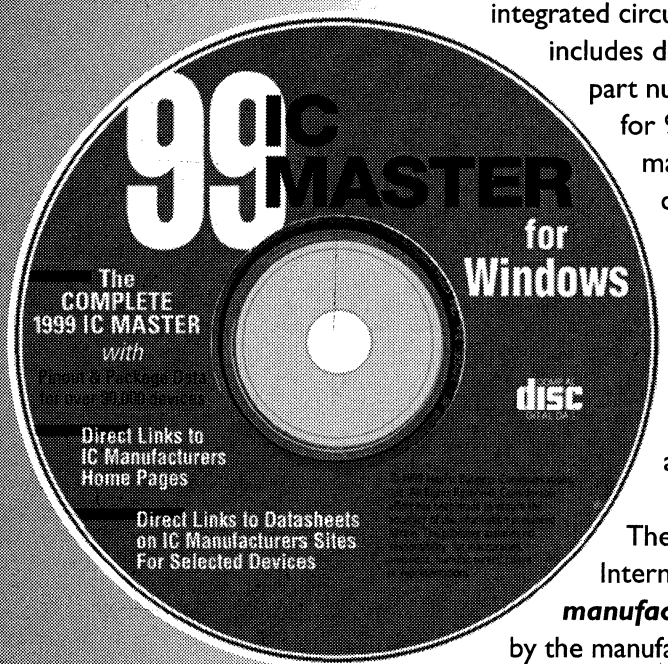


The **1999 IC MASTER CD-ROM for Windows** gives you direct access to product information on current and discontinued integrated circuits from over 300 manufacturers. The database includes device specifications for more than 135,000 base part numbers with pinout diagrams and package styles for 90,000 of these devices. Plus, complete manufacturer contact information with sales office and distributor listings.

A powerful part number and specification search engine lets you narrow your search to a few possible devices in just minutes. Then make your final device choices based on the most current and reliable information available, the manufacturer's own data!

The CD-ROM search program can launch your Internet browser and ***link*** you directly ***to the manufacturer's own website.*** And, for devices selected by the manufacturer, ***link*** you directly ***to the actual datasheets*** for the device on the manufacturer's website.

There is simply no better time-saving tool for IC buyers and specifiers.

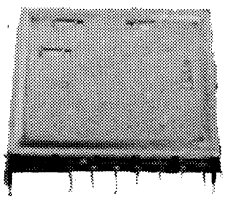
To order your 1999 IC MASTER CD-ROM for Windows
contact your local IC MASTER distributor or Marie Botta at:

Hearst Business Communications, Inc.
645 Stewart Avenue, Garden City, NY 11530
(516) 227-1314 FAX (516) 227-1453
Credit Card Hotline: 1-800-833-7138

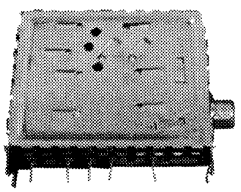
Tell Marie you saw IC MASTER in the 1999 EEM, and she'll take $10.00 off the subscription price!
The IC MASTER CD-ROM is released annually in March.
See us on the World Wide Web at http://icmaster.com

EPD
ELECTRONICS INC.
P.O. BOX 2517, GARDENA, CA 90247
16921 S. Western Ave., No. 300, Gardena, CA 90247 (310) 515-4996

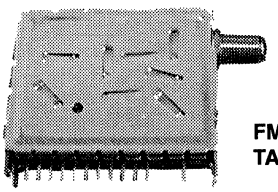
900/2400 MGHz TRANSMITTER AND RECEIVER MODULE



FMRXS 917
FMTXS 917



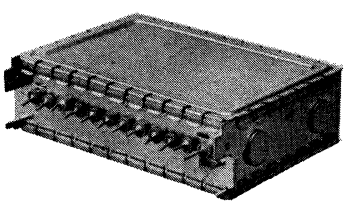
TAV918 M12L
FM900 RTIC
FM950 TSTC
FM200 TSIC
RAV900 M12C



FM2400 RTIC
TAV918 M12L

PIF 45CM02

45.75 MHZ PICTURE CARRIER INPUT
B+ 12V ± 10% MAX 13.2V
AFT, AGC, AFT SW, AUDIO
ATTENUATOR AND VIDEO
AND SOUND OUT

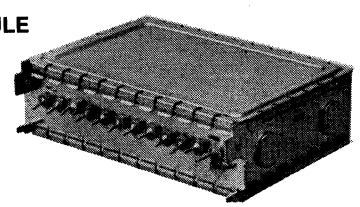


PIF 61CM02

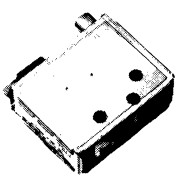
61.25 MHZ CHANNEL -
3 INPUT DEMODULATOR
VIDEO AND SOUND OUT

PIF CC101

CLOSED CAPTION MODULE



MODEL NO. RF-3405/3406 RF-MODULATOR



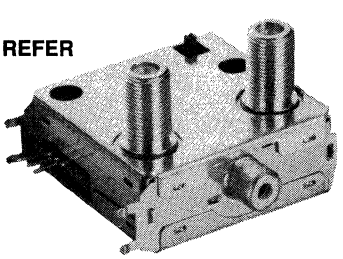
CRYSTAL CONTROLLED
FOR STABILITY

RATING	
Channel Output:	USA, Channel 3 NTSC USA, Channel 4 NTSC
Supply Voltage	9V ±0.5V
Current Consumption:	45 ma. maximum
RF Output Impedance:	75 ohm unbalanced (phono jack)
Input Voltage:	Video: 1 ±0.2Vpp Sound: 0.5 ±0.1 RMS
Temperature Range:	0-50°C
Humidity Range:	10-80%
PERFORMANCE VIDEO	
Video Carrier Frequency	CH-3 61.25 ±50 KHz CH-4 67.25 ±50 KHz
Video Modulation	75 ±10% VR1 at mid point
Video Carrier Output	66 ±3dbm 75 ohm loaded
Differential Gain	±10% at standard modulation
Differential Phase	±10%
PERFORMANCE SOUND	
Subcarrier Frequency	500 ±5 KHz
Sound Carrier Output	−16 = 3db value against FV
Distortion	3% maximum
Signal To Noise	40db maximum
Dimensions	2″ L x 1.5″ W x ¾″ H

MODEL NO. RM-EPMS3411

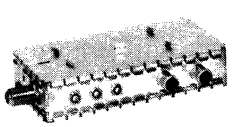
RF MODULATOR
W/AB SWITCH

SPECIFICATION REFER
TO OUR 3405/6



DBT950 D8T1750

SATELLITE TUNERS



IF = 70 MHz FC = 950 MHz—1.500 MHz	A.I/P Impedance = 75 Ω Unbalanced Output Impedance = 75 Ω Balanced
Prescribe Option by Order.	

OTHER VHF, UHF, CATV TUNERS AVAILABLE.

MODEL NO. VM-1000 RF MODULATOR

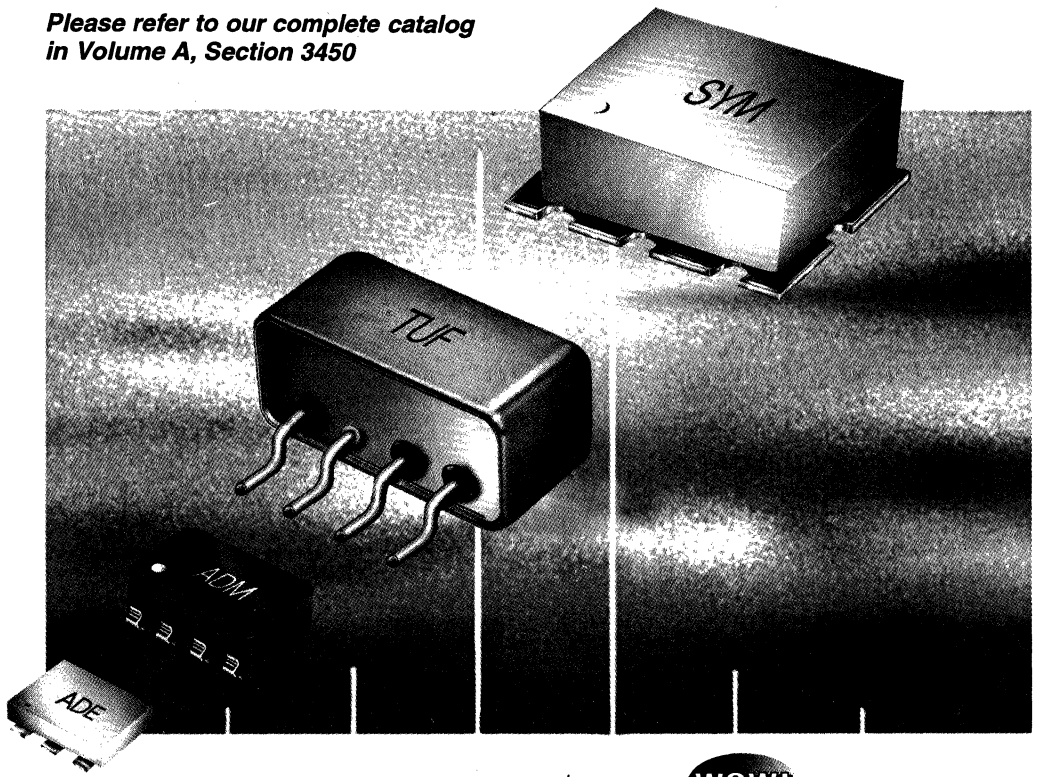
ELECTRICAL SPECIFICATIONS

Rating: Channel Output:	USA CH 3 NTSC/USA CH 4 NTSC
Supply Voltage:	9 ±0.5 VDC
Current Consumption:	60 ma Max.
RF Output Impedance:	75 ohm unbalanced
Input Voltage:	Video 1 ±0.2 VP-P/Audio 0.5 ±0.1 VRMS
PERFORMANCE VIDEO:	
Video Carrier:	CH 3 61.250 ±50 KHz/CH 4 67.250 ±50 KHz
Video Carrier Output:	66.5 ±2.5 dbu
Video Modulation:	
Smear:	7% max./S/N 45db min.
PERFORMANCE—SOUND:	
Sub-Carrier Frequency:	4500 ±5 KHz
Sound Carrier Output:	−15dB
Sound Modulation:	70 ±10%/S/N 40 db min.
Radiation:	23.5 dbu 1m method
Spurious Response:	−32db max.
Dimensions:	3.375″ L x 3″ W x 1.250″ H Weight: 6 oz.

HIGH IP3 MIXERS

suppress noisy intermods

Please refer to our complete catalog in Volume A, Section 3450



+30dBm IP3 100 to 2200MHz from $7.95 (10-49 qty.) WOW!

The popularity of wireless communication services is soaring, but when signal overcrowding creates intermodulation distortion... Mini-Circuits has the solution! Our full range of low distortion high IP3 mixers provide the muscle it takes to ***suppress noisy intermods*** and clear the air of unwanted signals. At the same time, these affordable surface mount and plug-in solutions achieve low conversion loss and excellent L-R, L-I isolation. Developed for both analog and digital use, applications include airphone, cellular and cordless phones, radar, satellite, FM Broadcast, ISM, PCS, and PCN. Achieve the high performance your customers expect. Specify low loss, high IP3 mixers from Mini-Circuits. It's the clear choice!

Mini-Circuits...we're redefining what VALUE is all about!

TYPICAL SPECIFICATIONS (LO=+17dBm), Surface Mount

Model	Freq. (MHz)	IP3 Midband (dBm)	Isol. Bandwide L-R	Isol. Bandwide L-I (dB)	Conv.Loss Midband (dB)	Price $ea. Qty. 1-9
*ADE-10H	400-1000	30	39	25	7.0	7.95**
*ADE-12H	500-1200	28	34	28	6.7	8.95**
SYM-10DH	800-1000	31	45	29	7.6	18.95
SYM-22H	1500-2200	30	33	38	5.6	19.95
•TUF-18DHSM	100-1800	27	41	33	7.3	21.95
*ADM-10DH	800-1000	30	35	37	6.0	15.95

* it™ *Innovative Technology* ***(Patent Pending)***

***Quantity 10 to 49*
•Plug-in version available, specify TUF-18DH
Available in tape and reel.

Mini-Circuits®

US INT'L *CIRCLE READER SERVICE CARD*

P.O Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718)332-4661 ***INTERNET*** http://www.minicircuits.com

For detailed specs on all Mini-Circuits products refer to • 760- pg. HANDBOOK • INTERNET • THOMAS REGISTER • MICROWAVE PRODUCT DATA DIRECTORY • EEM

ISO 9001 *CERTIFIED*

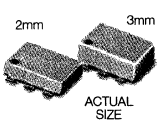
F 270 Rev Org

INNOVATIVE MIXERS

•smaller size •better performance •lower cost *1 to 3500MHz from* $2.95 (qty.10-49)

it™ *innovative technology*

Searching high and low for a better frequency mixer? Then take a closer look at the Innovative Technology built into Mini-Circuits ADE mixers. ***Smaller size*** is achieved using an ultra-slim, patent pending package with a profile as low as 0.078 inches (2mm) in height. Electrically, ADE mixers deliver ***better performance*** than previous generation mixers by using shorter connection lengths to dramatically improve high frequency performance. The result is higher IP2 and IP3 numbers for superior intermod suppression. Plus, ADE's innovative package design allows water wash to thoroughly drain. Another ADE high point is the ***lower cost***...priced from only $2.95 each (qty.10-49). So, if you've been searching high and low for a mixer that will exceed your expectations...ADE is *it*™



ADE Mixers...Innovations Without Traditional Limitations!

ADE* TYPICAL SPECIFICATIONS:

Model	Height (mm)	Freq. (MHz)	LO (dBm)	Conv. Loss Midband (dB)	L-R Isol. Bandwide (dB)	IP3 (dBm) @ Midband	Price ($ea.) Qty. 10-49
ADE-1ASK	3	2-600	+7	5.3	50**	16	3.95
ADE-2ASK	3	1-1000	+7	5.4	45**	12	4.25
ADE-12	2	50-1000	+7	7.0	35	17	2.95
ADE-14	2	800-1000	+7	7.4	32	17	3.25
ADE-901	3	800-1000	+7	5.9	32	13	2.95
ADE-13	2	50-1600	+7	8.1	40**	11	3.10
ADE-20	3	1500-2000	+7	5.4	31	14	4.95
ADE-18	3	1700-2500	+7	4.9	27	10	3.45
ADE-3GL	2	2100-2600	+7	6.0	34	17	4.95
ADE-3G	3	2300-2700	+7	5.6	36	13	3.45
ADE-35	3	1600-3500	+7	6.3	25	11	4.95
ADE-18W	3	1750-3500	+7	5.4	33	11	3.95
ADE-10H	3	400-1000	+17	7.0	39	30	7.95
ADE-20H	3	1500-2000	+17	5.2	29	24	8.95

Component mounting area on customer PC board is 0.320"x 0.290".
Available in tape and reel.
**Specified midband.

Patent Pending.

Please refer to our complete catalog in Volume A, Section 3450

Mini-Circuits®

US INT'L

CIRCLE READER SERVICE CARD

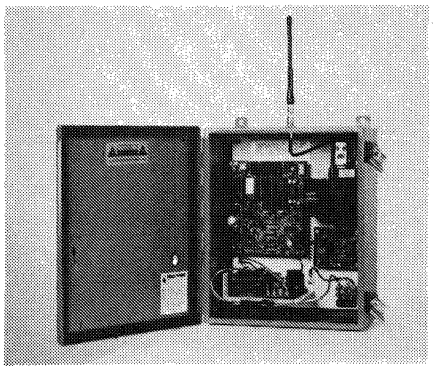
P.O Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718)332-4661 ***INTERNET*** http://www.minicircuits.com

For quick access to product information see MINI-CIRCUITS CATALOG & WEB SITE • EEM • MICROWAVE PRODUCT DATA DIRECTORY • WWW.RFGLOBALNET.COM

F267 Rev. B

ISO 9001 *CERTIFIED*

WIRELESS COMMUNICATIONS & CONTROL



Long Range Wireless Communications

SAI's CD8000/RFX Radio Modem provides you with a wireless full duplex 2400 (4800 optional) baud serial ASCII channel over a built in 2 Watt VHF or UHF RF link. Now you have a cost effective solution to those hard to wire, or mobile communications problems. The CD8000 is perfect for point to point, multi-drop, or data collection and control applications, all without the cost of hardwiring, or expensive phone lines!

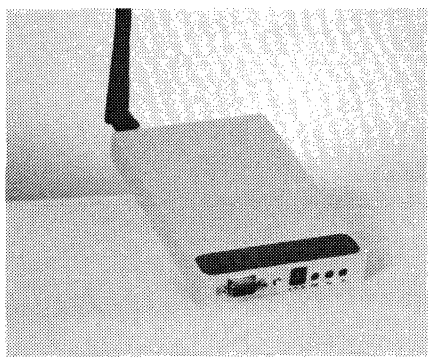
CD8000/RFX

Serial Interface
RS232 DCE Standard, 20mA/RS485 Optional

Transmitter
Frequency Range: 150-175MHz or 450-475MHz
Type: FM Direct modulation
Power Output: 2 Watt (4 Watt optional)

Receiver
Frequency Range: 150-174MHz or 450-475MHz
Sensitivity: 12db SINAD .3uV
Selectivity: -65db @ ±25KHz

Radio Link Communications
Baud Rate: 2400 standard, 4800 optional
Error Detection: CRC16
Error Correction: Automatic retries



High Speed Wireless Communications

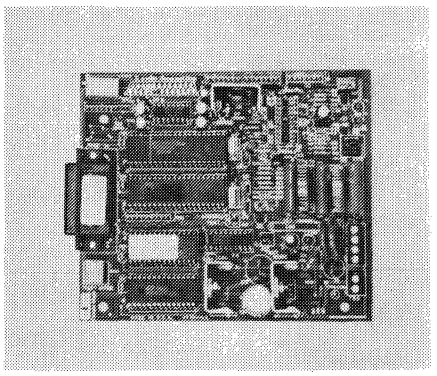
SAI's CD8300/RSS Radio Modem provides you with a wireless full duplex 19.2K baud serial ASCII channel over a built in **Spread Spectrum RF** link. Now you have a cost effective solution for those hard to wire, short or medium range communications problems. The CD8300 is perfect for point to point, multi-drop, or data collection and control applications, all without the cost of hardwiring, or FCC Licensing!

CD8300/RSS

Serial Interface
RS232 DCE Standard, 20mA/RS485 Optional

Radio Link Communications
Power Output: 400Mw
Frequency: 902-928MHz
Channels: 4
Range: Up to 1000'

Radio Link Protocol
RF Baud Rate: 121Kb
Error Detection: CRC16



You're Already Wired!

SAI's CD8000 power line modem converts your facility's power wiring to a high speed full duplex serial ASCII channel. Now you have a cost effective solution to those hard to wire, or mobile communications problems. The CD8000 is perfect for point to point, multi-drop, or data collection and control applications, all without the cost of hardwiring!

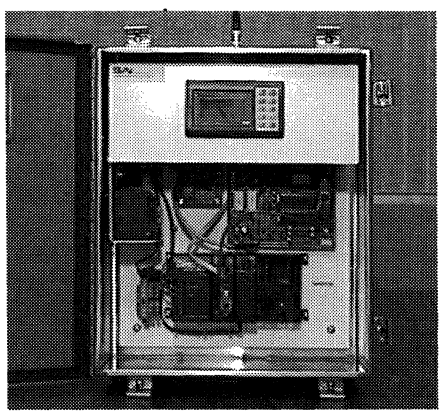
CD8000/PLM

Serial Interface
RS232 DCE Standard, 20mA/RS485 Optional

Transmitter
Type: Constant current carrier
Frequency: 125KHz standard, adjustable 115-135KHz

Receiver
Type: Phase Locked Loop with 30% of capture
Sensitivity: 5mv (66db attenuation from transmitter)

Powerline Communications
Baud Rate: 4800 standard, 9600 optional
Error Detection: CRC16
Error Correction: Automatic retries
Path: Any two wires with less than 250V AC or DC on them (480V with optional coupler)



Wireless Digital And Analog Signals

SAI's Innovative CD8100 Data Mirror is a configurable RTU utilizing industrial hardened I/O, and wireless communications. The CD8100 provides a flexible and cost effective way to collect data and provide control at remote locations. The CD8100 utilizes the industry standard Modbus protocol, and thus is compatible with most SCADA or MMI master stations. Alternatively a CD8100 can be a master for multiple remotes, "mirroring" the remotes I/O on the master's I/O-perfect for applications where there is no master SCDADA computer. In this form the master CD8100 can directly feed lights, switches, chart recorders, or PLC I/O. All of this over a variety of wireless communications options.

CD8100

Communications Options
Powerline carrier (see CD8000/PLM specs.)
Narrow band Radio (see CD8000/RFX specs.)
Spread Spectrum Radio (see CD8300/RSS specs.)
or leased phone line.

Digital Inputs
Order in groups of 8 pts (120 vac or 24 vdc)

Digital Outputs
Order in groups of 8 pts (120 vac, 24 vdc, relay)

Analog Inputs
Order in groups of 4 pts (4-20ma, 0-10v) 12 bit

Analog Outputs
Order in groups of 2 pts (4-20ma, 0-10v) 12 bit

Need solutions? SAI offers complete engineered systems from concept through installation and start-up. Competent analysis and proposals for control and automation solutions and custom manufactured component parts, modems, protocol converters and PLC's are available.

SAI

Compu-Mech Communications and Control Group
Systems Alternatives - 1705 Indian Wood Circle, Maumee, Ohio 43537
Ph: 419-891 - 1100 Fax: 419-891 - 1045

Communication Switching, Conferencing and Control Systems

PROCOM-1400 and PROCOM-1500 SERIES

"Programmable Communication" Systems with on-site user reconfiguration capability.

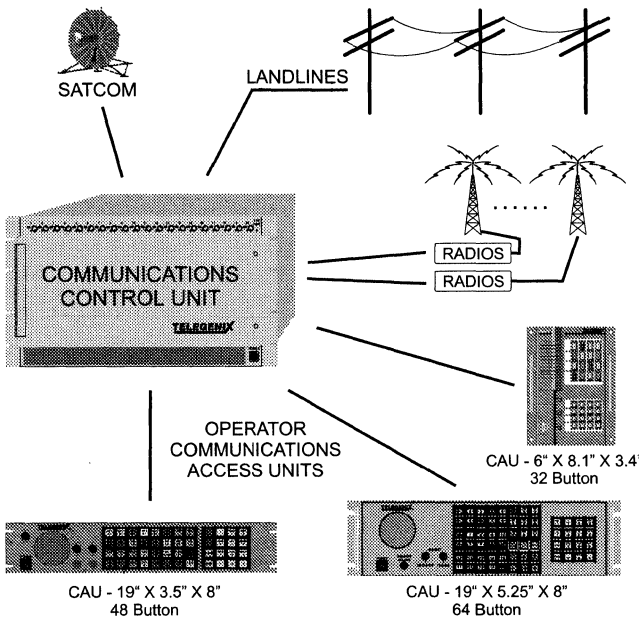
OVERVIEW

The PROCOM Series provides small to large communications switching and control system capabilities for "fixed ground" (Type 1400) and "ruggedized transportable" (Type 1500) applications, including -

- Vessel Tracking Control Systems
- Emergency Services - Fire, Police, Disaster Dispatch
- Air Traffic Communication and Control
- Tactical and Range Command and Control
- Signal Intelligence and Counter-Terrorist Activity
- Communication and Control Training Simulation

FEATURES

- The PROCOM family provides ***flexible, configurable "Off-The-Shelf"*** systems to meet your communication switching requirement - your way.
- The state of the art Integrated Communication Control System provides ***multichannel intercom, telephone and radio control*** at multiple operator positions with independent voice logging.
- ***Interface to devices*** via hardwire, microwave, fiber optic, etc.
- Configurable ***totally non blocking or selective blocking*** audio connectivity.
- ***Full conferencing*** capability with selective networks.
- Standard operational protocol and housekeeping functions factory ***configured on modular plug-in EPROMS*** (Erasable programmable Memory). Future upgrades can be made by user EPROM substitution in the field.
- ***Non-volatile RAM retains current system configuration*** in case of primary power loss or system shut-down.
- Integrated ***Red/Black capabilities*** available.
- ***Simple installation*** procedures allow connection by the user and quick turn- on after delivery.
- ***Modular architecture*** allows implementing the system components in a small package to meet the user's need and permit easy maintenance by substitution of common spare modules.
- ***High MTBF*** and ***low MTTR*** provide a reliable, easy to maintain, full featured Integrated Communication and Control System. Any subsystem degradation will cause only a temporary loss of one operator console or one external or radio landline trunk. Full system restoration is normally less than 15 minutes by modular component replacement.
- ***No special test equipment*** is required for on-site service to the modular replacement level.
- All PROCOM family systems are provided with a standard ***one-year factory warranty*** with extended service optionally available.



IVDM - 102 SMART MODEM

"Smart" Integrated Voice and Data Modems for Remote Control of Radio Channels and efficient use of inexpensive transmission links.

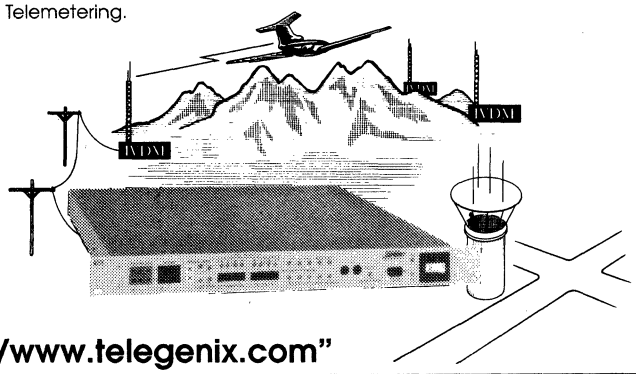
OVERVIEW

The IVDM-102 is a versatile, cost-effective "Smart" universal subsystem specifically engineered to handle a variety of remote radio control requirements. Normally connected in pairs via a 4-wire voice grade non-distance limited telephone line, IVDMs provide simultaneous transmission and reception of voice and data.

IVDM-102s have a number of operating features that allow use in typical two-way voice plus radio control combinations. Simultaneous audio can be switched to any of six locations on a priority basis while analog and digital inputs and outputs allow operator remote control and remote monitoring.

APPLICATIONS

- Remote radio transmitter and receiver control.
- Remote radio frequency tuning.
- Remote monitoring and intrusion detection.
- Computer to computer interface over long distance.
- Alarm and Control functions.
- Telemetering.



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Email: Sales@telegenix.com

Visit our Website at:"http://www.telegenix.com"

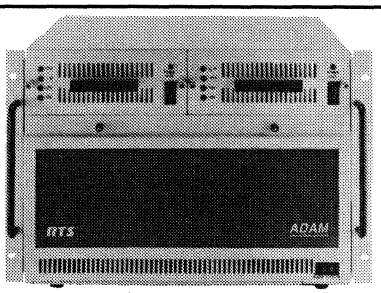
Telex®

RTS ADAM™

The RTS ADAM™ (Advanced Digital Audio Matrix) Intercom System by Telex Communications is both an extension and a successor to the highly successful and proven CS9000 Series matrix intercom used at major installations worldwide. By using a proprietary implementation of Time Division Multiplex (TDM) architecture U.S. patent #5,483,528 for signal switching, the ADAM™ intercom provides a number of advantages over existing systems and includes individual level controls per crosspoint, linear expansion, and a system capacity of more than 1000 users.

The ADAM™ Intercom System is based on the proven CS9000 control system and is fully compatible with the entire line of RTS CS9000 series intercoms including keypanels, telephone interfaces, relay chassis, assignment panels and other accessories. The system is fully compatible with RTS™ Intelligent Trunking, which permits up to 20 RTS™ Matrix Intercom Systems to function as an integrated communications system.

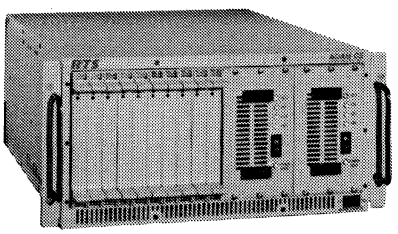
This backward compatibility demonstrates the Telex philosophy to support and offer to our existing customers the possibility to upgrade to new technology while still maintaining existing system components.



RTS ADAM CS

- CD quality audio (19.5 KHz). ADAM CS™ can handle virtually any audio source.
- Compatible with existing CS9000 matrices, key-panels and accessories. Provides a simple and cost effective upgrade solution for existing systems.
- Upgrade path to larger ADAM™ system is available. Provides a platform for virtually unlimited expansion. Expansion is fast, simple and cost effective.
- Redundant power supplies (may be connected to alternate power sourcing) and controllers available. Prevents downtime caused by power failures or component failures.
- Extremely simple installation. The ADAM CS™ chassis is complete with all connectors integral to the unit–no need for breakout panels or other wiring accessories. Just plug in the power and the keypanels and the system is ready to go!

ADAM CS™ uses the proven architecture of the larger ADAM™ system, and provides the same CD quality sound and individual crosspoint level control. The external bus is 24 bits wide to fully preserve the signal quality of all communications. The ADAM™ CS provides up to 64 ports for keypanels and 4 wire signals in a compact 5 RU enclosure.



RTS Zeus™ 2400

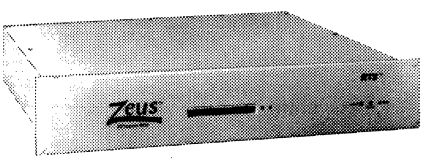
DSP Digital Matrix Intercom System

You need the power and programmability of a top of the line digital matrix intercom, but want it for the price of a party line intercom system or an analog matrix intercom system. You need the capabilities of a fully-featured digital matrix intercom system, but have limited space in which to add the equipment.

The RTS Zeus™ 2400 DSP Matrix intercom system provides 24 channels of high-quality audio in a compact 2 rack unit package.

Each channel is capable of supporting any of the Telex line of matrix keypanels, or 4 wire inputs and outputs for program and IFB feeds.

The Zeus™ 2400 system comes complete with Zeus-Edit, Windows® based, full-featured configuration software, providing on-line and off-line configuration capabilities. Zeus-Edit includes a number of preset system configurations to get any installation up and running in a fast and efficient manner.

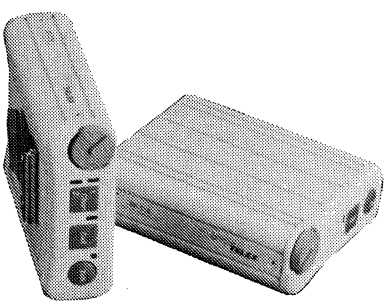


RTS

BP-318 and BP-350 Beltpack

- 1 channel (BP-318) and 2 channel (BP-350) versions
- Call function allows signals to be sent and received between units.
- Call signal detect can activate call light and/or audible call alert signal in headset.
- Talk key can be operated as latching and momentary as standard.
- Microprocessor controlled Remote Microphone Kill detection
- Dynamic, Electret and Carbon microphone capable
- Rugged Extruded aluminum case
- Water resistant construction

Both beltpacks include a host of user configurable features, including audible call alert and remote microphone kill enable. The talk key features RTS™ "digi-action" momentary/latching capability. The beltpacks support carbon, dynamic and electret microphone elements and provide a powerful 60 milliwatts of drive to the headset. The RTS™ BP-318 and BP-350 both provide sidetone level adjustment.
The units are powered externally from the RTS™ intercom line using patented "Bi-Lateral Current Source" technology.
The BP-318 and BP-350 beltpacks are constructed with extruded aluminum bodies and die cast metal end caps for long, long life and reliable operation. The precision fit of the case parts, along with rubber membrane switch covers provide a high degree of water resistance.



Telex® is a leading manufacturer of intercom systems for broadcast, entertainment, military and industrial applications. Telex's RTS™ Matrix systems provide point to point communications and are highly configurable. The Telex® RTS™ and Audiocom® 2 wire systems provide excellent quality partyline communications from simple two station systems to 22 Channel systems with over 100 intercom stations. Telex® also manufactures a wide variety of headsets, microphones, wireless video, audio tape duplicators, and accessories for all your communication requirements.

RTS™

Telex Communications, Inc. • 9600 Aldrich Avenue South • Minneapolis, Minnesota 55420 USA • 612-884-4051
West Coast Office • 2550 Hollywood Blvd. #207 • Burbank, CA 91505 • 818-566-6700
For Fax communication: USA 612-884-0043
E-Mail: pro.sound@telex.com
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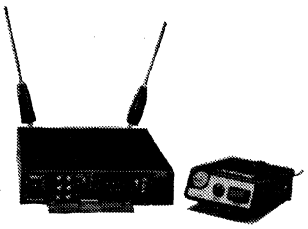
Telex®

Audiocom® Radiocom™ Wireless Intercom Systems



RADIOCOM™ BTR-500/BTR-600 UHF

Wireless Intercom System

The Telex Radiocom™ BTR-500/600 UHF Wireless intercom systems offer the ultimate in reliable, high performance, high fidelity full duplex communications.

The BTR-600 series has all of the features of the BTR-500 with the addition of digital modulation and encryption for secure communications.

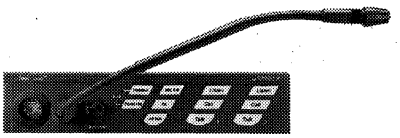
The BTR-500 series includes the BTR-500 frequency agile base station, working with the TR-500 transceiver beltpack. The BTR-500 base station provides full duplex communications with a single belt pack, and can accommodate an unlimited number of beltpacks operating in push to transmit mode.

The BTR systems incorporate auto-switching 2 channel operation, permitting the belt pack operator to choose between 2 separate audio channels of communications, with the base station tracking the belt pack selection. Auto-switching allows the user the flexibility to create party lines within the same beltpack.

The BTR-500 and BTR-600 are perfectly suited for stand alone operation and also are fully equipped with interfaces for RTS™TW, Audiocom™, and Clear-com® party-line intercoms, as well as RTS matrix systems and other 4 wire communications systems.

The BTR-600 series includes digital encryption for those situations where secure communications are required. Base stations and belt packs can choose from over 65,000 security codes out of over 1 million possible codes by means of 4 position cipher codes switches on the units.

The Radiocom BTR series has been designed for reliable, efficient operation. Operating in the 520 to 760 MHz range, the units operate reliably at distances of 1,000 feet.



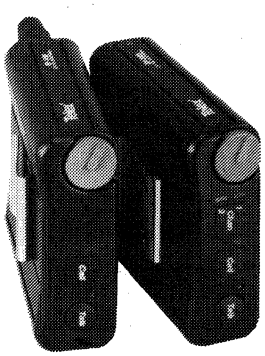
US-2000A

General Features

The US 2000A may be used as a stand-alone, 2-channel, user station or as the core component of any size master station. Use on desktop, or mount in equipment rack with rack mount. Use with monaural headset, handset or goose-neck/speaker combination. All operating buttons are back-lit for high visibility in low ambient light.

Other Features

- Separate VOX circuits (voice activated microphone) with separate VOX sensitivity trimmers for headset microphone and panel microphone.
- Balanced audio program input for each channel, with back-panel input level trimmers.
- Program auto-interrupt during talk selectable via internal switches.
- Program routing to conference lines may be turned on or off via front panel programming.



BP-1000

Single Channel Belt Pack

BP-2000

Two Channel Belt Pack

Telex belt packs deliver long-lasting reliability with their lightweight, high-impact metal cases.

The sturdy and versatile Audiocom® BP-1000 single-channel and BP-2000 dual-channel belt packs can be used with a Telex Audiocom® intercom system or virtually any other wired intercom configuration.

The belt packs are compatible with balanced or unbalanced lines, dynamic or electret microphones and different call signal formats.

Telex belt packs are comfortable and easy to use, featuring a form-fitting, contoured shape and a volume control with 30 distinct positions that prevents unwanted changes in volume levels.

HR-1 HEADSET

The Telex HR-1 headset is a medium weight noise reduction headset with a dynamic microphone. It has a noise reduction rating of 21 dB, and is suitable for use in moderately noisy environments. The HR-1 model features a unique headband design that distributes ear cushion pressure evenly over the entire ear with no pressure points, unlike conventional designs which apply more pressure on the bottom of the ear than on the top. An added advantage of this design is that the headset folds into an extremely compact shape for storage.

Telex® is a leading manufacturer of intercom systems for broadcast, entertainment, military and industrial applications. Telex's RTS™ Matrix systems provide point to point communications and are highly configurable. The Telex® RTS™ and Audiocom® 2 wire systems provide excellent quality partyline communications from simple two station systems to 22 Channel systems with over 100 intercom stations. Telex® also manufactures a wide variety of headsets, microphones, wireless video, audio tape duplicators, and accessories for all your communication requirements.

TELEX®

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Telephone 612-887-5550 • Fax 612-884-0043
Web: telex.com • E-Mail: pro.sound@telex.com

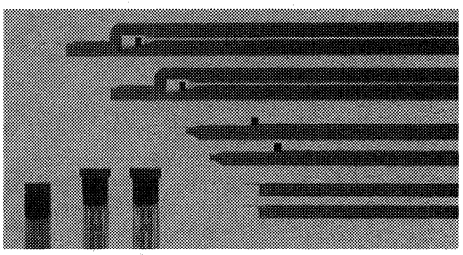
Specifications subject to change without notice.

MICROTRAN.

THICK FILM THERMAL PRINT HEADS

Tamura's Thermal-Printing Heads are manufactured to the highest standards using precision techniques for high reliability printing in applications such as measuring instruments, ticket vending machines, bar code printers and video printers.

SERIAL TYPE THIN FILM THERMAL PRINT HEADS



FEATURES

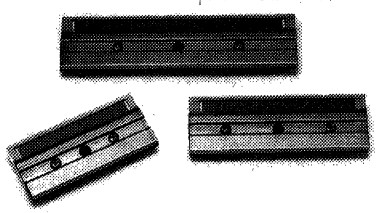
- Excellent thermal response characteristics for high-speed printing.
- A unique heat-proof resistive element for stable performance.
- Newly developed thin-film protective element with improved thermal conductivity, and abrasion durability for greater reliability.
- Excellent for both thermal-sensing and thermal-transcribing techniques.

SPECIFICATIONS

	TAH24R-V2	TAH48R-V2	TAH48L-02	TAH64L-02	Unit
Substrate dimensions	5.3 x 10.0	10.0 x 10.0	10.0 x 5.1	12.0 x 5.1	mm
Number of heat generating elements	24	48	48	64	—
Pitch of heat generating elements	0.141	0.079	0.141	0.141	mm
Average resistance	100~350	100~350	300~500	300~500	Ω
Pulse period	0.5 x 10	0.4~0.6	5~10	5~10	ms
Supply voltage	10~21	10~21	10~12	10~12	V
Driver IC included	NO	NO	YES	YES	—

Note: Custom Designs Available (consult factory)

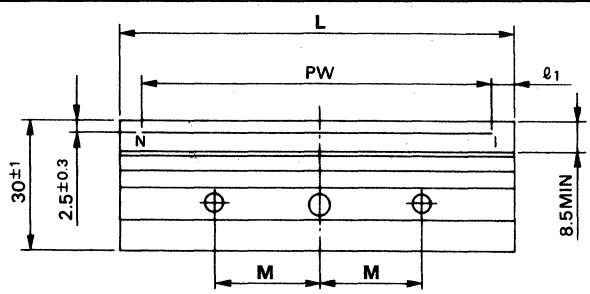
LINE TYPE THIN FILM THERMAL PRINT HEADS



FEATURES

- Operating Voltage: 12V(L1) and 24V(L2) (for 8 dots/mm series) selectable.
- High durability for long life.
- 6-8 dot/mm resolution.
- Custom designs available (consult factory).

	TAS5306 L2	TAS7506 L2	TAS0706 L2	TAS4808 L1/L2	TAS5608 L1/L2	TAS7208 L1/L2	TAS0408 L1/L2	Unit
Printing Width	53	75	107	48	56	72	104	mm
Number of heat generating	320	448	640	384	448	576	832	dot
Heat-generating elements pitch	0.167			0.125				mm
Average Resistance	700			310/1240				Ω
Supply Voltage	24			12/24				V
Print Period	2.5~5.0	2.5~5.0	2.5~5.0	2.5~5.0	2.5~5.0	2.5~5.0	2.5~5.0	mm
Printable Length	50	50	50	50	50	50	50	km



Item / Head NO.	N	PW	L	ℓ1	M
TAS5306	320	53.4	65	5.8	15
TAS4808	384	48.0	65	3.5	15
TAS5608	448	56.0	65	4.5	15
TAS7506	448	74.8	90	7.6	25
TAS7208	576	72.0	85	6.5	25
TAS0706	640	106.9	117	5.1	30
TAS0408	832	104.0	117	6.5	30

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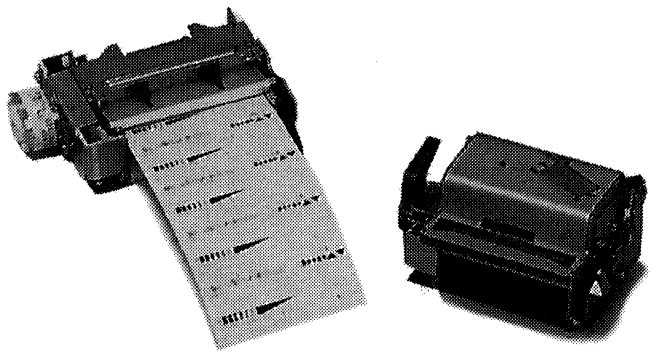
MICRO LINE THERMAL PRINTERS

Tamura printers are used for printing data output from measuring instruments/medical equipment, data communication equipment, ticket vending machines, etc.

tamura
MICROTRAN.

FEATURES

- Horizontal one-line head thermal printing.
- Compact construction for easy maintenance.
- The thick-film line thermal technique provides high reliability, long life and low noise.
- Auto-cutter Guillotine type is optional.
- Reversable paper-insert direction.
- 8 dots/mm resolution.
- Friction paper feeding.
- Photo-interupt "out of paper" detector.
- Operating Temperature Range: 0~+40
- Storage Temperature Range: -20~+60a



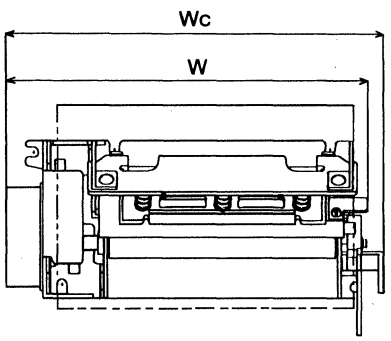
SPECIFICATIONS

	TLPU060A-12xx	TLPU060A-24xx	TLPU112A-12xx	TLPU112A-24XX	TLHU060A-24xx	TLHU080A-24xx	TLHU112A-24xx
Effective print width/ Paper width(mm)	56 / 60		104 / 112		56 / 60	72 / 80	104 / 112
Total number of dots (dots)	448		832		448	576	832
Printing speed (dot line/sec)	300		200		500	500	400
Driving voltage							
Head (V)	12V±5%	24V±5%	12V±5%	24V±5%	24V±5%	24V±5%	24V±5%
Motor (V)	12V±5%	24V±5%	12V±5%	24V±5%	24V±5%	24V±5%	24V±5%
Logic (V)	5V±5%	5V±5%	5V±5%	5V±5%	5V±5%	5V±5%	5V±5%
Weight (g)	210		300		270	330	450

MODEL SELECTION TABLE

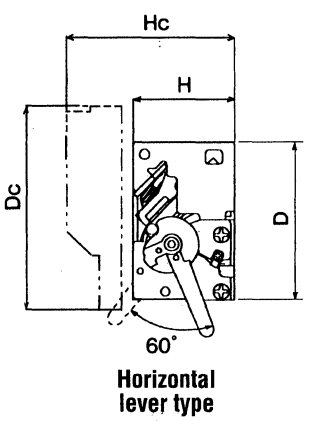
TLPU/TLHU XXX A X 24 X X
❶ ❷ ❸ ❹ ❺

Paper Width ❶	Option I ❷	Head-Motor driving ❸	Paper insert direction ❹	Option II (Head-up lever) ❺
060 : 60mm 080 : 80mm 112 : 112mm	None C: with auto-cutter E: paper guide	12:12V 24:24V	A: Horizontal B: Vertical	A: Horizontal B: Vertical C: Horizontal long D: Vertical long

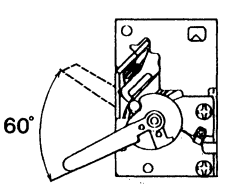


DIMENSIONS

Model	W	D	H
TLHU060A	105.5	55	35.4
TLHU080A	125.8	55	35.4
TLHU112A	159.5	55	35.4
TLPU060A	105.2	59	25.4
TLPU112A	157.2	59	25.4



Horizontal lever type



Vertical lever type

OPTIONAL-AUTOCUTTER

Model	Size of Wc	Size of Dc	Size of Hc
TLHU060AC	109.7	69	65.4
TLHU080AC	131.3	71.5	58.8
TLHU112AC	165.3	68	62
TLPU060AC	111.3	71.8	56.2
TLPU112AC	163.3	74.8	53.7

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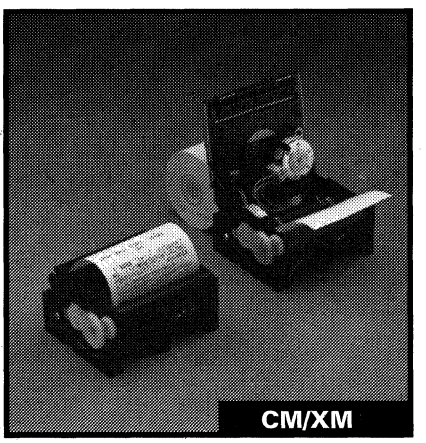
Worldwide Designer and Manufacturer of Thermal Mechanisms, Dot Matrix Printheads, Transaction Printers, Smart Card and Magstripe Readers and Writers

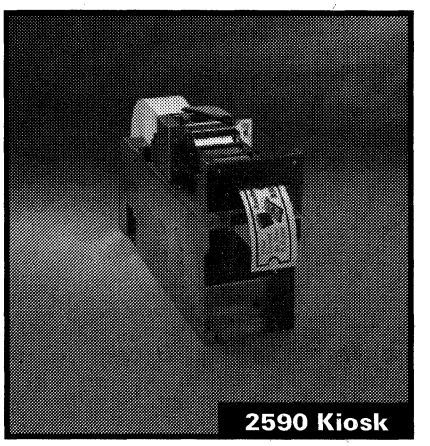
Axiohm Transaction Solutions, Inc., is one of the largest designers, manufacturers and marketers of transaction printers in the world and the only transaction printer manufacturer currently making its own thermal and impact printheads. Axiohm offers a comprehensive product portfolio including dot matrix printers, high-end thermal transfer printers, direct thermal printers, magstripe, smart card and hybrid technologies available in standard and custom configurations. We also have expertise in microelectronics and electro-mechanics.

All of this means you can confidently partner with us on product design. With the acquisition of DH Technology in 1997, Axiohm is your single source for transaction printers, bar code printers, magstripe and smart card readers and writers, card printers, dot matrix impact printheads, magnetic heads, print and apply labeling systems, and consumables for the demanding requirements of retail/point of sale, financial, food service, lottery, ticketing, kiosk, gaming and industrial applications.

Thermal Mechanisms

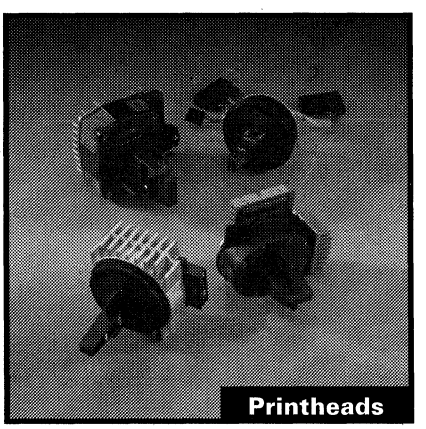
Axiohm designs and manufactures a full range of drop-in printer mechanisms designed to be integrated with other Axiohm accessories — all with injection molded chassis and rugged, ultra-reliable mechanisms for applications where the printer/cutter must not fail. From the compact CM "mini-printer," suitable for cash registers and weighing scales, to rugged kiosk printers for use in ticket, receipt and voucher dispensers, Axiohm offers the benefits of advanced research and development to a host of OEMs.


CM/XM


2590 Kiosk

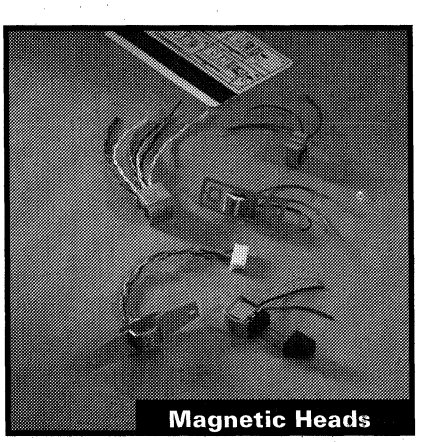
Dot Matrix Printheads

Axiohm is the world's leading independent supplier of dot matrix impact printheads. OEMs can choose from a complete line of standard products that are easily customized to their specific requirements. Streamlined manufacturing methods ensure competitively priced products for a diverse customer base.


Printheads

Magnetic Heads

Technical expertise is the cornerstone of Axiohm's magnetic head manufacturing. We offer a complete line of products for standard and customized applications ranging from standard read and write magnetic heads to leading-edge high-coercivity models, integrated read/write heads, MICR check reader heads and airline ticket & boarding (ATB) heads.

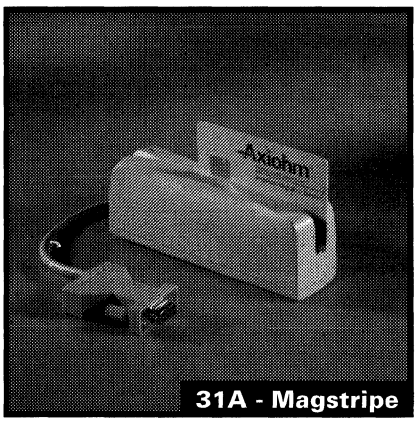

Magnetic Heads

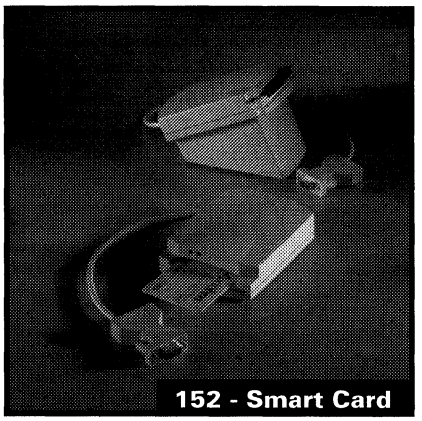
Axiohm™

Making Global Impressions℠

Axiohm American Magnetics Magstripe and Smart Card Reader and Writers

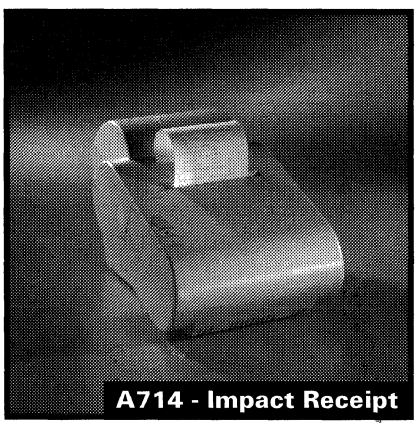
Axiohm American Magnetics is a pioneer in card reading technology and an international leader in the field of card readers and writers, managing a comprehensive product portfolio which includes magstripe and smart card technologies. Applications include POS, finance terminals, auto ID and access control, public terminals, driver licenses and loyalty programs.

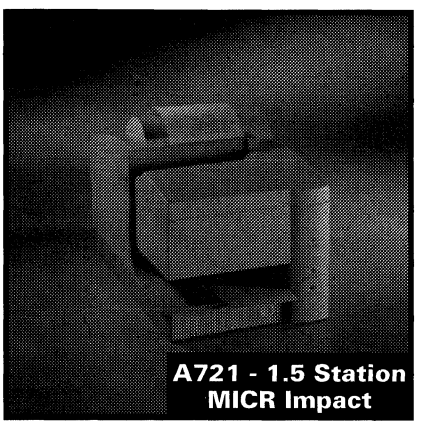


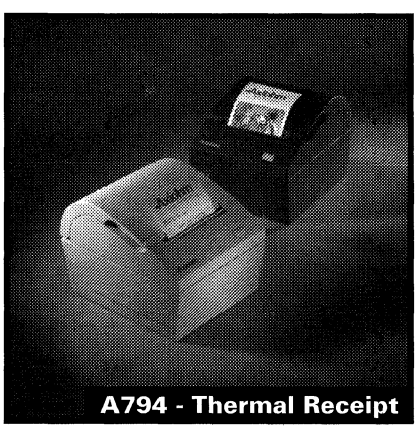


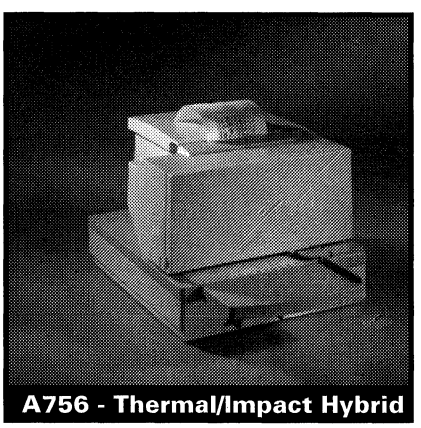
Customized Products

Our engineering team can provide — in addition to Axiohm's full line of finished impact and thermal printers and magstripe and smart card readers and writers — a cost-effective, custom solution with impact or thermal technologies at any level: printhead, mechanism, and/or complete printer.









Boards and Accessories

Axiohm controllers are full-featured compact boards designed to provide flexibility, performance and protection. The controller allows optimization of power consumption and management as well as print speed and quality. In addition, Axiohm offers a full range of accessories including cutters, document presenters and power supplies to provide comprehensive solutions. Axiohm's complete control over the entire product line guarantees maximum efficiency and reliability.

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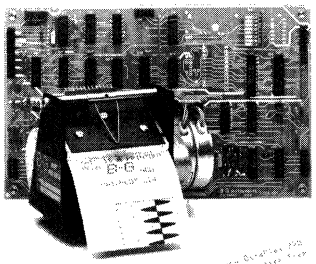
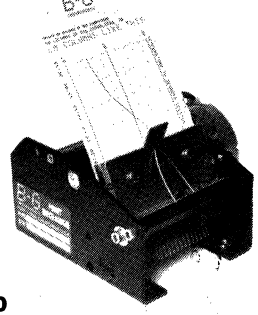
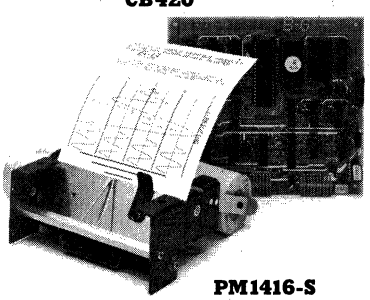


CB1224

PM1224-V



PM1320



CB420

PM1416-S

DataPlot Thermal Print Mechanisms

Model Number	Paper Width	Columns Across[2]	Dots /Inch	Dots /Line	OEM Price[1]
PM1224	2.6 inches	18 to 37	100	224	$311
PM1320	2.6 inches	23 to 53	150	320	$296
PM1416	4.5 inches	29 to 69	100	416	$443

1. This is the 300-piece OEM price. It is subject to change without notice.
2. The maximum number of columns depends on the font and size selected. The higher number is for 5 x 7 characters, approximately 16 characters/in.

DataPlot Printer Control Boards

Model Number	Digital Input	Analog Inputs	OEM Price[1]
CB1224	Parallel & Serial	Optional to 8 channels	$136
CB1320	Parallel & Serial	Optional to 8 channels	$136
CB1416	Parallel & Serial	Optional to 8 channels	$136
CB1100	Parallel & Serial	10-bit, 8-channel std.	$236
CB420	Parallel Only	None	$113

A complete printer normally includes a print mechanism and a control board.

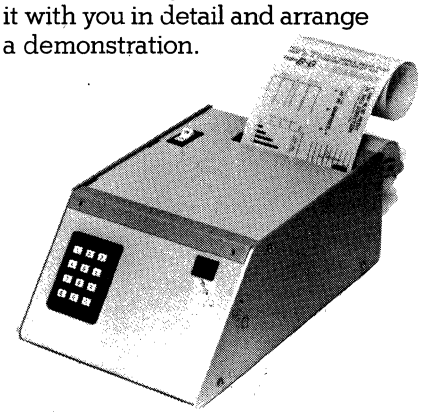
Reliable. All B-G Instruments' printers use fixed-dot, thick-film thermal printheads to achieve fast, quiet operation, long life and reliable performance.

Powerful. B-G's standard DataPlot software makes it easy to print across the paper, print down the paper, and print while you plot data. Simple plotting commands produce curves, grids and bar graphs directly from the input data.

Versatile. For a moderate one-time fixed charge, any B-G printer can quickly be reprogrammed to meet the special requirements of a specific application. Custom character sets, printing stored forms with inserted data, clock/calendar functions, special calculations, conditional operations, these are but a few of the many features that have been included in specially programmed B-G printers.

Custom Instruments. The recording thermograph shown above is built around a DataPlot 1224-V printer with a custom control/interface board that performs A/D conversion, corrects for thermistor non-linearity, drives a panel display and provides the entire logic system. May we design an instrument for your application?

More Information. Detailed brochures, a price list and sample printouts will be mailed to you as soon as we receive your inquiry. If you have an upcoming OEM application, we would be pleased to discuss it with you in detail and arrange a demonstration.



Cabinets and power supplies are also available.

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19615 N. Holcomb • Mead, WA 99021 • Phone: (888) 244-4004 or (509) 238-4757 • FAX: 509/238-4920

ULTRA HIGH-SPEED THERMAL PRINTERS

FTP621 & FTP631 Series

FUJITSU

THERMAL PRINTERS

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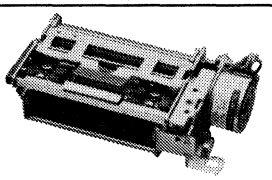
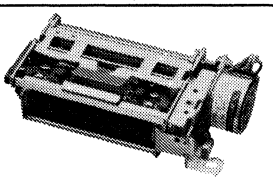
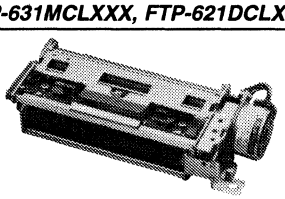
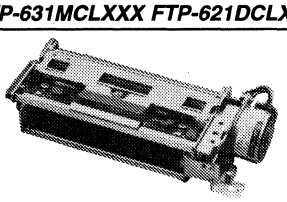
		FTP-621MCLXXX, FTP-621DCLXXX	*FTP-621MCLXXX, FTP-621DCLXXX*
			
Dot structure [dots/line]		448 (or 432)	448 (or 432)
Horizontal dot pitch [dots/mm (dpi)]		8 (203)	8 (203)
Printing speed [dots line/s]		800	800
Dimensions W x D x H [mm (in.)]	**Mechanism**	105 x 48 x 28 (4.134 x 1.890 x 1.102)	105 x 48 x 28 (4.134 x 1.890 x 1.102)
	Interface board	140 x 89 x 24 (5.512 x 3.504 x 0.945)	140 x 89 x 24 (5.512 x 3.504 x 0.945)
Weight [g]	**Mechanism**	210	210
	Interface board	100	100
Power supply voltage [V]		24/5	24/5
Paper width [mm (in.)]		60 (2.362)	60 (2.362)
Remarks		Front paper insertion Centronics standard interface UL recognized	Rear paper insertion Centronics standard interface UL recognized

MODEL	**(DOTS)**	***PART NUMBERS***			
Original Mechanism	**(448)**	FTP-621MCL001	FTP-621DCL001	FTP-621MCL002	FTP-621DCL001
Enhanced Mechanism	**(448)**	FTP-621MCL101	FTP-621DCL002	FTP-621MCL102	FTP-621DCL002
Economical Mechanism	**(432)**	FTP-621MCL201	FTP-621DCL003	FTP-621MCL202	FTP-621DCL003
Enhanced For Cutter	**(448)**	FTP-621MCL301	FTP-621DCL012	FTP-621MCL302	FTP-621DCL012
Economical For Cutter	**(432)**	FTP-621MCL351	FTP-621DCL013	FTP-621MCL352	FTP-621DCL013
Cutter Mechanism		FTP-621CT001		FTP-621CT001	

		FTP-631MCLXXX, FTP-621DCLXXX	*FTP-631MCLXXX FTP-621DCLXXX*
			
Dot structure [dots/line]		640 (or 576)	640 (or 576)
Horizontal dot pitch [dots/mm (dpi)]		8 (203)	8 (203)
Printing speed [dots line/s]		800	800
Dimensions W x D x H [mm (in.)]	**Mechanism**	130 x 48 x 28 (5.118 x 1.890 x 1.102)	130 x 48 x 28 (5.118 x 1.890 x 1.102)
	Interface board	140 x 89 x 24 (5.512 x 3.504 x 0.945)	140 x 89 x 24 (5.512 x 3.504 x 0.945)
Weight [g]	**Mechanism**	260	260
	Interface board	100	100
Power supply voltage [V]		24/5	24/5
Paper width [mm (in.)]		85 (3.346)	85 (3.346)
Remarks		Front paper insertion Centronics standard interface UL recognized	Rear paper insertion Centronics standard interface UL recognized

MODEL	**DOTS**	***PART NUMBERS***			
Original Mechanism	**(640)**	FTP-631MCL001	FTP-621DCL001	FTP-631MCL002	FTP-621DCL001
Enhanced Mechanism	**(640)**	FTP-631MCL101	FTP-621DCL002	FTP-631MCL102	FTP-621DCL002
Economical Mechanism	**(576)**	FTP-631MCL201	FTP-621DCL003	FTP-631MCL202	FTP-621DCL003
Enhanced For Cutter	**(640)**	FTP-631MCL301	FTP-621DCL012	FTP-631MCL302	FTP-621DCL012
Economical For Cutter	**(576)**	FTP-631MCL351	FTP-621DCL013	FTP-631MCL352	FTP-621DCL013
Cutter Mechanism		FTP-631CT001		FTP-631CT001	

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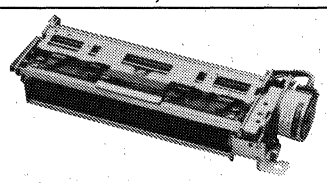
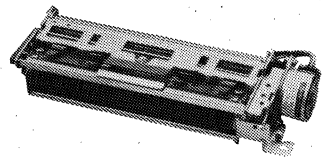
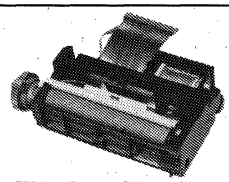
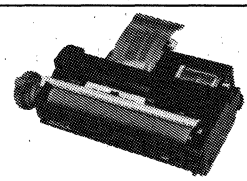
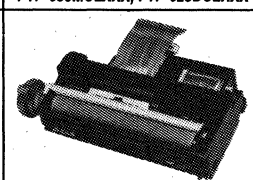
		FTP-641MCLXXX, FTP-621DCLXXX	*FTP-641MCLXXX, FTP-621DCLXXX*
			
Dot structure [dots/line]		832 (or 864)	832 (or 864)
Horizontal dot pitch [dots/mm (dpi)]		8 (203)	8 (203)
Printing speed [dots line/s]		800	800
Dimensions W x D x H [mm (in.)]	Mechanism	159 x 48 x 28 (6.260 x 1.890 x 1.102)	159 x 48 x 28 (6.260 x 1.890 x 1.102)
	Interface board	140 x 89 x 24 (5.512 x 3.504 x 0.945)	140 x 89 x 24 (5.512 x 3.504 x 0.945)
Weight [g]	Mechanism	290	290
	Interface board	100	100
Power supply voltage [V]		24/5	24/5
Paper width [mm (in.)]		114 (4.488)	114 (4.488)
Remarks		Front paper insertion Centronics standard interface UL recognized	Rear paper insertion Centronics standard interface UL recognized

MODEL	(DOTS)	*PART NUMBERS*			
Original Mechanism	(832)	FTP-641MCL001	FTP-621DCL001	FTP-641MCL002	FTP-621DCL001
Enhanced Mechanism	(832)	FTP-641MCL101	FTP-621DCL002	FTP-641MCL102	FTP-621DCL002
Economical Mechanism	(864)	FTP-641MCL201	FTP-621DCL003	FTP-641MCL202	FTP-621DCL003
Enhanced For Cutter	(832)	FTP-641MCL301	FTP-621DCL012	FTP-641MCL302	FTP-621DCL012
Economical For Cutter	(864)	FTP-641MCL351	FTP-621DCL013	FTP-641MCL352	FTP-621DCL013
Cutter Mechanism		FTP-641CT001		FTP-641CT001	

BATTERY-OPERATED MICRO THERMAL PRINTERS

		FTP-623MCLXXX, FTP-623DCLXXX	*FTP-623MCLXXX, FTP-623DCLXXX*	*FTP-633MCLXXX, FTP-623DCLXXX*	*FTP-633MCLXXX, FTP-623DCLXXX*
					
Dot structure [dots/line]		384	384	512	512
Horizontal dot pitch [dots/mm (dpi)]		8 (203)	8 (203)	8 (203)	8 (203)
Printing speed [dots line/s]		480	480	480	480
Dimensions W x D x H [mm (in.)]	Mechanism	73 x 49 x 20 (2.874 x 1.929 x 0.787)	73 x 49 x 20 (2.874 x 1.929 x 0.787)	85 x 49 x 20 (3.346 x 1.929 x 0.787)	85 x 49 x 20 (3.346 x 1.929 x 0.787)
	Interface board	108 x 91 x 18 (4.252 x 3.583 x 0.709)	108 x 91 x 18 (4.252 x 3.583 x 0.709)	108 x 91 x 18 (4.252 x 3.583 x 0.709)	108 x 91 x 18 (4.252 x 3.583 x 0.709)
Weight [g]	Mechanism	80	80	88	88
	Interface board	60	60	60	60
Power supply voltage [V]		4.2 - 8.5	4.2 - 8.5	4.2 - 8.5	4.2 - 8.5
Paper width [mm (in.)]		58 (2.283)	58 (2.283)	70 (2.756)	70 (2.756)
Remarks		Battery operated is possibe. • Front paper path.1 ply, 2 ply. UL recognized.	Battery operated is possible. • Rear paper path. Labels or 1 ply, 2 ply. UL recognized.	Battery operated is possible. • Front paper path. 1 ply, 2 ply. UL recognized.	Battery operated is possible. • Rear paper path. Label paper or 1 ply, 2 ply. UL recognized.

MODEL	*PART NUMBERS*							
Original Mechanism	FTP-623MCL353	FTP-623DCL001	FTP-623MCL354	FTP-623DCL001	FTP-633MCL353	FTP-623DCL001	FTP-633MCL354	FTP-623DCL001
Enhanced Mechanism	FTP-623MCL400	FTP-623DCL002	FTP-623MCL402	FTP-623DCL002	FTP-633MCL400	FTP-623DCL002	FTP-633MCL402	FTP-623DCL002

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Impact/Thermal Panel Mount Models

Keltron Miniprinters incorporate many features not usually offered in panel mounted printers. Scientific applications include analytical instrumentation, patient monitors and diagnostic testers; industrial applications include logging temperature, pressure, frequency, power and other parameters.

COMPACT (LC SERIES) WITH NO-SACRIFICE PERFORMANCE

- **24/32 OR 40/30, Programmable**
- **2K Data Buffer w/Battery backed clock/calendar**
- **Choice of Input Power: DC or AC, European or USA**
- **Available w/2 part paper**
- **Standard Communications Interface. Choose from: RS-232C, RS-422, RS-485, Parallel (Centronics)**
- **5" depth (w/2.5" depth models available)**

GENERAL PURPOSE UNITS

8K Data Buffer, Expandable to 64K
16 to 42 Column Units Available
Red/Black Printing Option
Full 256 Character ASCII Set
Autoprint with Built-in Interval Timer
Double Height, Double Width Characters
Line Counter
Test/List Operation
Membrane Switch Front Panel
Graphics Capability
Hardware/Software Handshaking, Serial Interfaces
Hardware Clock Option
Choice of Input Power, Including Wide Range 9-40 VDC
Dual Series/Parallel Interface Option

AND MANY STANDARD / OPTIONAL FEATURES NOT READILY AVAILABLE ELSEWHERE:

BDC Input
Minimum Depth
Line Counter
Internal Paper Take-up
64K Data Buffer
Interval Timer
Standard Software Clock
PLC Printer
Analog Printer

PRINTOUT DATA

	Number of Columns	Speed (lpm)	MTBF (lines)
LC Series (Compact)	24/32; 40/30 (programmable)	150	1,000,000
MM Series (Standard Speed)	16, 24, 32, 40	25 to 60	500,000
MH Sereis (High Speed)	24, 30, 36, 42	60 to 102	500,000 to 700,000
VS Series (Very High Speed)	35, 42	138	1,500,000

KELTRON CORPORATION

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□Thermal □Impact □Inkjet □2 inches to 8 inches Paper Width
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□Panel Mount □Chassis Printers □Slip Printers □Turnkey Solutions

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□2 inches to 4 inches Paper Width □Table Top □Wall Hanging □Portable

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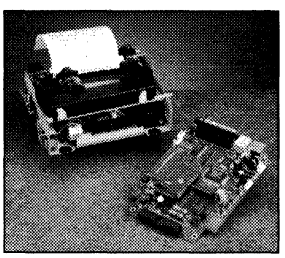
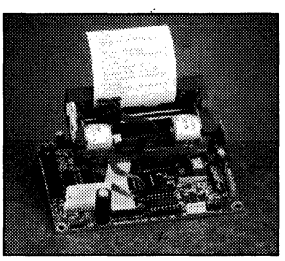
☐OEM MECHANISMS & CONTROLLERS

MODEL	PRINT METHOD	PAPER WIDTH	No. OF DOTS	PRINT SPEED	POWER SUPPLY	DIMMENSIONS W x D x H mm
OPC200	IMPACT	3.0"	320	5.0LPS	24VDC	146 x 133 x 73
OPC180	IMPACT	2.25"	144-252	1.0LPS	5.0VDC	88 x 80 x 19.5
OPC190	IMPACT	2.25"	144-252	1.0LPS	5.0VDC	92 x 80 x 45
OPC910	IMPACT	2.25"	144-180	1.8LPS	5.0VDC	92 x 80 x 45
OPC311	IMPACT	3.0"	210	3.3LPS	12VDC	110 x 96 x 38
iJ200	INKJET	3.0"	840	5.0LPS	24VDC	146 x 133 x 73
OPC1205	THERMAL	58mm	24 CH.	0.8LPS	5.0VDC	92 x 52 x 31
OPC1451	THERMAL	112mm	256	6.0LPS	24VDC	156 x 102 x 56
OPC1900	THERMAL	58mm	696	7.0LPS	12VDC	110 x 96 x 38
OPC2205	THERMAL	58mm	144	4.0LPS	5.0VDC	123 x 70 x 42
OPC2212	THERMAL	58mm	144	4.0LPS	12VDC	123 x 70 x 42
OPC2305	THERMAL	80mm	252	2.8LPS	5.0VDC	123 x 70 x 42
OPC2312	THERMAL	80mm	252	2.8LPS	12VDC	123 x 70 x 42
OPC3200	THERMAL	58mm	384	6.0LPS	5-12VDC	96 x 108 x 46
OPC3300	THERMAL	80mm	576	10.0LPS	5-12VDC	96 x 108 x 46
OPC3800	THERMAL	80mm	576	12.0LPS	24VDC	96 x 108 x 46
OPC8200	THERMAL	60mm	448	18.0LPS	24VDC	105 x 55 x 36
OPC8300	THERMAL	80mm	576	15.0LPS	24VDC	125 x 55 x 36
OPC8400	THERMAL	112mm	832	12.0LPS	24VDC	160 x 55 x 36



OPC 200

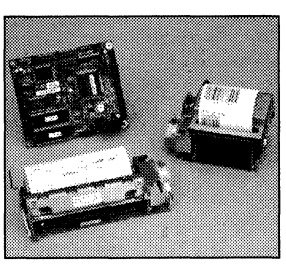


OPC 2212

☐CONTROLLERS

All Above Models Include Full Featured Controllers.

☐SERIAL OR PARALLEL INTERFACE ☐GRAPHICS
☐BAR CODE ☐ 4K BUFFER ☐AUTO PAPER CUTTER
☐PERIPHERAL DRIVER ☐SINGLE INPUT POWER SUPPLY
☐EPSON™ ESCAPE POS EMULATION ☐CUSTOM DESIGN



OPC 8000

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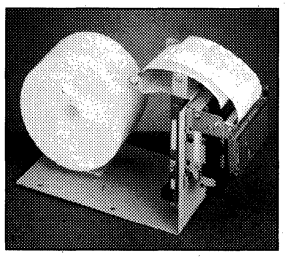
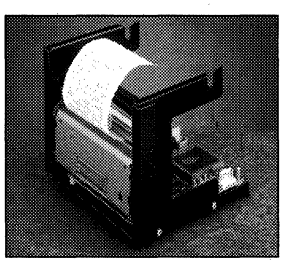
□OEM SPECIALTY PRINTERS

□CHASSIS MOUNTED PRINTERS



CH 311

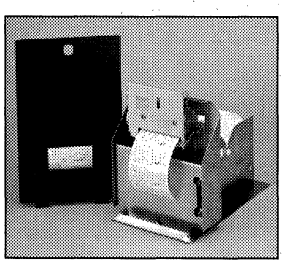
MODEL	PRINT METHOD	PAPER WIDTH	No. OF CLMNS.	PRINT SPEED	POWER SUPPLY	DIMMENSIONS W x D x H (INCH)
CH311	IMPACT	3.0"	30-42	3.3 LPS	12-24VDC	6.25 x 11.25 x 7.25
CH3200	THERMAL	58mm	40	6.0 LPS	12 VDC	5.0 x 3.75 x 4.0
CH8200	THERAML	60mm	35	18 LPS	24VDC	13 x 7 x 11.5
CH8300	THERMAL	80mm	33/42	15 LPS	24VDC	13 x 7 x 11.5
CH8400	THERMAL	112mm	54/80	12 LPS	24VDC	13 x 7 x 11.5



CH 3200

□PANEL MOUNT PRINTERS

MODEL	PRINT METHOD	PAPER WIDTH	No. OF CLMNS.	PRINT SPEED	POWER SUPPLY	PANEL CUT OUT W x H (INCH))
PM190	IMPACT	2.25"	24-40	1.0 LPS	5-12 VDC	4 x 3.75
PM1900	THERMAL	58mm	40	6.0 LPS	5-12 VDC	4 x 3.75



CH 8300

□CUSTOM CHASSIS

□CUSTOM METAL FABRICATION □CUSTOM INTERFACE
□CUSTOM EMULATION □TURNKEY APPLICATONS

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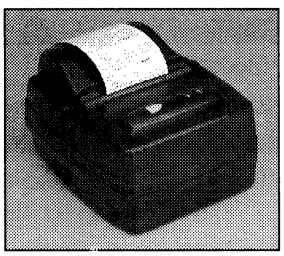
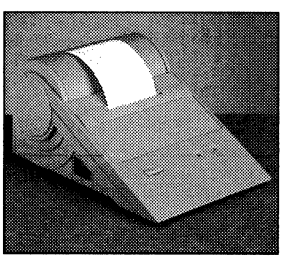
□PACKAGED PRINTERS

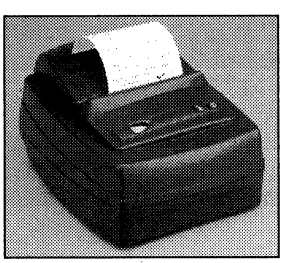
MODEL	PRINT METHOD	PAPER WIDTH	No. OF CLMNS.	PRINT SPEED	OPTIONS	DIMMENSIONS W x D x H (INCH)
OM100	IMPACT	3.0"	40/42	2.8 LPS		6.35 x 11.1 x 5.45
OM200	IMPACT	3.0"	40/42	5.0 LPS	AUTO-CUTTER	6.8 x 8.6 x 5.2
iJ200	INKJET	3.0"	40/42	5.0 LPS		6.8 x 8.6 x 5.2
OM426	THERMAL	112mm	42	6.0 LPS		9.6 x 7.8 x 3.3
OM1000	THERMAL	112mm	40/80	2.0 LPS	BATTERY	7.0 x 6 x 2.5
OM3200	THERMAL	58mm	40	6.0 LPS	AUTO-CUTTER	5.5 x 4.0 x 8.0
OM3300	THERMAL	80mm	40	10 LPS	AUTO-CUTTER	5.5 x 4.0 x 8.0
OM5500	THERMAL	112mm	40/60/80	10 LPS		7.0 x 5.9 x 2.3
OM8300	THERMAL	80mm	56/42	16 LPS	AUTO-CUTTER	6.25 x 8.0 x 4.75



OM 200



OM 3200



OM 8300

□OPTIONS

□A WIDE VARIETY OF OPTIONS AND CUSTOM CONFIGURATIONS ARE AVAILABLE. PLEASE CALL FOR YOUR SPECIFIC REQUIREMNETS.

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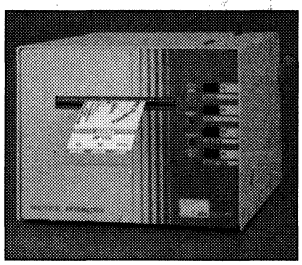
HIGH QUALITY THERMAL PRINTERS

LTX2000 SERIES TICKET PRINTERS

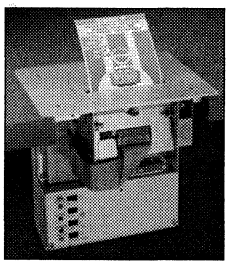


Model u/LTx2000

The LTX2000 series direct thermal ticket printers are an effective economical alternative to full featured, high performance printers. Smaller and lower priced than competitive product offerings the LTX2000 series is a practical choice for low to moderate ticketing printing applications including local cinemas, university box office and sporting events. Ticket stock is self loading and ticket stock is dispensed using a tearbar.

FEATURES

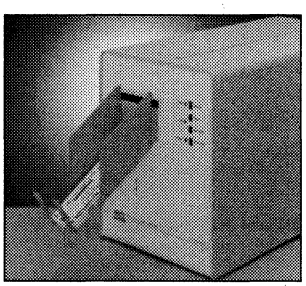
- *Print resolution 200dpi*
- *Compact size*
- *Automatic ticket loading*
- *Ticket jam detect*
- *WYSIWYG Windows driver*



Model p/LTx2000

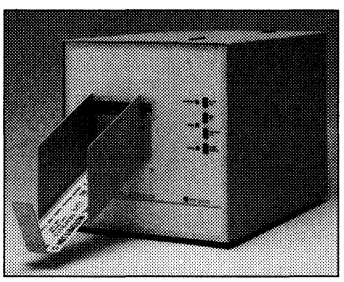
ETX SERIES HIGH PERFORMANCE TICKET PRINTERS

The standard ETX is a counter top printer with a locking cabinet and internal storage for 1500 fanfold tickets. External ticket feed can also be accommodated. An integral ticket cutter is standard.



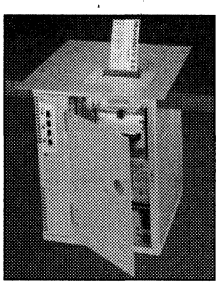
Standard ETX

The model u/ETX is a counter top ticket printer drastically reduced in size to minimize counter space requirements. The printer accommodates external ticket feed. An integral ticket cutter is standard.



Model u/ ETX

The model p/EPX is designed for vertical mounting with operating controls located behind the panel. A cutter and cut ticket retainer is standard. The primary application for p/ETX is motion picture admissions.



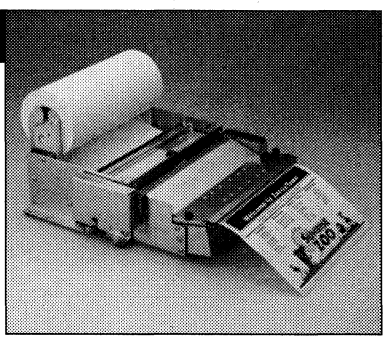
Model p/ ETX

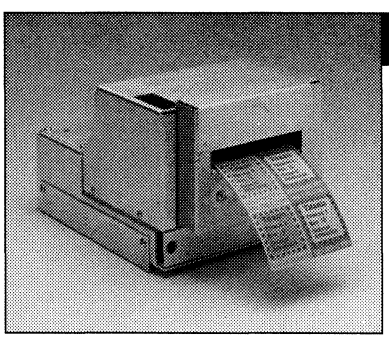
ATX38 WIDE FORMAT KIOSK PRINTERS

The ATX38 series is a direct thermal printer system designed specifically for kiosk applications requiring wide printing formats. Applications include statements, maps, invoices, directory information, etc. Additional features friendly to a kiosk environment significantly ease the task of system integration.

FEATURES

- *High resolution 300dpi printing*
- *Adjustable paper width (61/2 to 81/2 inches)*
- *Full 8 inch print field on 81/2 inch wide paper*
- *Windows compatible WYSIWYG controller*
- *Reverse channel status communication*
- *Intelligent power manager minimizes power supply requirements*
- *High capacity external paper roll holder (10" dia.)*
- *Cutter and presenter with jam protect, loop storage, document hold and eject*





c/LTx KIOSK TICKET PRINTER

The c/LTx is a direct thermal modular ticket printing system designed for easy integration into ATM (automatic ticketing machine) kiosk. The defining characteristics of the c/LTx are its ability to use heavy stock and fast print speed. The c/LTx uses .0075 inch thick fanfold and perforated ticket stock and a typical 5 1/2 inch long ticket can be printed, cut and ejected in approximately 2 seconds.

FEATURES

- *Print resolution 200dpi*
- *Integral ticket cutter*
- *Compact size*
- *Automatic ticket loading*
- *Ticket jam detector*
- *WYSIWYG Windows driver*

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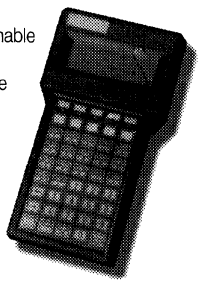
QTERM-II Rugged Industrial Terminal

- 20x4 supertwist LCD display (wide-temperature, VFD and lighted displays available)
- 24- or 40-key keypad with up to five user-programmable LEDs
- Full-duplex EIA-232, -422 or 5-volt Buffered interface
- Every key is programmable with strings
- Tough, impact-resistant ABS case
- Handheld or panel-mount configurations
- Optional battery back and auxiliary serial port
- $249 (1-6 units)



CE

QTERM-IV Multidrop Control Terminal

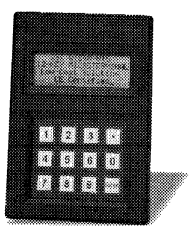
Similar to the QTERM-II, plus:

CE

- Multidrop EIA-485 or -422m interface
- Programmable macros, local commands, auto execute strings, two-key rollover and block mode
- $295 (1-6 units)

QTERM-N15 Low Cost Microterminal

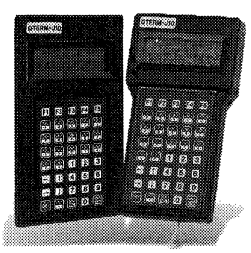
- 20x4 supertwist LCD display (lighting and VFD optional)
- 12-key tactile keypad with fully customizable embossed legend
- EIA-232, -422, or 5-volt Buffered interface
- Serial communications up to 19,200 baud
- Low power: 28 mA @ 5 VDC
- CE Certified, NEMA-12/13
- $171 (1-6 units)



CE

QTERM-J10 Low Cost Industrial Control Terminal

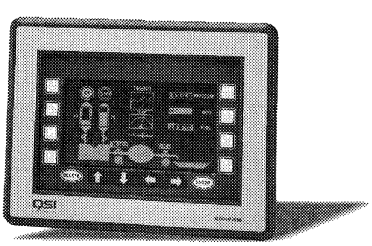
- 20x4 supertwist LCD display (lighting and VFD optional)
- 18- 24- or 40-key keypad
- Full-duplex EIA-232, -422 or 5-volt Buffered interface
- Handheld or panel-mount configurations
- Communications up to 19,200 baud
- Tough, impact-resistant ABS case
- $175 (1-6 units)



CE

QTERM-K65 NEMA-4 Graphics Touch Screen Terminal

- Large, lighted, LCD graphics display with 240x128 pixels
- Touch screen with any number or size of touch areas
- Programmable keys on all four sides of the display supported
- EIA-232 or -422 interface
- Object-oriented programming simplifies graphics development
- Complex graphics even with low speed communications
- Rugged NEMA-4 enclosure, CE Certified
- Pedestal-mount QTERM-K60 available*
- $705 (1-6 units)

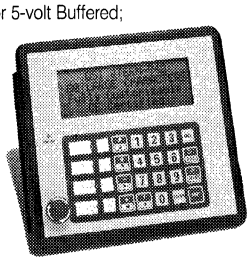


CE

* Features and price may vary.

QTERM-P40 Water-Tight Panel-Mount Terminal

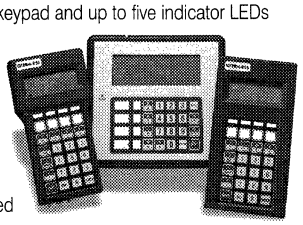
- Large-character 20x4 lighted supertwist display; easily readable from three meters
- 24- or 40-key keypad with up to five user-programmable indicator LEDs
- Full-duplex or block mode EIA-232, -422 or 5-volt Buffered; multidrop EIA-485 or -422m interface
- Tough fiberglass-reinforced nylon enclosure
- Programmable macros, local commands, auto execute strings and two-key rollover
- Optional emergency-stop switch and auxiliary serial port
- CE Certified, NEMA-4
- $475 (1-6 units)



CE

QTERM-R55 Programmable Terminal with Screen Storage

- 20x4 supertwist LCD display with optional lighting (/H or /P) or lighted supertwist large-character 20x4 display (/L)
- 24- or 40-key tactile programmable keypad and up to five indicator LEDs
- Full-duplex EIA-232 or -422 interface
- Programmable with a simple but powerful object-oriented event-driven scripting language
- Handheld /H, panel-mount /P or large-character panel-mount /L configurations
- Program, data and screens are stored in 512 Kbytes of flash memory
- Real-time clock option allows elapsed-time or time-of-day event code
- Starting at $306 (1-6 units)



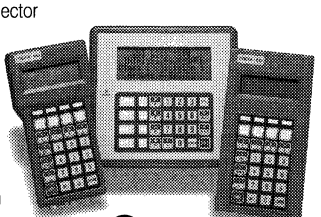
CE

QTERM-B30 Rugged Data Entry Terminal

- Shock-mounted, lighted 40x4 display
- QWERTY keypad with 55 keys
- Full-duplex EIA-232 or -422
- Rugged aluminum housing with pedestal-mount
- Four user-programmable LEDs
- $585 (1-6 units)

QTERM-S50 Intrinsically Safe Terminal

- Lighted supertwist 20x4 LCD display (/H or /P) or supertwist large-character 20x4 display (/L)
- 24- or 40-key tactile programmable keypad and up to five indicator LEDs
- EIA-232 interface with DB9 connector
- Certified for use in Class 1, Division 1 and 2, Groups A, B, C and D hazardous environments
- Handheld /H, panel-mount /P or large-character panel-mount /L configurations
- Optional emergency-stop switch (/H or /L)
- Starting at $795 for /H or /P (1-6 units)



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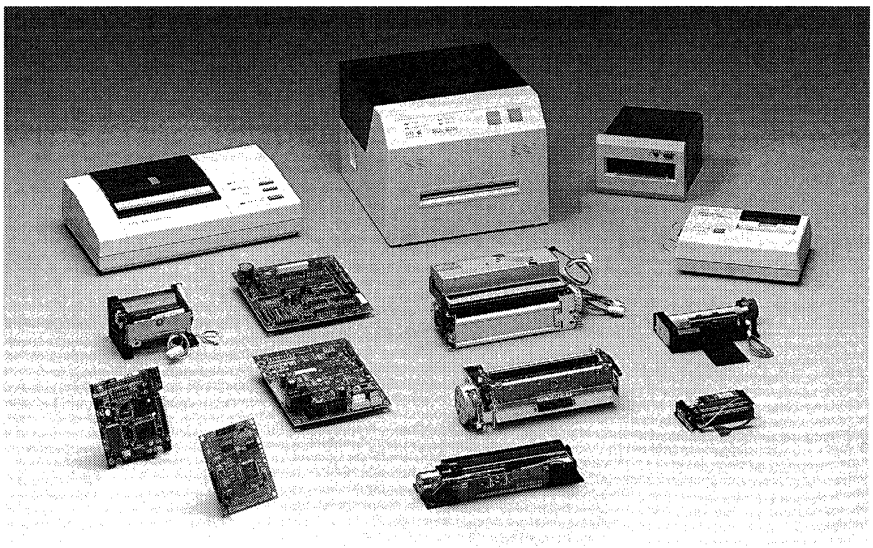

MTP Series

Meets the needs for small, inexpensive printers
- Low cost, quiet, compact
- Maintenance free
- Character and graphic output
- Speeds up to 1.5 lines per second
- Low power, 5 Volts
- 13-40 Columns

STP Series

Meets the needs for small bidirectional printers
- Compact and lightweight
- Character bidirectional logic seeking
- Graphics unidirectional logic seeking
- Prints up to 46 cps
- Stepper motors for quiet operation
- Low power, 5 Volts

LTP 3000 Series

Low power, high speed line printers
- High definition print quality 8 dots/mm
- Alphanumeric and graphic printing
- Automatic "Paper Out" &"Head Up" detection
- Battery powered
- Operating temperatures 0° to 50° C
- On board thermistor
- Prints thermal paper or label stock
- 5 Volts head and logic

LTP 5000 Series

High speed - high resolution graphic line printers
- Prints up to 700 cps
- Near photographic print quality 8 dots/mm
- Alphanumerics and graphics
- 12 or 24 VDC
- Automatic paper load
- Operating temperature
- Auto-cutter option

DPU Series

Stand-alone and panel mount printers
- 13-40 Columns
- Horizontal or vertical configurations
- Operating temperatures 0° to 55° C
- High quality
- Up to 11 lines/second
- Compact, lightweight
- Quiet operation
- 2.3" to 4.4" paper width
- Resident bar code
- Auto-cutter option

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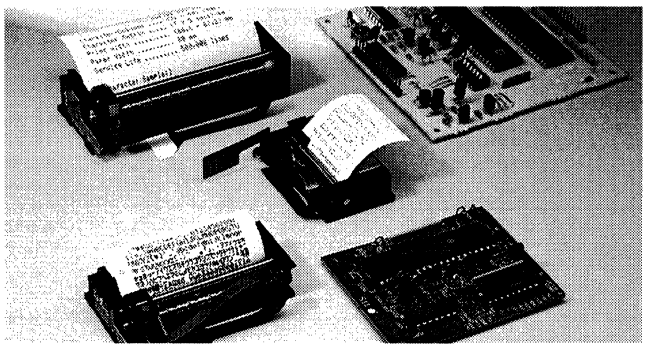
MTP SERIES — Small, Inexpensive Printers For Characters And Graphics



Character Mechanism

Items		Characteristics				
Model		MTP102		MTP201		MTP401
	Chrs/line (7x5 matrix)	13	16	20	24	40
Printing	Method	Thermal serial head system				
	Printing direction	Left to right				
	Print timing	Synchronized with Tach - Generator				
	Printing width (mm)	26		46		67
	Paper feed pitch (mm)	3.8				
	Printing speed (cps)	19.5	19.2	18	19.2	24
Paper width (mm)		38		58		80
Detection	Home position	Mechanical switch				
Dimensions WxDxH (mm)		48 x 31 x 14		70 x 34 x 15		91 x 36 x 20
Weight (g)		35		40		50
Power supply	Operating voltage	5V				
	Current consumption	3 A max.				
Service Life	MCTF	500,000 LINES				
	Failure rate	1 x 10E-6/line max.				
Operating temperature (°C)		0 to 50				
Storage temperature (°C)		-40 to 60				

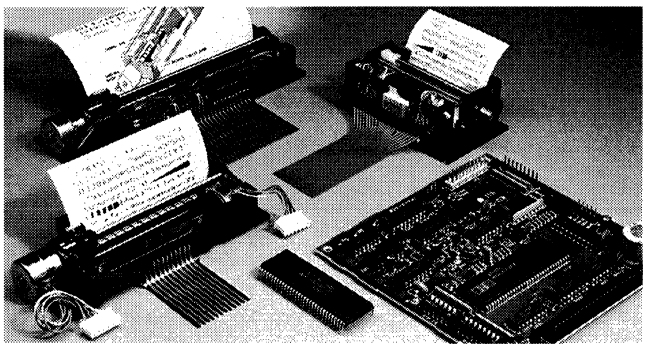
Graphic Mechanism

Items		Characteristics			
Model		MTP201G		MTP401G	
	Dot composition	128	166	256	280
Printing	Method	Thermal serial head system			
	Printing direction	Left to right			
	Print timing	Synchronized with Tach - Generator			
	Printing width (mm)	45	46	67	67
	Paper feed pitch (mm)	2.8			
	Printing speed (lps)	0.9	0.8	0.6	
Paper width (mm)		58		80	
Detection	Home position	Mechanical switch			
Dimensions WxDxH (mm)		70 x 34 x 14.4		92 x 36 x 20	
Weight (g)		40		50	
Power supply	Operating voltage	5V			
	Current consumption	3 A max.			
Service life	MCTF	500,000 lines			
	Failure rate	1 x 10E-6/line max			
Operating temperature (°C)		0 to 50			
Storage temperature (°C)		-40 to 60			

Interface

Items	Characteristics
Model	IFM001-01B
Applicable printer	All MTP series mechanisms
CPU	HD6433238P43F (Flat SMT package)
Input control method	Parallel (Modified centronics) Serial (TTL level)
Character type	Alphanumeric, International, extended graphics, Katakana
Dimensions (WxDxH)	71.5 x 59 x 11.5
Weight (g)	20
Operating temperature (°C)	0 to 50
Storage temperature (°C)	-20 to 60
Features	Graphics, inverted, expand, test print

STP SERIES — Small, Bidirectional Printers That Print Characters And Graphics



Mechanism

Items		Characteristics				
Model		STP211		STP312	STP411	
	Dot composition	-144	-192	-256	-256	-320
Printing	Method	Thermal serial dot system				
	Printing direction	Bidirectional character, Unidirectional graphics / Logic seeking				
	No. of characters/line	24	32	42	42	40
	Printing width (mm)	46		64	90	
	Printing speed (cps)	46		42	41	50
Paper width (mm)		58		80	112	
Detection	Print timing	Step motor synchronization				
	Paper out detection	Mechanical switch				
Dimensions (WxDxH)		80x47x27		127x45x21	153x45x20	
Weight (g)		110		120	135	
Power supply	Operating voltage	5V				
	Current consumption	3.5A max				
Service life		500,000 lines				
Operating temperature (°C)		0 to 50				
Storage temperature (°C)		-20 to +60				

Interface

Items	Characteristics	
Model	IF0121-GCB	IF4112-GCB
Applicable printer	All STP Models	STP411-320
CPU	M50747-753SP	M50747-500SP
Input control method	Parallel (modified centronics)	
	RS-232 Serial	
Character type	256-Alphanumeric,graphic,International,special	
		20,40,80 Characters/line
Operating voltage	5V	5V, (+12V, -12V for serial)
Dimensions (WxDxH)	130x118x22	120x119x22
Weight (g)	105	95
Operating temperature (°C)	0 to 50	
Storage temperature (°C)	-20 to +60	
Features	Condensed/double-width printing	
	Single/double density bit image graphics	
	Super/Subscript printing	
	Inverted print	

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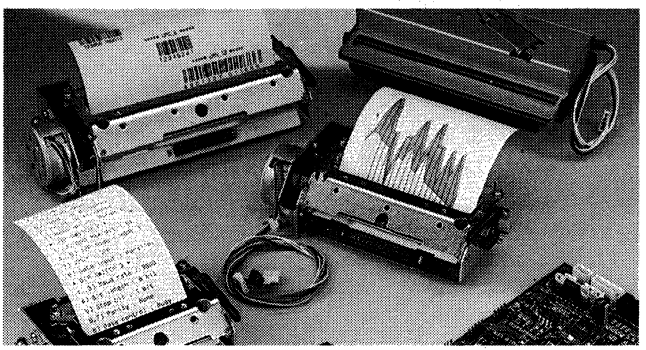
LTP SERIES — High Speed Line Thermal Printers With High-Resolution Graphics



Mechanism

Items		Characteristics				
Model		LTP5242	LTP5246	LTP5347	LTP5442	LTP5446
Printing	No. of dots/line	448		576	832	
	No. of characters/line	28		36	52	
	Printing width (mm)	56		72	104	
	Method	Thermal line dot system				
	Resolution	8 dots/mm				
	Paper feed pitch (mm)	0.125				
Print Speed	(chr. lines/s)	10	5	10		5
	(mm/s)	50	25	50		25
Paper width (mm)		60		80	112	
Detection	Head temperature	By thermistor				
	Paper out detection	By photo interrupter				
	Head up detection	By mechanical switch				
Dimensions (mm) WxDxH		106x60x37		126x60x37	158x60x37	
Weight (g)		280		320	380	
Power supply	Operating voltage	24	12	24		12
	Current consumption	6.0 A max.	6.5 A max.	4.5 A max.	7.6 A max.	9.0 A max.
	(No.blocks/No. dots)	(3/192)	(3/192)	(5/128)	(4/256)	(3/288)
Service life	Pulse activation	400 million pulses				
	Abrasion resistance	100 km				
Operating temperature (°C)		0 to 50				
Storage temperature (°C)		-20 to 60				
Paper path		Straight / Curve				

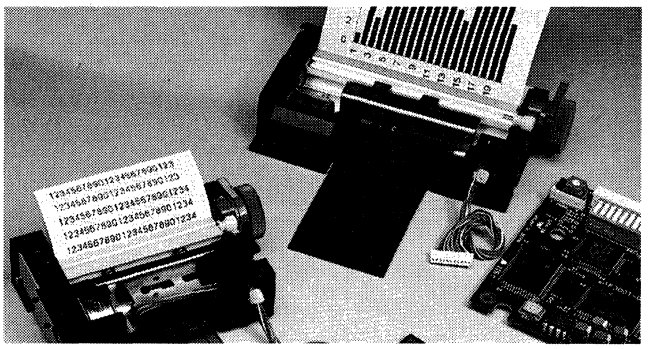
Interface

Items	Characteristics
Model	IF5003-01B
CPU	PT502P01/PT500GA1
Input control method	Parallel (modified centronics)
	Serial (TTL Level)
Character type	222-IBM compatible
	126-Japanese Kana
Dimensions (WxDxH)	100x130x22
Weight (g)	90
Operating temperature (°C)	0 to 50
Storage temperature (°C)	-20 to 60
Features	Auto-paper loading
	Auto-cutter
	Dynamic division control
	Bit image graphics
	Ruler lines

Automatic Cutter

Items		Characteristics				
Model		ACU5212A	ACU5224A	ACU5324A	ACU5412A	ACU5424A
Method		Guillotine type				
Cut condition		Full or partial cut				
Cut width (mm)		60		80	112	
Drive voltage (V)	Motor	12	24	24	12	24
	Detector	5				
Service life (cuts)		300,000				
Dimensions WxDxH (mm)		70x58x22		105x58x22	130x58x22	
Weight (g)		150		210	250	

LTP SERIES — Low Power, High-Speed Thermal Printers



Mechanism

Items		Characteristics	
Model		LTP3245	LTP3345
Printing	Method	Thermal line dot system	
	No. of dots /line	384	576
	No. of characters/line	24	36
	Printing width (mm)	48	72
	Resolution	8 dots/mm	
	Paper feed pitch (mm)	0.125	
Printing speed	mm/s	22.5	25 @ 5V / 45 @ 7V
	cps	168	324 @5V / 648 @ 7V
Paper width (mm)		60	80
Detection	Head temperature	By thermistor	
	Paper out detection	By photo interupter	
	Head up detection	By mechanical switch	
Dimensions (WxDxH)		76.3x50x20	97x57x21
Weight (g)		80	115
Power supply	Operating voltage	5V	4.2 V to 7V
	Current consumption	3.8A @ 64 dots	2.9A @ 64 dots &5V
Service life	Pulse activation	50 million pulses	
	Abrasion resistance	30 km	
Operating temperature (°C)		0 to 50	
Storage temperature (°C)		-20 to 60	
Paper path		Straight or curve	

Interface

Items	Characteristics	
Model	IF3001-01B	IF3002-01B
Applicable printer	LTP3245	LTP3345
CPU	PT300P01/PT300GA1	PT301P01/PT500GA1
Input control method	Parallel (modified centronics)	
	Serial (TTL level)	
Character type	222-IBM compatible	
	126-Japanese kana	
Dimensions (WxDxH)	67x75x20	80x80x18
Weight (g)	40	45
Operating temperature (°C)	0 to 50	
Storage temperature (°C)	-20 to 60	
Features	Bit image graphics	
	Ruler line	
		Dynamic division control
		Download characters
		User defined characters
		Stamp function
		Character string
		Auto paper loading

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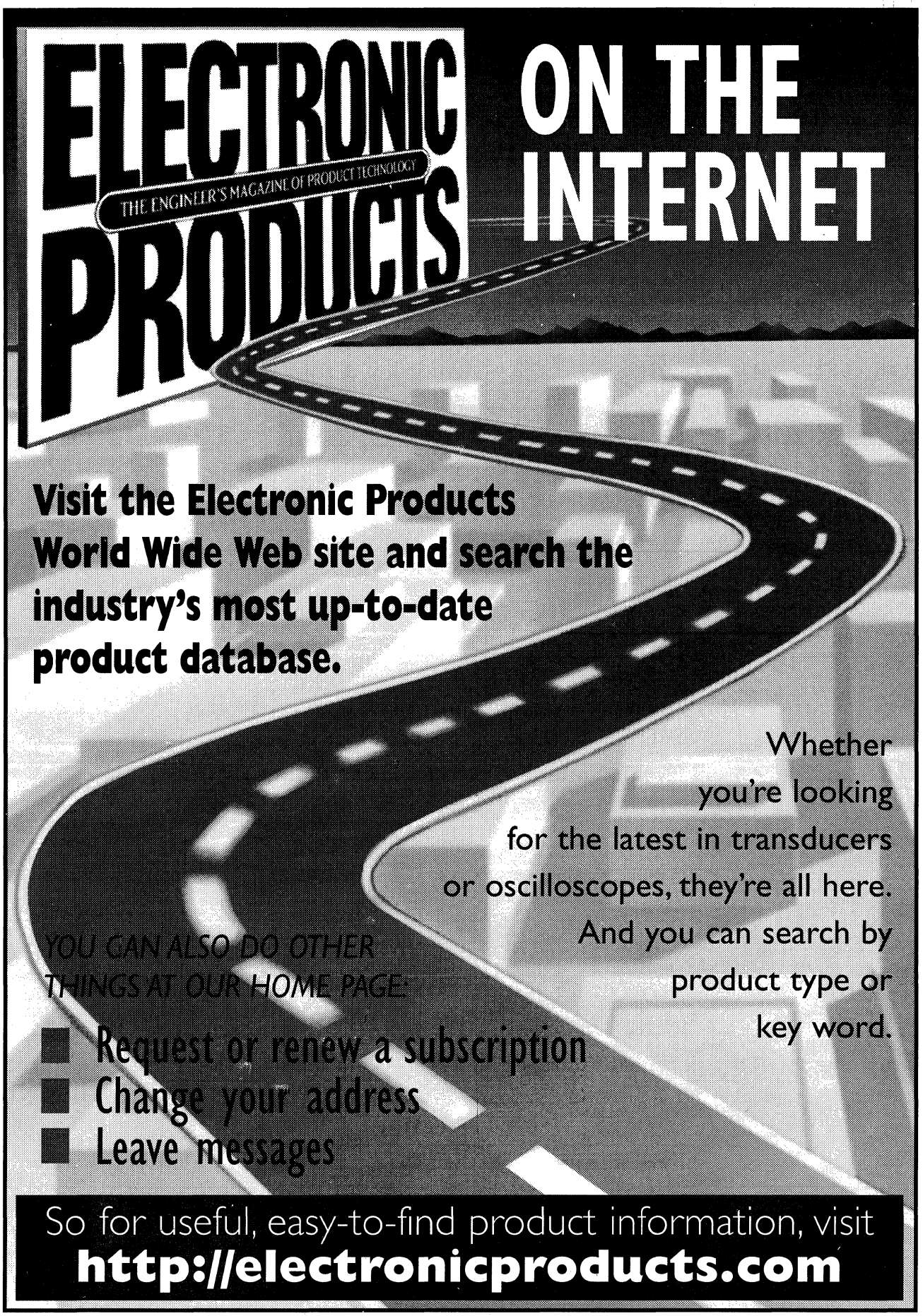

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★Under development

■Symmetrical Block Smart Voltage Flash Memories

Capacity	Configuration (bytes/words x bits)	Erase block size (bytes/words)	Model No.	Access time (ns) MAX. (Vcc=5 V)	Supply voltage (V)	Read current (mA) MAX. (f=8 MHz, Vcc=5V)	Standby current (μA) MAX.	Operating temp. (°C)	Package
2M	256k x 8	64kB	★LH28F002SCT/N/B-L85	85	*1 Smart voltage (2.7 V read available)	50	100	0 to 70	40TSOP(I)Normal/ 44SOP/48FBGA (CSP)
			★LH28F002SCT/N/B-L12	120					
			★LH28F002SHT/N/B/-L85	85	*1 Smart voltage (2.7 V read available)	50	100	-40 to 85	40TSOP(I)Normal/ 44SOP/48FBGA (CSP)
			★LH28F002SHT/N/B/-L12	120					
4M	512k x 8	64kB	LH28F004SCT/N*/B/S*-L85	85	*1 Smart voltage (2.7 V read available)	50	100	0 to 70	40TSOP(I)Normal/44SOP*/ 48FBGA (CSP)/ 40TSOP(I)Normal (10 x 14 mm)*
			LH28F004SCT/N*/B/S*-L12	120					
			LH28F004SCHT/N*/B/S*-L85	85	*1 Smart voltage (2.7 V read available)	50	100	-40 to 85	40TSOP(I)Normal/44SOP*/ 48FBGA (CSP)/ 40TSOP(I)Normal (10 x 14 mm)*
			LH28F004SCHT/N*/B/S*-L12	120					
8M	1M x 8	64kB	LH28F008SCT/R/N/B*-85	85	*1 Smart voltage	50	100	0 to 70	40TSOP(I)Normal/Reverse/ 44SOP/42FBGA (CSP)*
			LH28F008SCT/R/N/B*-12	120					
			LH28F008SCHT/R/N/B*-85	85	*1 Smart voltage	50	100	-25 to 85	40TSOP(I)Normal/Reverse/ 44SOP/42FBGA (CSP)*
			LH28F008SCHT/R/N/B*-12	120					
			★LH28F008SCT/R/N/B-L85	85	*1 Smart voltage (2.7 V read available)	50	100	0 to 70	40TSOP(I)Normal/Reverse/ 44SOP/42FBGA (CSP)
			★LH28F008SCT/R/N/B-L12	120					
			★LH28F008SCHT/R/N/B-L85	85	*1 Smart voltage (2.7 V read available)	50	100	-25 to 85	40TSOP(I)Normal/Reverse/ 44SOP/42FBGA (CSP)
			★LH28F008SCHT/R/N/B-L12	120					
	512k x 16	32kW	LH28F800SGE/R/N/B-L70	70	*1 Smart voltage (2.7 V read,write, erase available)	50	100	0 to 70	48TSOP(I)Normal/Reverse/ 44SOP/48FBGA (CSP)
			LH28F800SGE/R/N/B-L10	100					
			LH28F800SGHE/R/B-L70	70	*1 Smart voltage (2.7 V read,write, erase available)	50	100	-40 to 85	48TSOP(I)Normal/Reverse/ 48FBGA (CSP)
			LH28F800SGHE/R/B-L10	100					
16M	2M x 8	64kB	LH28F016SCT/R/N*/B-L95	95	*1 Smart voltage (2.7 V read available)	50	100	0 to 70	40TSOP(I)Normal/Reverse/ 44SOP*/48FBGA (CSP)
			LH28F016SCT/R/N*/B-L12	120					
			LH28F016SCHT/R/B/S*/SR*-L95	95	*1 Smart voltage (2.7 V read available)	50	100	-40 to 85	40TSOP(I)Normal/Reverse/48FBGA (CSP)/ 40TSOP(I)Normal/Reverse (10 x 14 mm)*
			LH28F016SCHT/R/B-L12	120					40TSOP(I)Normal/Reverse/48FBGA (CSP)

■Symmetrical Block Smart Voltage Flash Memories(Smart 3*2)

Capacity	Configuration (bytes x bits)	Erase block size (bytes)	Model No.	Access time (ns) MAX. (Vcc=3.3 V)	Supply voltage (V)	Read current (mA) MAX. (f=5 MHz)	Standby current (μA) MAX.	Operating temp. (°C)	Package
8M	1M x 8	64k	LH28F008SCT/R/N/B*-T12	120	Smart voltage Vcc = 3.3 Vpp = 3.3/12	18	100	0 to 70	40TSOP(I)Normal/Reverse/ 44SOP/42FBGA (CSP)*
			LH28F008SCT/R/N*/B*-T15	150					40TSOP(I)Normal/Reverse/ 44SOP*/48FBGA (CSP)*
			LH28F008SCHT/R/N*/B*-T12	120	Smart voltage Vcc = 3.3 Vpp = 3.3/12	18	100	-25 to 85	40TSOP(I)Normal/Reverse/ 44SOP/42FBGA (CSP)*
			LH28F008SCHT/R/N*/B*-T15	150					
			★LH28F008SCT/R/N/B-TL12	120	Smart voltage Vcc = 3.3 Vpp = 3.3/12 (2.7 V read available)	18	100	0 to 70	40TSOP(I)Normal/Reverse/ 44SOP/42FBGA (CSP)
			★LH28F008SCT/R/N/B-TL15	150					
			LH28F008SCHT/R/N*/B-TL12	120	Smart voltage Vcc = 3.3 Vpp = 3.3/12 (2.7 V read available)	18	100	-25 to 85	40TSOP(I)Normal/Reverse/ 44SOP*/42FBGA (CSP)
			LH28F008SCHT/R/N*/B-TL15	150					

■Symmetrical Block Smart Voltage Flash Memories(Smart 5*3)

Capacity	Configuration (bytes x bits)	Erase block size (bytes)	Model No.	Access time (ns) MAX. (Vcc=5 V)	Supply voltage (V)	Read current (mA) MAX. (f=8 MHz)	Standby current (μA) MAX.	Operating temp. (°C)	Package
8M	1M x 8	64k	LH28F008SCT/R/N/B*-V85	85	Smart voltage Vcc = 5 Vpp = 5/12	50	100	0 to 70	40TSOP(I)Normal/Reverse/44SOP/42FBGA (CSP)*
			LH28F008SCT/R/N*/B*-V12	120					40TSOP(I)Normal/Reverse/44SOP*/42FBGA (CSP)*
			LH28F008SCHT/R/N*/B*-V85	85	Smart voltage Vcc = 5 Vpp = 5/12	50	100	-25 to 85	40TSOP(I)Normal/Reverse/ 44SOP*/42FBGA (CSP)*
			LH28F008SCHT/R/N*/B*-V12	120					

*1 Smart voltage : Power supply is made an arbitrary selection among (single 3.3 V, single 5 V, 3.3 V/5 V, dual 3.3 V/12 V and 5V/12 V power supply (x 8) / single 3 V, single 5 V, dual 3 V/5 V, 3 V/12 V and 5V/12 V power supply (x 16)) without using control signals.
*2 Smart 3 : Power supply is made an arbitrary selection between single 3.3 V and dual 3.3 V/12 V power supply without using control signals.
*3 Smart 5 : Power supply is made an arbitrary selection between single 5V and dual 5 V/12 V power supply without using control signals.

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■Boot Block Smart Voltage Flash Memories*2

Capacity	Configuration (words x bits)	Erase block size (words)	Model No.	Access time (ns) MAX. (Vcc=5 V)	Supply voltage	Read current (mA) MAX. (f=8 MHz, Vcc=5V)	Standby current (μA) MAX.	Operating temp. (°C)	Package
4M	256k x 16	4k x 2 (Boot), 4k x 6 (Parameter), 32k x 7 (Main)	★LH28F400BGE/N/B-TL85	85	Smart voltage*1 (2.7 V read, write, erase available)	50	100	0 to 70	48TSOP(I)Normal/44SOP/ 48FBGA(CSP)
			★LH28F400BGE/N/B-TL12	120					
			★LH28F400BGHE/B-TL85	85				-40 to 85	48TSOP(I)Normal/ 48FBGA(CSP)
			★LH28F400BGHE/B-TL12	120					
			★LH28F400BGE/N/B-BL85	85				0 to 70	48TSOP(I)Normal/44SOP/ 48FBGA(CSP)
			★LH28F400BGE/N/B-BL12	120					
			★LH28F400BGHE/B-BL85	85				-40 to 85	48TSOP(I)Normal/ 48FBGA(CSP)
			★LH28F400BGHE/B-BL12	120					
8M	512k x 16	4k x 2 (Boot), 4k x 6 (Parameter), 32k x 15 (Main)	★LH28F800BGE/R/N/B-TL85	85				0 to 70	48TSOP(I)Normal/Reverse/ 44SOP/48FBGA(CSP)
			★LH28F800BGE/R/N/B-TL12	120					
			★LH28F800BGHE/R/B-TL85	85				-40 to 85	48TSOPI)Normal/Reverse/ 48FBGA(CSP)
			★LH28F800BGHE/R/B-TL12	120					
			★LH28F800BGE/R/N/B-BL85	85				0 to 70	48TSOP(I)Normal/Reverse/ 44SOP/48FBGA(CSP)
			★LH28F800BGE/R/N/B-BL12	120					
			★LH28F800BGHE/R/B-BL85	85				-40 to 85	48TSOP(I)Normal/Reverse/ 44SOP/48FBGA(CSP)
			★LH28F800BGHE/R/B-BL12	120					

Capacity	Configuration (words x bits)	Erase block size (words)	Model No.	Access time (ns) MAX. (Vcc=2.7 to 3.6 V)	Supply voltage (V)	Read current (mA) MAX.	Standby current (μA) MAX.	Operating temp. (°C)	Package
16M	1M x 16	4k x 2 (Boot), 4k x 6 (Parameter), 32k x 31 (Main)	★LH28F160BGE/R/B-TTL10	100	Smart voltage Vcc=2.7 to 3.6 Vpp=2.7 to 3.6/12	TBD	TBD	0 to 70	48TSOP(I)Normal/Reverse/ 48FBGA(CSP)
			★LH28F160BGE/R/B-TTL12	120					
			★LH28F160BGHE/R/B-TTL10	100				-40 to 85	48TSOP(I)Normal/Reverse/ 48FBGA(CSP)
			★LH28F160BGHE/R/B-TTL12	120					
			★LH28F160BGE/R/B-BTL10	100				0 to 70	48TSOP(I)Normal/Reverse/ 48FBGA(CSP)
			★LH28F160BGE/R/B-BTL12	120					
			★LH28F160BGHE/R/B-BTL10	100				-40 to 85	48TSOP(I)Normal/Reverse/ 48FBGA(CSP)
			★LH28F160BGHE/R/B-BTL12	120					

Capacity	Configuration (words x bits)	Erase block size (words)	Model No.	Access time (ns) MAX. (Vcc=2.4 to 3.0 V)	Supply voltage (V)	Read current (mA) MAX.	Standby current (μA) MAX.	Operating temp. (°C)	Package
16M	1M x 16	4k x 2 (Boot), 4k x 6 (Parameter), 32k x 31 (Main)	★LH28F160BGE/R/B-TTLL12	120	Smart voltage Vcc=2.4 to 3.0 Vpp=2.4 to 3.0/12	TBD	TBD	0 to 70	48TSOP(I)Normal/Reverse/ 48FBGA(CSP)
			★LH28F160BGE/R/B-TTLL15	150					
			★LH28F160BGHE/R/B-TTLL12	120				-40 to 85	48TSOP(I)Normal/Reverse/ 48FBGA(CSP)
			★LH28F160BGHE/R/B-TTLL15	150					
			★LH28F160BGE/R/B-BTLL12	120				0 to 70	48TSOP(I)Normal/Reverse/ 48FBGA(CSP)
			★LH28F160BGE/R/B-BTLL15	150					
			★LH28F160BGHE/R/B-BTLL12	120				-40 to 85	48TSOP(I)Normal/Reverse/ 48FBGA(CSP)
			★LH28F160BGHE/R/B-BTLL15	150					

*1 Smart voltage : Power supply is made an arbitrary selection among
single 3 V, single 5 V, dual 3 V/5 V, 3 V/12 and 5V/12 V power supply without using control signals.

*2 Boot block architecture : A well-balanced block architecture for storage of system programs.
This architecture consists of small-sized blocks (4k-word) for storage of boot code and parameters,
and larger size symmetric blocks (32k-word) for storage of main code.

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Combination Memories

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SRAM+Flash Memory

Capacity	Configuration (words x bits)	Model No.	Access time (ns) MAX.	Supply current: Operating (mA) MAX. Flash Memory Read	Supply current: Operating (mA) MAX. Flash Memory Write	Supply current: Operating (mA) MAX. SRAM	Supply current: Data retention (μA) MAX. Flash Memory power off	Supply current: Data retention (μA) MAX. Flash Memory deep power down	Supply current: Standby (μA) MAX.	Supply voltage (V): Operating	Supply voltage (V): Data retention	Package
1M SRAM 4M FLASH	128k x 8 512k x 8	★LR-S1301	85 150	12	57	15	1	21	26	2.7 to 3.3	2.0 to 3.3	40TSOP(I)Normal* (8 x 13.4 mm)
1M SRAM 8M FLASH	128k x 8 1M x 8	★LR-S1302	85 150	12	57	15	1	13	18	2.7 to 3.6	2.0 to 3.6	40TSOP(I)Normal* (8 x 13.4 mm)
2M SRAM 8M FLASH	256k x 8 1M x 8	★LR-S1303	85 150	12	57	25	2	14	20	2.7 to 3.6	2.0 to 3.6	40TSOP(I)Normal* (8 x 13.4 mm)
2M SRAM 16M FLASH	256k x 8 2M x 8	★LR-S1305	85 150	12	57	25	2	22	26	2.7 to 3.6	2.0 to 3.6	48TSOP(I)Normal* (10 x 14 mm)
1M SRAM 8M FLASH	64k x16 512k x16	★LR-S1304	85 120	25	57	25	1	22	26	2.7 to 3 6	2.0 to 3.6	48TSOP(I)Normal* (10 x 14 mm)
2M SRAM 8M FLASH	256k x 8 512k x 16	★LR-S1306	85 120	25	57	25	2	22	26	2.7 to 3.6	2.0 to 3.6	48TSOP(I)Normal* (10 x 14 mm)
2M SRAM 16M FLASH	256k x 8 1M x 16	★LR-S1307	85 120	25	97	25	2	12	16	2.7 to 3.6	2.0 to 3.6	60TSOP(I)Normal* (12 x 18 mm)

* 0.4 mm pin-pinch

SRAM+Mask ROM

Capacity	Configuration (words x bits)	Model No.	Access time (ns) MAX.	Supply current: Operating (mA) MAX.	Supply current: Data retention (μA) MAX.	Supply current: Standby (μA) MAX.	Supply voltage (V): Operating	Supply voltage (V): Data retention	Package
256k SRAM 2M MASK ROM	32k x 8 256k x 8	★LH-MS20XX	450 450	20	10	—	2.0 to 3.3	2.0 to 3.3	32TSOP(I)Normal/ 32TSOP(I)Normal (8 x 13.4 mm)

Mask ROM Pin Compatible Flash Modules

Mask ROM Pin Compatible Flash Modules

Capacity	Configuration (words x bits)	Model No.	Access time (ns) MAX.	Supply voltage (V)	Operating Temp. (°C)	Package	Remarks
32M	2M x 16	LR0G537	120	5 ± 5%	0 to 70	42DIP	Configuration : Sharp 16M-bit flash memory x 2, Mask ROM specific pinout
64M	4M x16	LR0G536	120	5 ± 5%	0 to 70	42DIP	Configuration : Sharp 32M-bit flash memory x 2, Mask ROM specific pinout

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■ Mask ROMs

Process	Capacity	Configuration (words x bits)	* Pinout	Model No.	User's No.	Access time (ns) MAX. Cycle time (ns) MIN.	Supply current (mA) MAX.	Supply voltage (V)	Package
CMOS	256k	32k x 8	J	**LH53259D/N/T**	LH-5359XX	150	25	5 ± 10%	28DIP/28SOP/28TSOP(I)Normal
	512k	64k x 8	J	**LH53517D/N/T/TR/U**	LH-5317XX	150	30	5 ± 10%	28DIP/28SOP/ 28TSOP(I)Normal/Reverse/32QFJ
	1M	128k x 8	J	**LH531V00D/N/T/U**	LH-531VXX	100	50	5 ± 10%	32DIP/32SOP/ 32TSOP(I)Normal/32QFJ
			J	**LH53V1R00N/T**	LH-5V1RXX	120	30	2.7 to 3.6	32SOP/32TSOP(I)Normal
			J	**LH530800AD/AN/AU**	LH-531HXX	150	35	5 ± 10%	32DIP/32SOP/32QFJ
			M	**LH531000BD/BN**	LH-531GXX	150	25	5 ± 10%	28DIP/28SOP
			M	**LH531000BN-S**	LH-531MXX	500	18	2.6 to 3.6	28SOP
			J	**LH531024D/N/U**	LH-531CXX	100	75	5 ± 10%	40DIP/40SOP/44QFJ
		64k x 16	J	**★LH53V2R00AN/AT**	LH-5V2HXX	120	35	2.7 to 3.6	32SOP/32TSOP(I)Normal
	2M	256k x 8	J	**LH53V2R00N/T**	LH-5V2RXX	120	35	2.7 to 3.6	32SOP/32TSOP(I)Normal
			J	**LH532100BD/BN/BT/BS/BSR/BU-1**	LH-532KXX	120	50	5 ± 10%	32DIP/32SOP/ 32TSOP(I)Normal/
			J	**LH532100BD/BN/BT/BS/BSR/BU**	LH-532KXX	150	50	5 ± 10%	32TSOP(II)Normal/Reverse/ 32QFJ
			J	**★LH53V2Y00N/E**	LH-5V2YXX	500	25	1.8 to 3.6	32SOP/ 32TSOP(I)Normal(8 x 13.4 mm)
		128k x 16	J	**LH532048D/N/U**	LH-532CXX	100	75	5 ± 10%	40DIP/40SOP/44QFJ
		256k x 8/ 128k x 16	M	**LH532600D/N/T/TR**	LH-5326XX	100	75	5 ± 10%	40DIP/40SOP/ 48TSOP(I)Normal/Reverse
			M	**★LH53V2P00AN/AT**	LH-5V2GXX	120	35	2.7 to 3.6	40SOP/48TSOP(I)Normal
			M	**LH53V2P00N/T**	LH-5V2PXX	120	35	2.7 to 3.6	40SOP/48TSOP(I)Normal
			M	**LH532000BD/BN/BT/BTR-1**	LH-532GXX	120	50	5 ± 10%	40DIP/40SOP/ 48TSOP(I)Normal/Reverse
			M	**LH532000BD/BN/BT/BTR**	LH-532GXX	150	50	5 ± 10%	
	4M	512k x 8	J	**LH53H4100D/N**	LH-5H41XX	80	90	5 ± 10%	32DIP/32SOP
			J	**LH534700D/N**	LH-5S47XX	100	75	5 ± 10%	32DIP/32SOP
			J	**LH534R00BD/BN**	LH-5S4RXX	120	65	5 ± 10%	32DIP/32SOP
			J	**LH53V4T00E**	LH-5V4TXX	120	35	2.7 to 3.6	32TSOP(I)Normal(8 x 13.4 mm)
			J	**LH53V4R00AN/AT**	LH-5V4HXX	120	35	2.7 to 3.6	32SOP/32TSOP(I)Normal
			J	**LH53V4R00N/T**	LH-5V4RXX	150	35	2.7 to 3.6	32SOP/32TSOP(I)Normal
			F	**LH534A00T**	LH-5S4AXX	120	65	5 ± 10%	32TSOP(I)Normal
			F	**LH534B00T**	LH-5S4BXX	120	60	5 ± 10%	40TSOP(I)Normal
			F	**LH53V4B00T**	LH-5V4BXX	150	35	3.0 to 3.6	40TSOP(I)Normal
			J	**LH53V4Y00N/E**	LH-5V4YXX	500	25	1.8 to 3.6	32SOP/ 32TSOP(I)Normal(8 x 13.4 mm)
		256k x 16	J	**LH534096D/N/U**	LH-5S4HXX	100	75	5 ± 10%	40DIP/40SOP/44QFJ
			J	**LH534Y00AD/AN**	LH-5S4YXX	120	65	5 ± 10%	40DIP/40SOP
		512 x 8/ 256k x 16	M	**LH53B4P00D/N*1**	LH-5B4PXX	120[50]	100	5 ± 10%	40DIP/40SOP
			M	**LH534600CD/CN/CT**	LH-5S46XX	100	75	5 ± 10%	40DIP/40SOP/48TSOP(I)Normal
			M	**LH53V4P00N/T**	LH-5V4PXX	120	35	2.7 to 3.6	40SOP/48TSOP(I)Normal
			M	**LH534P00BD/BN/BT**	LH-5S4PXX	120	65	5 ± 10%	40DIP/40SOP/48TSOP(I)Normal
			F	**LH53F4600N**	LH-5S4ZXX	100	75	5 ± 10%	44SOP
			F	**LH53F4P00N**	LH-5S4GXX	120	65	5 ± 10%	44SOP
			F	**★LH53V4C00E**	LH-5V4CXX	150	35	3.0 to 3.6	48TSOP(I)Normal(12 x 20 mm)

* J : JEDEC standard EPROM pinout, M : Mask ROM specific pinout, F: Flash Memory compatible pinout

*1 With page mode. Figures in brackets indicate assess time during page mode.

Low voltage model

T : TSOP(Type I) Normal bend
S : TSOP(Type II) Normal bend
QFJ=PLCC

TR : TSOP(Type I) Reverse bend
SR : TSOP(Type II) Reverse bend

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■ Mask ROMs (cont'd)

Process	Capacity	Configuration (words x bits)	* Pinout	Model No.	User's No.	Access time (ns) MAX. Cycle time (ns) MIN.	Supply current (mA) MAX.	Supply voltage (V)	Package
CMOS	8M	1M x 8	J	**LH538700AD/AN/AS***	LH-538VXX	100	100	5 ± 10%	32DIP/32SOP/32TSOP(II)Normal*
			J	**LH538R00CD/CN**	LH-5S8RXX	120	60	5 ± 10%	32DIP/32SOP
		1M x 8/ 512k x 16	M	**★LH53B8V00D/N*[1]**	LH-MB8VXX	85[45]	120	5 ± 10%	42DIP/44SOP
			M	**LH53BV8600D/N*[1]**	LH-5D86XX	100[50]	85	3.0 to 3.6	42DIP/44SOP
			M	**LH53BV8600T*[1]**	LH-5D8DXX	100[50]	85	3.0 to 3.6	48TSOP(I)Normal
			M	**★LH53B8600D/N*[1]**	LH-MB86XX	100[50]	100	5 ± 10%	42DIP/44SOP
			M	**LH53BV8P00D/N*[1]**	LH-5D8PXX	120[50]	85	3.0 to 3.6	42DIP/44SOP
			M	**LH53BV8P00T*[1]**	LH-5D8BXX	120[50]	85	3.0 to 3.6	48TSOP(I)Normal
			M	**LH53B8P00BD/BN**[1]**	LH-MB8PXX	120[50]	100	5 ± 10%	42DIP/44SOP*
			M	**LH53B8P00AD/AN*[1]**	LH-5B8GXX	120[50]	100	5 ± 10%	42DIP/44SOP
			M	**LH538600CD/CN/CT***	LH-5S86XX	100	100	5 ± 10%	42DIP/44SOP/48TSOP(I)Normal*
			M	**LH538P00CD/CN/CT***	LH-5S8PXX	120	60	5 ± 10%	42DIP/44SOP/48TSOP(I)Normal*
			M	**LH53V8500N/T**	LH-5V85XX	150	35	2.7 to 3.6	44SOP/48TSOP(I)Normal
			F	**LH53FV8P00T**	LH-5G8PXX	120	35	3.0 to 3.6	56TSOP(I)Normal
	16M	2M x 8 1M x 16	M	**LH53CV16P00D/N/T*[1]**	LH-5E7PXX	120[50]	85	3.0 to 3.6	42DIP/44SOP/48TSOP(I)Normal
			M	**LH53B16P00AD/AN*[1]**	LH-5B7GXX	120[50]	120	5 ± 10%	42DIP/44SOP
			M	**LH53C16H00D/N*[1]**	LH-5C7HXX	120[50]	150	5 ± 10%	42DIP/44SOP
			M	**LH53C16P00AD/AN*[1]**	LH-5C7GXX	120[60]	150	5 ± 10%	42DIP/44SOP
			M	**LH53C16600D/N*[1]**	LH-5C76XX	100[50]	150	5 ± 10%	42DIP/44SOP
			M	**LH5316600AD/AN/AS**	LH-537UXX	100	100	5 ± 10%	42DIP/44SOP/44TSOP(II)Normal
			M	**LH5316P00DD/DN/DS**	LH-537NXX	120	70	5 ± 10%	42DIP/44SOP/44TSOP(II)Normal
			M	**LH5316P00DT/DTR**	LH-537ZXX	120	70	5 ± 10%	48TSOP(I)Normal/Reverse
			M	**LH53V16500AN/AT**	LH-MV7FXX	150	35	2.7 to 3.6	44SOP/48TSOP(I)Normal
			F	**LH53FV16P00AT**	LH-5G7PXX	120	35	3.0 to 3.6	56TSOP(I)Normal
		1M x 16/ 512k x 32	M	**LH53B16R00N*[1]**	LH-5B7RXX	120[50]	180	5 ± 10%	70SSOP
			M	**LH53BV16900N/M/T*[1]**	LH-MD79XX	100[30]	120	3.0 to 3.6	70SSOP/100LQFP/70TSOP(II)Normal
	24M	3M x 8	M	**LH5324000D**	LH-5360XX	150	65	5 ± 10%	42DIP
		1.5M x 16	M	**LH5324C00D**	LH-536CXX	120	80	5 ± 10%	42DIP
			M	**LH5324A00AD**	LH-536GXX	150	65	5 ± 10%	42DIP
		3M x 8/ 1.5M x 16	M	**LH5324P00N**	LH-536PXX	120	80	5 ± 10%	44SOP
			M	**LH5324P00T**	LH-536DXX	120	80	5 ± 10%	48TSOP(I)Normal

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■ Mask ROMs (cont'd)

Process	Capacity	Configuration (words x bits)	* Pinout	Model No.	User's No.	Access time (ns) MAX. Cycle time (ns) MIN.	Supply current (mA) MAX.	Supply voltage (V)	Package
CMOS	32M	4M x 8	M	**LH5332Y00D**	LH-MN5YXX	100	100	5 ± 10%	42DIP
			M	**LH5332000BD**	LH-MN5RXX	150	65	5 ± 10%	42DIP
		2M x 16	M	**LH5332H00D**	LH-MN5HXX	100	100	5 ± 10%	42DIP
			M	**LH5332C00BD**	LH-MN5LXX	120	80	5 ± 10%	42DIP
		4M x 8/ 2M x 16	M	**LH53CV32800N*1**	LH-MC58XX	100[30]	120	3.0 to 3.6	44SOP
			M	**LH53CV32800T*1**	LH-ME53XX	100[30]	120	3.0 to 3.6	48TSOP(I)Normal
			M	**LH53C32600N*1**	LH-MC56XX	100[50]	170	5 ± 10%	44SOP
			M	**LH53CV32P00N*1**	LH-ME5GXX	120[50]	100	3.0 to 3.6	44SOP
			M	**LH53CV32P00T*1**	LH-ME5BXX	120[50]	100	3.0 to 3.6	48TSOP(I)Normal
			M	**LH5332600AN**	LH-MN5UXX	100	100	5 ± 10%	44SOP
			M	**LH5332600AT**	LH-MN5VXX	100	100	5 ± 10%	48TSOP(I)Normal
			M	**LH5332P00BN**	LH-MN5KXX	120	80	5 ± 10%	44SOP
			M	**LH5332P00BT**	LH-MN5SXX	120	80	5 ± 10%	48TSOP(I)Normal
			M	**LH53V32500AN**	LH-MV5GXX	150	35	2.7 to 3.6	44SOP
			M	**LH53V32500AT**	LH-MV5CXX	150	35	2.7 to 3.6	48TSOP(I)Normal
		2M x 16/ 1M x 32	M	**LH53BV32900AN/AT*1**	LH-MD5UXX	100[30]	120	3.0 to 3.6	70SSOP/70TSOP(I)Normal
			M	**LH53BV32700N*1**	LH-MD57XX	100[50]	100	3.0 to 3.6	70SSOP
			M	**LH53BV32R00N/M*1**	LH-MD5RXX	120[50]	100	3.0 to 3.6	70SSOP/100LQFP
	64M	4M x 16	M	**★LH5364H00D**	LH-MN0HXX	100	100	5 ± 10%	42DIP
			M	**LH5364P00D**	LH-MN0CXX	120	80	5 ± 10%	42DIP
		8M x 8/ 4M x 16	M	**★LH5364600T**	LH-MN0BXX	100	100	5 ± 10%	48TSOP(I)Normal
			M	**★LH5364600N**	LH-MN06XX	100	100	5 ± 10%	44SOP
			M	**★LH53V64P00T**	LH-MV0BXX	120*2	35	3.0 to 3.6*2	48TSOP(I)Normal
			M	**★LH53V64P00N**	LH-MV0PXX	120*2	35	3.0 to 3.6*2	44SOP
			M	**LH5364P00N**	LH-MN0PXX	120	80	5 ± 10%	44SOP
			M	**LH5364P00T**	LH-MN0DXX	120	80	5 ± 10%	48TSOP(I)Normal
			M	**LH5364P00N-1**	LH-MN0PXX	150	70	5 ± 10%	44SOP
			M	**LH5364P00T-1**	LH-MN0DXX	150	70	5 ± 10%	48TSOP(I)Normal

* J : JEDEC standard EPROM pinout; M : Mask ROM specific pinout; F: Flash Memory compatible pinout
*1 With page mode. Figures in brackets indicate assess time during page mode.
*2 Access time at 2.7V : 150 ns

Low voltage model
T : TSOP(Type I) Normal bend
S : TSOP(Type II) Normal bend
TR : TSOP(Type I) Reverse bend
SR : TSOP(Type II) Reverse bend

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■Static RAMs

Process	Capacity	Configuration (words x bits)	Model No.	Access time (ns) MAX. Cycle time (ns) MIN.	Supply current: Operating (mA) MAX.	Supply current: Standby (mA) MAX.	Supply voltage (V)	Operating temp. (°C)	Package
Full CMOS	16k	2k x 8	LH5116/NA/D-10	100	40	0.001	5 ± 10%	0 to 70	24DIP/24SOP/24SK-DIP
			LH5116H/HN/HD-10	100	40	0.001	5 ± 10%	-40 to 85	24DIP/24SOP/24SK-DIP
			LH5116SN	1 000	10	0.001	3 ± 10%	0 to 50	24SOP
	64k	8k x 8	LH5164A/AN-80L	80	55	0.001	5 ± 10%	-10 to 70	28DIP/28SOP
			LH5164A/AN/AD/AK/AT-10L	100	45	0.001			28DIP/28SOP/28SK-DIP/ 28SOJ/28TSOP(I)Normal
			LH5164AH/AHN/AHD/AHT-10L	100	50	0.001*4	5 ± 10%	-40 to 85	28DIP/28SOP/28SK-DIP/ 28TSOP(I)Normal
			LH5164AVN/AVT	200	45	0.001	2.7 to 5.5	-10 to 70	28SOP/28TSOP(I)Normal
			LH5164AV3HN	200	50	0.001*4	2.7 to 5.5	-40 to 85	28SOP
			LH5164AVHN/AVHT	200	25	0.001*4	3.0 to 3.6	-40 to 85	28SOP/28TSOP(I)Normal
			LH5164AST	500	20	0.001	2.5 to 5.5	-10 to 70	28TSOP(I)Normal
			LH5164ASHN/ASHT	500	20	0.001*4	2.5 to 5.5	-40 to 85	28SOP/28TSOP(I)Normal
	256k	32k x 8	LH51V256N/T-85SL	250*1 85*2	25	0.003	1.8 to 3.6	0 to 70	28SOP/28TSOP(I)Normal
			LH51V256HN/HT-85SL	250*1 85*2	25	0.005	1.8 to 3.6	-40 to 85	28SOP/28TSOP(I)Normal
CMOS Periphery	64k	8k x 8	LH5268A/AN/AD-10LL	100	40	0.04	5 ± 10%	0 to 70	28DIP/28SOP/28SK-DIP
	256k	32k x 8	LH52258AD/AK-20	20	150	1	5 ± 10%	0 to 70	28SK-DIP/28SOJ(300mil)
			LH52258AD/AK-25	25	140	1			
			LH52256C/CN/CD/CT-70LL	70	45	0.04	5 ± 10%	0 to 70	28DIP/28SOP/28SK-DIP/ 28TSOP(I)Normal
			LH52256C/CN/CD/CT-85LL	85	40	0.04			
			LH52256C/CN/CD/CT-10LL	100	40	0.04			
			LH52256CH/CHN/CHT-70LL	70	45	0.04	5 ± 10%	-40 to 85	28DIP/28SOP/ 28TSOP(I)Normal
			LH52256CH/CHN/CHT-85LL	85	40	0.04			
			LH52256CH/CHN/CHT-10LL	100	40	0.04			
			LH52CV256N/T-10LL	100	15	0.025	2.7 to 3.6	0 to 70	28SOP/28TSOP(I)Normal
			LH52CV256JN/JT-10LL	100	15	0.025	2.7 to 3.6	-25 to 85	28SOP/28TSOP(I)Normal
			LH52CV256HN/HT-10LL	100	15	0.025	2.7 to 3.6	-40 to 85	28SOP/28TSOP(I)Normal
			LH52256CVN/CVT	200*2 150*3	15	0.02	2.7 to 3.6	0 to 70	28SOP/28TSOP(I)Normal
			★LH52256CVJN/CVJT	200	15	0.04	2.7 to 3.6	-25 to 85	28SOP/28TSOP(I)Normal
			LH52256CSN/CST	500	10	0.02	2.5 to 3.6	0 to 70	28SOP/28TSOP(I)Normal
	512k	64k x 8	LH52512N-85LL	85	50	0.05	5 ± 10%	0 to 70	32SOP
			LH52512N-10LL	100	50	0.05			

*1 1.8 V ≦ Vcc ≦ 3.6 V
*2 2.7 V ≦ Vcc ≦ 3.6 V
*3 3.0 V ≦ Vcc ≦ 3.6 V
*4 Standby : Ta = 0 to 70°C

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■ Static RAMs(cont'd)

Process	Capacity	Configuration (words x bits)	Model No.	Access time (ns) MAX. Cycle time (ns) MIN.	Supply current: Operating (mA) MAX.	Supply current: Standby (mA) MAX.	Supply voltage (V)	Operating temp. (°C)	Package
CMOS Periphery	1M	256k x 4	LH521002AK-20	20	140	2	5 ± 10%	0 to 70	28SOJ(400mil)
			LH521002AK-25	25	130	2			
		128k x 8	LH52V1000CS-70LL	70	40	0.06	2.7 to 3.6	0 to 70	32TSOP(I)Normal (8 x 13.4 mm)
			LH52V1000CS-85LL	85	40	0.06			
			LH52V1000CJS-70LL	70	40	0.06	2.7 to 3.6	-25 to 85	32TSOP(I)Normal (8 x 13.4 mm)
			LH52V1000CJS-85LL	85	40	0.06			
			LH52V1000CHS-70LL	70	40	0.06	2.7 to 3.6	-40 to 85	32TSOP(I)Normal (8 x 13.4 mm)
			LH52V1000CHS-85LL	85	40	0.06			
			LH52D1000T/S-85LL	85	40	0.045	2.7 to 3.6	-25 to 85	32TSOP(I)Normal/ 32TSOP(I)Normal/ (8 x 13.4 mm)
			LH52D1000T/S-10LL	100	40	0.045			
			LH521007AK-20	20	180	2	5 ± 10%	0 to 70	32SOJ(400mil)
			LH521007AK-25	25	175	2			
		64k x 8	LH521028AU-15	15	300	4	5 ± 10%	0 to 70	52QFJ
			LH521028AU-17	17	300	4			
			LH521028AU-20	20	300	4			
			LH521028AU-25	25	300	4			
		32k x 32	LH51V1032C4M-15	8*6 15*7	220	2	3.3 ± 5%	0 to 70	100LQFP
			LH51V1032C4M-17	9*6 17*7	200	2			
	2M	256k x 8	LH59BV2000JS-70L	70	35	0.1	2.7 to 3.6	-25 to 85	32TSOP(I)Normal (8 x 13.4 mm)
			★LH52V2000JS/JY-L	85	35	0.09	2.7 to 3.6	-25 to 85	32TSOP(I)Normal(8 x 13.4 mm)/ 32FBGA(CSP)

*6 Access time

*7 Cycle time

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FIFO Memories

Capacity	Configuration (words X bits)	Model No.	Operating frequency (MHz) MAX.	Access time (ns) MAX.	Cycle time (ns) MIN.	Supply current		Supply voltage (V)	Package
						Operating (mA) MAX.	Standby (mA) MAX.		
0.5k	64 x 8	LH5481D/U-25	25	—	—	45	—	5 ± 10%	28SK-DIP/ 28QFJ
		LH5481D/U-35	35	—	—	45	—		
	64 x 9	LH5491D/U-25	25	—	—	45	—	5 ± 10%	28SK-DIP/ 28QFJ
		LH5491D/U-35	35	—	—	45	—		
4.5k	512 x 9	LH5496/D/U-20	—	20	30	100	5	5 ± 10%	28DIP/ 28SK-DIP/ 32QFJ
		LH5496/D/U-35	—	35	45	100	5		
		LH5496/D/U-50	—	50	65	100	5		
9k	1k x 9	LH540202D/U-15	—	15	25	100	5	5 ± 10%	28SK-DIP/ 32QFJ
		LH540202D/U-20	—	20	30	100	5		
		LH540202D/U-25	—	25	35	100	5		
		LH540202D/U-35	—	35	45	100	5		
	512 x 18	LH540215U-20	—	12	20	190	1	5 ± 10%	68QFJ
		LH540215U-25	—	15	25	190	1		
		LH540215U-35	—	20	35	190	1		
18k	2k x 9	LH540203D/U-15	—	15	25	100	5	5 ± 10%	28SK-DIP/ 32QFJ
		LH540203D/U-20	—	20	30	100	5		
		LH540203D/U-25	—	25	35	100	5		
		LH540203D/U-35	—	35	45	100	5		
	1k x18	LH540225U-20	—	12	20	190	1	5 ± 10%	68QFJ
		LH540225U-25	—	15	25	190	1		
		LH540225U-35	—	20	35	190	1		
	256 x36 x 2	LH543601P-20	—	12.8	20	280	0.1	5 ± 10%	132QFP
		LH543601P-25	—	16	25	280	0.1		
		LH543601P-30	—	20	30	280	0.1		
		LH543601P-35	—	25	35	280	0.1		
36k	4k x 9	LH540204D/U-20	—	20	30	110	8	5 ± 10%	28SK-DIP/ 32QFJ
		LH540204D/U-25	—	25	35	110	8		
		LH540204D/U-35	—	35	45	110	8		
	2k x 18	LH540235M/U*-20	—	12	20	245	1	5 ± 10%	64TQFP*1/ 68QFJ★
		LH540235M/U*-25	—	15	25	245	1		
		LH540235M/U*-35	—	20	35	245	1		
	1k x 36	LH543620P-20	—	14	20	380	1	5 ± 10%	132QFP
		LH543620P-25	—	16	25	380	1		
		LH543620P-30	—	18	30	380	1		
	512 x36 x 2	LH543611M/P-18	—	13	18	280	1	5 ± 10%	144TQFP*2/ 132QFP
		LH543611M/P-20	—	13.8	20	280	1		
		LH543611M/P-25	—	16	25	280	1		
		LH543611M/P-30	—	20	30	280	1		
		LH543611M/P-35	—	25	35	280	1		
72k	8k x 9	LH540205D-20	—	20	30	110	8	5 ± 10%	28SK-DIP
		LH540205D-25	—	25	35	110	8		
		LH540205D-35	—	35	45	110	8		
	4k x 18	LH540245M/U*-20	—	12	20	245	1	5 ± 10%	64TQFP*1/ 68QFJ★
		LH540245M/U*-25	—	15	25	245	1		
		LH540245M/U*-35	—	20	35	245	1		
	1k x 36 x 2	LH543621M/P-18	—	13	18	280	1	5 ± 10%	144TQFP*2/ 132QFP
		LH543621M/P-20	—	13.8	20	280	1		
		LH543621M/P-25	—	16	25	280	1		
		LH543621M/P-30	—	20	30	280	1		
		LH543621M/P-35	—	25	35	280	1		

*1 1.4 mm thickness *2 1.6 mm thickness QFJ = PLCC

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OEM Specialty and Mini Printers

Telpar is the leading manufacturer of its own line of thermal and impact printers for OEM manufactuers, systems integraters, and value added resellers. These printers, both direct thermal and impact, are known for their high quality, high reliability and ability to stand the rigors of the environments of stand-alone operations such as:

- **Information Kiosks**
- **ATM Machines**
- **Gaming machines**
- **Receipt applications (fueling stations and mobil delivery-type applications)**

P.O.S. Equipment and Accessories

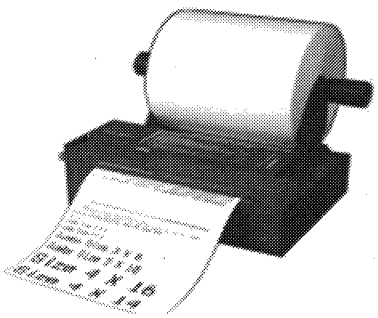
Telpar is a distributor of quality Point of Sale (P.O.S.) products to Value Added Resellers (VARs), Resellers and System Integrators. Products include:

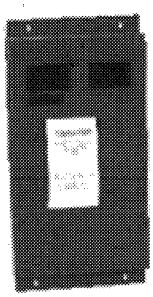
- **Receipt, slip, label and verification printers**
- **Cash Drawers**
- **Scanners and other input devices**
- **Keyboards**
- **Touch screens**
- **Ribbons, papers, and labels**

These products are produced by such quality manufacturers as:

- **EPSON®**
- **Seiko Instruments**
- **CITIZEN®**
- **Symbol**
- **Key Source International**
- **Welch Allyn**
- **Tatung**
- **APG Cash Drawers**
- **Other quality P.O.S. manufacturers**

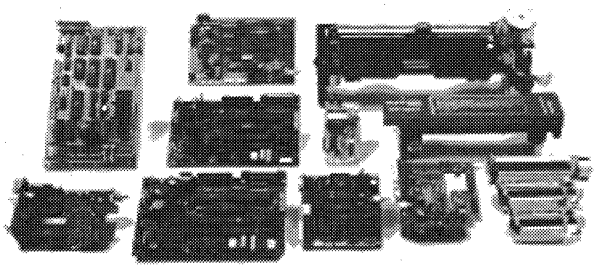
Kiosk Printers



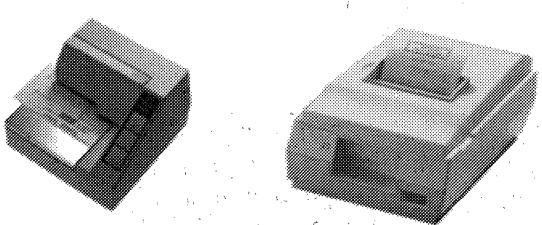


Panel Mount Printers

Printer Mechanisms and Controllers



P.O.S. Printers and Accessories



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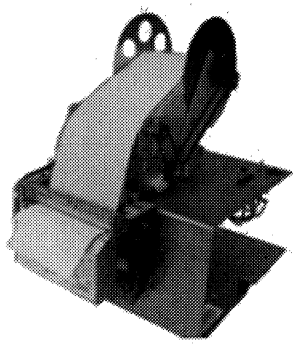
Kiosk and Stand-Alone Printers



MP-260 Series Kiosk Printers

The MP260 series of modular printers features a basic design concept which can be customized to the requirements of the applications.

Applications

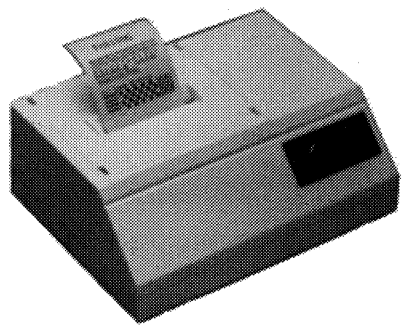
- Kiosks
- Equipment requiring

Customizing features

- Cutter or no cutter
- 12 VDC, 24 VDC or 115 VAC power
- Journal take up option
- Interface control codes
- Chassis modification to meet space and mounting requirements
- RS-232 or Centronics interface
- One color or two color ribbon
- Paper out sensor and paper roll size

Specifications/features

- 35 or 42 columns
- 210 dots per line
- Standard paper roll: 3" w x 3.25" O.D.
- 150 to 19200 baud (serial version)
- Bit image graphics
- Print speed: 2 lines per second
- Normal, inverted, double high and double wide print
- Mechanism current (12 volt version): Average while printing 1.5 amps



TG-180C & TGC-180C Stand-Alone Printer

These printers manufactured by Telpar are ideal for POS and mobile applications. Both Centronics parallel or RS-232 serial interface is available.

Specifications/Features

- Bit image graphics
- Normal, inverted, double high and double wide print
- 150 to 19200 baud (Serial version)
- Input buffer: TXG series - 6912 characters and TG Series - 2048 characters

Options

- One or two cash drawer drivers
- Display Driver for Telpar Customer Display
- RS-422 interface
- Multi-drop capability

Number of columns

	TG180C	TG-180C	TG-182C	TG-183C
Number of columns	24	30	36	42
Dots per line	144	180	216	252
Print Speed(lines/sec)	1.7	1.3	1.1	1.0
Paper				
Width	2.25"	same	same	same
Diameter (approx.)	1.6"	same	same	same
Length	65 feet	same	same	same
Dimension				
W x D x H 7.8" x6" x 2.9"		same	same	same
Weight				
(without paper)	1.5 lbs.	same	same	same

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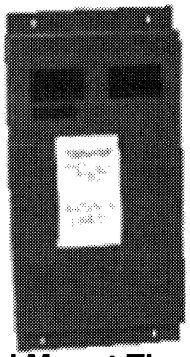
OEM Panel Mount Printers



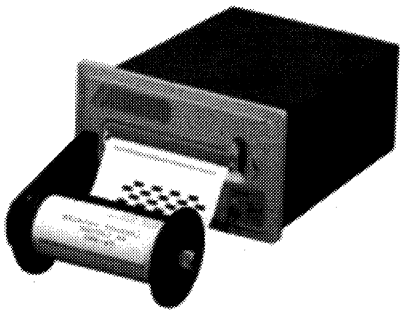
SP-328 Panel Mount Thermal Data Logger

The SP-328 Data Logger Thermal Printer is an industrial quality panel mount direct thermal printer with an integral paper take-up system. This unit is specifically designed and manufactured to withstand the punishing conditions commonly encountered in demanding industrial OEM applications.

The unit offers features that combat the perils of the industrial environment. These features include: fixed head printing technology with minimal moving parts, an internal paper take-up system that feeds paper out so that it can be seen in the viewing area with 90 mm (3.5 in) of printed media viewable prior to being spooled, automatic paper load feature, input source voltage fusing, transient protection, unregulated single voltage input, short circuit protection, voltage/temperature compensation, thermal printhead protection and automatic interface selection that includes serial RS-232 and parallel. Thiscombination of technology is housed in an all metal chassis that is ready to be bolted into your next panel mount application.

Features

Internal paper take-up system
Reverse channel status and mode communications.
8 dot/mm (203 dots/inch) resolution
Fixed thermal printhead
Print speeds up to 33.7mm (1.33 inches) per second



SP-401 Thermal Panel Mount

The SP-401 thermal panel mount printer is a smart low cost solution to difficult applications, including factory floor, outdoors and vehicular. Optional nonvolatile memory RAM can store alarms, messages, account numbers, etc. EPROM is programmable to specify functions like font changes or number crunching input data. Advanced electronic design provides built in protection for mobile use.

Features

- RS-232C, 20mA, and optional parallel interface
- Dimensions: 4.5"Wx2.7"Hx 5.7"D
- Double width printing
- Internal 7000 character data buffer
- Operates from 6-30 VAC or DC supply
- Data and text modes
- 8 bit Centronics compatible, DB25 connector

Options:

- Paper take-up journal
- Custom character sets
- Time/date stamp

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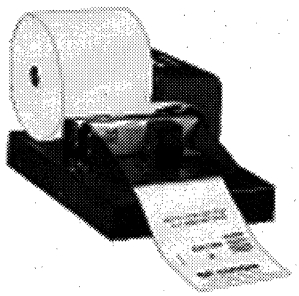
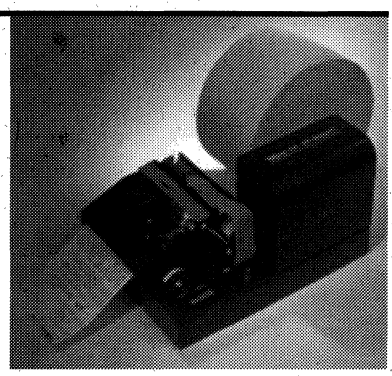
Kiosk Thermal Printers





SP-5000 4" Kiosk Thermal Printer

The SP-5000 kiosk receipt thermal printer series of intelligent printers utilize a microprocessor controlled paper delivery system that spools and protects the document from public access while printing. When the document is completed and cut, the unit automatically dispenses it, gripping the trailing edge so that the printout is not dropped. If the document is not taken, upon receiving the next print command, the printer will retract the existing document and dispose of it within the kiosk. This protocol prevents litter around the kiosk and paper jams, eliminating the need for costly repairs.

In the unlikely event that a jam condition occurs, the printer will attempt to clear the jam and, if unsuccessful, the paper will be retracted and again disposed of inside the kiosk. The printer will simultaneously notify the host of the jam via reverse channel communications. Printer status conditions also communicated via RS-232C are: ticket taken, buffer full/empty, cutter jam, and paper low/out. Models available in 50 mm (2 in), 76 mm (3 in) and 101 mm (4 in) wide versions.

Features

- Long life guillotine paper cutter
- Available paper widths:112mm (4.40 in), 80mm (3.125 in), and 60mm 2.350 in)
- Low paper sensor
- Intelligent paper delivery system standard

SP-5000HC High Capacity 4" Kiosk Thermal Printer

The SP-5000HC kiosk receipt thermal printer is the high capacity version of the SP-5000 series of thermal printers. The SP-5000HC handles rolls of thermal paper up to 8" (203 mm) in diameter with a length of 1,182 feet (360 mm) with a paper width of 112 mm (4.4 in).

These printers utilize a microprocessor controlled paper delivery system that spools and protects the document from public access while printing. When the document is completed and cut, the unit automatically dispenses it, gripping the trailing edge so that the printout is not dropped. If the document is not taken, upon receiving the next print command, the printer will retract the existing document and dispose of it within the kiosk. This protocol prevents litter around the kiosk and paper jams, eliminating the need for costly repairs.

Printer status conditions also communicated via RS-232C are: ticket taken, buffer full/empty, cutter jam, and paper low/out.

Features

- Long life guillotine paper cutter
- Available paper widths:112 mm (4.40 in)
- All metal construction
- Low paper sensor
- Intelligent paper delivery system standard

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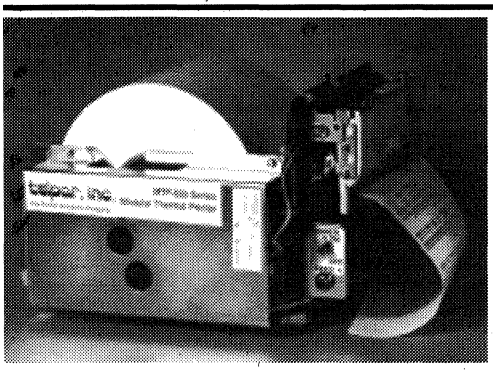
Printer solutions for your kiosk needs



MTP-600 Series Modular Thermal Printer

The MTP-600 series of modular thermal printers are designed specifically for the high performance, size and durability requirements of cut and drop applications. The compact size and high performance characteristics, coupled with its rugged design also makes it ideal for the kiosk environment.

Four models make up the MTP-600 Series:

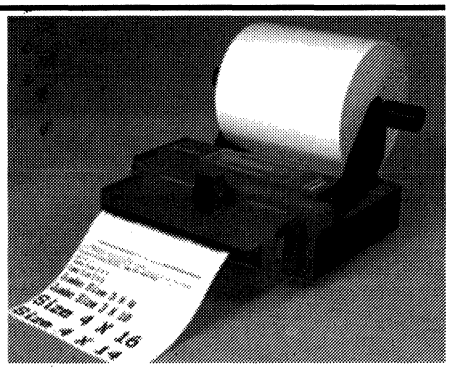
- MTP-630-S - 85 mm (3.35 in) paper width, RS-232C serial interface.
- MTP-630-P - 85 mm (3.35 in) paper width, Centronics parallel interface.
- MTP-640-S - 114 mm (4.49 in) paper width, RS-232C serial interface.
- MTP-640-P - 114 mm (4.49 in) paper width, Centronics parallel interface.

Applications

Parking ticket dispensing
Automated Teller Machines (ATMs)
Gaming
Interactive media kiosks

Features

Direct thermal printhead
All metal construction
Adjustable paper low sensor
Print speed of up to 80 mm/sec (3.1 in/sec)
Dip switches accessible without removing cover.



SP-2021K 8.5" Kiosk Printer

The SP-2021 kiosk thermal printer features an 216 mm (8.5 in) wide direct thermal printhead and provides variable length documents for demanding unattended public uses. The SP-2021 is available in basic three configurations determined by the method of handling paper. They are:

- The SP-2021 without a paper delivery presenter
- The **SP-2021 IK** model prevents the user from touching the document until the unit has completed the print and cut cycle. The document is then delivered to the user.
- The **SP-2021 SIK** offers the same features as the "IK" but if the document is not taken, upon receiving the next print command the printer will retract the existing document and dispose of it inside the kiosk. The "SIK" model also incorporates an anti-jam feature that detects a paper jam and automatically attempts to clear the paper jam. In the unlikely event it is unsuccessful, the printer will notify the host via the RS-232C reverse channel.

Features

216 mm (8.5 in) direct thermal printhead
Industrial quality rotary cutter
Large memory - 32K
Paper: 216 mm (8.5 in) wide with a maximum diameter of roll of 203 mm (8.0 in) and length of up to 335 meters (1,100 ft)

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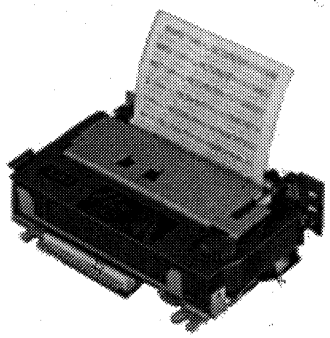
EPSON® Printer Mechanisms



M-260 Series Shuttle Dot Printers

The EPSON® M-260 Series is amazingly small and light. In addition, these printers have a low profile and are easy to incorporate in various products.

Features:

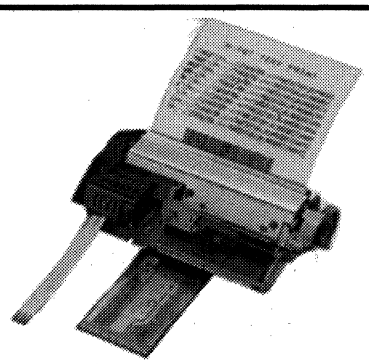
- Operates on 12 volt battery current
- Full graphic functions
- Black/red or single color printing

Applications

The M-260 Series is ideal for receipts, journals, credits/debits and instrumentation applications.

Specifications

	M-260	M-265
Printing	same	same
Font	same	same
Column cap.	42	same
Total dots	210/line	same
Paper	same	same
Reliability		
Mech. (MCBF)	$1.5x10^6$ lines	same
Dimensions		
WxDxH (mm) :	122.0x83.6x25.4	same
Weight(approx)	340 g	same



M-T61 & M-T81 Thermal Line Printers

The EPSON® M-T81 and M-T81 Series of thermal line printer mechanisms are ideally suited to receipt printing as well as bar code applications such as in-store marking and receipt printing. These printers incorporate a high-density line thermal head (8 dots/mm) which ensures high quality print. The printing is also faster than with impact dot printers.

Features

- Easy head cleaning
- Easy paper removal

Specifications

	M-T61	M-T81
Printing	Thermal	same
Resolution	8 dots/mm	same
Printing width	56 mm	72 mm
Total dots	448/line	576/line
Paper	Roll paper	same
Feeding speed	44.6 mm/sec.	same
Reliability		
Mech. (MCBF)	$5x10^6$ lines	same
Dimensions		
WxDxH (mm)	90.6 x54.0x26.2	110.6x54.0x26.2
Weight(approx)	130 g	150g

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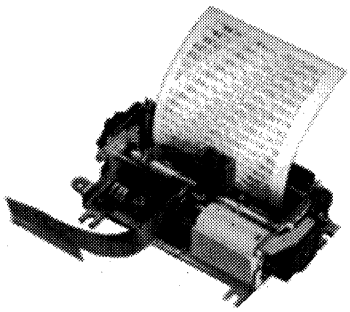


M-TS60 Series - Serial Thermal Printers

The light weight (100g) EPSON® M-TS60 mount has the same dimensions as the M-180 mount, precluding additional costs for producing mount molds. Both the M-TS60 and M-TS63 are driven at 5 DC +/- 10%.

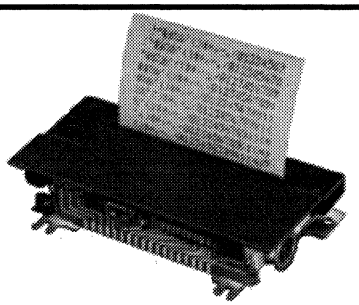
By printing two lines simultaneously and using bidirectional printing, the M-TS60 series offers high throughput speed. The M-TS60 prints at 4 lines per second and the M-TS63 prints at 2.4 lines per second.

Applications

This printer series is ideally suited for the printing of receipts, journals, credits and debits.

Specifications

	M-TS60	M-TS63
Printing	Serial Thermal	same
Font	5x7	same
Column cap.	24	42/36
Printing speed	4.0 lines/sec.	2.4 lines/sec.
Paper	Roll paper	same
Reliability		
Mech. (MCBF)	1x10^6 lines	same
Dimensions WxDxH (mm)		
:	97.2x46.9x23.6	same
Weight(approx)	100g	same



M-190 Series Shuttle Dot Printers

The EPSON® M-190 Series is only 15.8 mm high and weighs a mere 100 grams, making it suitable for incorporation within a wide variety of products. This printer is capable of printing at speeds of 2.5 lines per second and helps to improve customer service. The fast printing speed is complemented by high reliability and a MCBF of 1.5 x 10^6 lines, ensuring suitability for a variety of instrumentation applications.

It is mount compatible with the M-180 avoiding any additional costs for mounting molds. The M-190 can be operated on four Ni-Cad batteries.

Specifications

	M-190	M-191	M-192	M-195
Printing:	shuttle dot	same	same	same
Font	5x7	same	same	same
Column cap.	24	32	40	18
Printing speed lines/sec	2.5	1.9	1.5	2.5
Paper thickness 0.06-0.085mm		same	same	same
ReliabilityMech.(MCBF) n x10^6 lines				
	1.5	1.1	0.9	1.5
Dimensions WxDxH(mm): 122.0x83.6x25.4		same	same	same
Weight(approx) 340g		same	same	same

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Customer Care Programs

Telpar customers are assured of full and continuous service on printers we sell. Other companies may be eager to cut prices to get your order, but if you have questions, need service or general assistance on spare parts, consumables and accessories, they do not seem to know you. That does not happen at Telpar.

Our prices are competitive and we provide a full service solution for your printer needs.

With over 20 years experience providing quality OEM printer solutions and Point of Sale (POS) products and services to our customers, Telpar has developed a multi-faceted Customer Care Program. Major elements include:

- **Standard Warranty**
- **Hot Spares Program**
- **Fixed Cost to Repair (upon request)**
- **Expedited RMA's**
- **Spare Parts**
- **Consumables (paper, ribbons, cutters, etc.)**

If you have any questions on how Telpar can help you, give us a call. Our representatives are ready to help you.

Going for the low dollar price on printers for your business may seem like a good business decision on the day you buy, but what about when you have a question or need service?

Telpar is there for you for the long haul. Your long term satisfaction is our prime objective. Whether it is a question regarding control codes, the proper paper or ribbon for a particular printer, or maintaining a supply of hot spares, Telpar is part of your total print solution.

Standard Telpar Warranty

Each printer sold by Telpar automatically has a one year warranty covering defects and workmanship, starting the day you receive it. This includes printers manufactured by Telpar as well as those distributed by Telpar from one of its quality suppliers.

Our warranty guarantees complete repair or replacement of your printer unless, of course, there has been abuse. This does not include replacement of parts for cosmetic reasons, special cleaning or normal wear and tear.

In most cases, printers under warranty are repaired within two days, and ready for return shipment to the customer.

Hot Spares Program

For critical applications where it is imperative you have particular replacement stock always available for immediate shipment, Telpar can warehouse a set percentage of your total printer commitment, typically four to five percent, to be available for immediate shipment (Monday through Friday). These printers are pretested and ready for operation. When you call, an already tested printer is immediately shipped to you. You would then return the defective printer to Telpar, where it is repaired and returned to your hot spares inventory. This program can be tailored for your unique requirements.

Consumables and Accessories

With Telpar, service does not end with the delivery of a quality printer. Telpar carries a full range of consumables and supplies for all of the printers we sell. Consumables include:

- **Paper - both standard and thermal**
- **Ribbon (both original and generic)**
- **Cutter blades**
- **Cables (serial and parallel)**

These are available to you at a competitive price and with immediate delivery. If you are not sure of part numbers or model numbers our Customer Service Department is ready and willing to help you.

Summary

There are many reasons for using Telpar as your exclusive source for specialty and mini-printers. These include:

- **Telpar's exclusive Customer Care Program**
- **Quality mini-printer products, both impact and thermal**
- **Specialty and custom engineered printer products**
- **Other Point of Sale (POS) products**

If you have questions regarding Telpar's Customer Care call Telpar today at 800-872-4886, extension 238.

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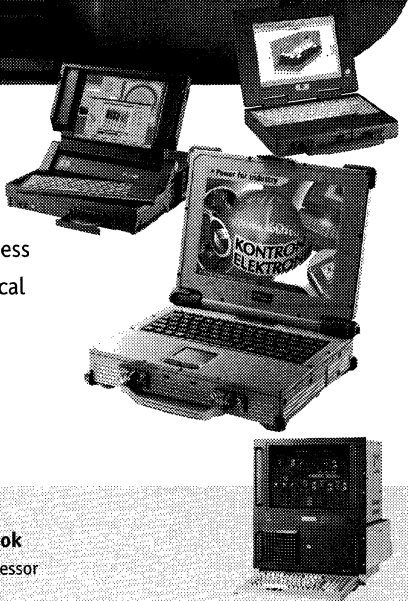

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➤ **CF-25 Low Cost Industrial Notebook**
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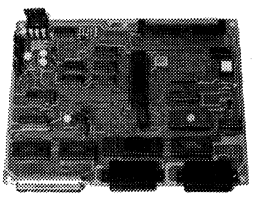

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- 32 Channel A/D • Timers
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- 8K - 32K RAM
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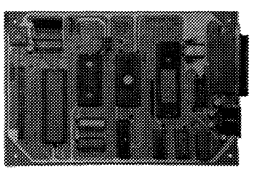
Use as Development System, Burn Program into EPROM with On Board EPROM Burner, Then Use as Final System



"BABY MINI"™

- Full Basic Interpreter
- BCD Floating Point Math
- Serial Port
- 24 I/O Lines
- 8K - 32K RAM • 8K - 24K EPROM
- Timers • Printer Port
- Auto Reset
- On Board EPROM Burner

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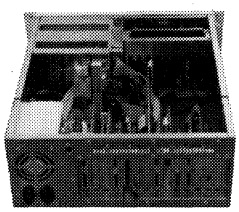

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- I/O Boards - Analog/Digital
- Solid State Disk
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PS-2B	• Power Supply for Basic µC
DRB-1	• MOCOMM BASIC Communications Software
MB-1	• BASIC Users Manual
OPT-X	• HMOS, CMOS; Battery Backed RAM, Clock

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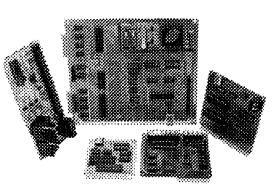
- 2 Serial Ports
- IDE Port
- Floppy Port
- Timers
- Programing Timer
- DMA Controller
- Interrupt Controller
- Power Save Mode

6502 SINGLE BOARD MICROCOMPUTER



- 6502, 65C02 CPU
- Crystal Oscillator
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- 2 - 16K EPROM
- 16 - 32 I/O Lines
- Serial Port
- Timer/Counters
- Various Models

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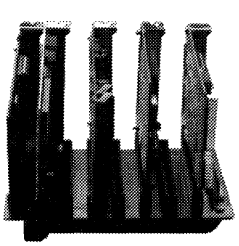

- V-20 CPU
- 8087 Coprocessor Socket
- 256K - 2 MEG RAM
- 64K BIOS
- Zero Wait State RAM
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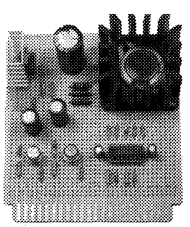

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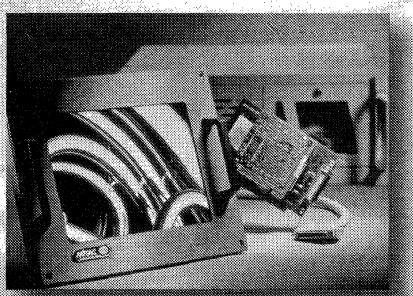

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- **Operator interface HMI workstations**
- **ISA, PCI, PICMG, multi-segment passive backplanes**
- **CRT monitors, LCD flat panel displays**

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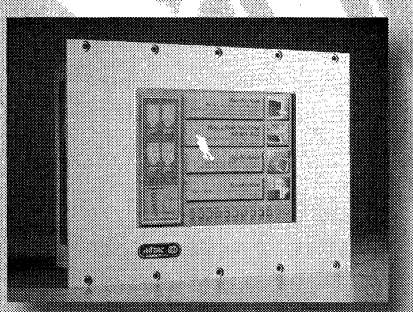

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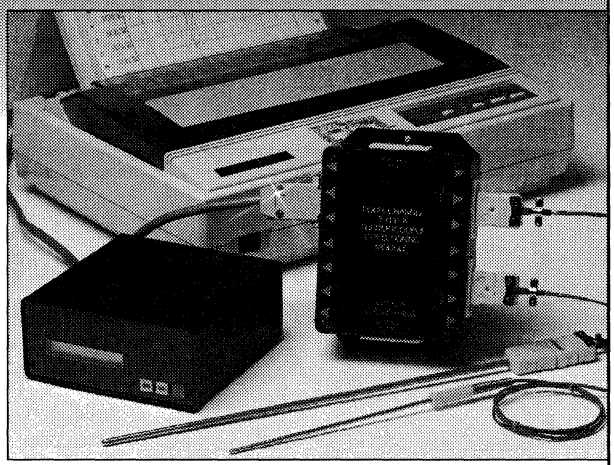
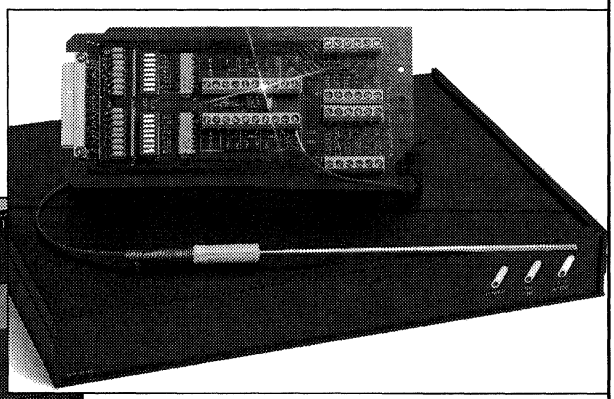
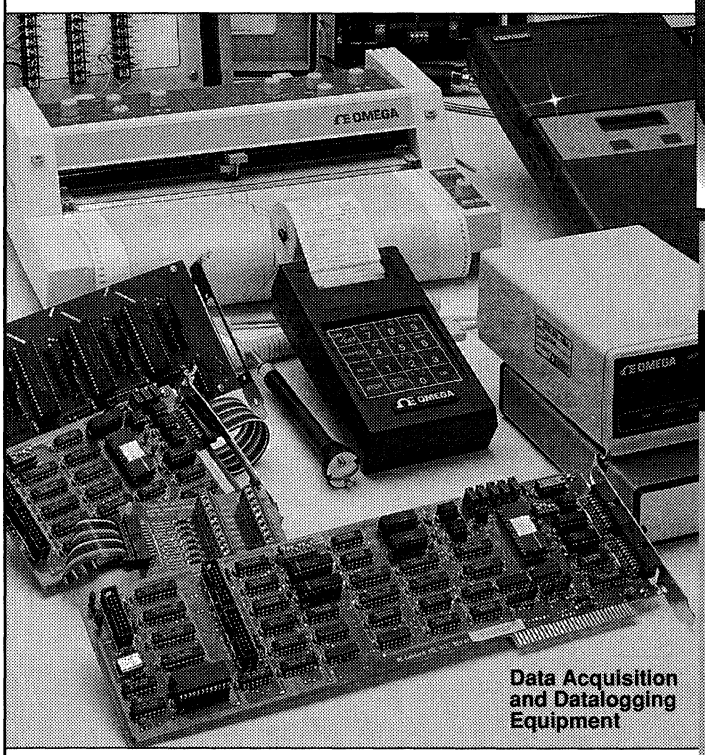


Data Acquisition and Datalogging Equipment





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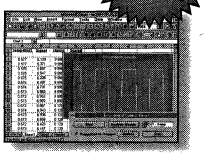

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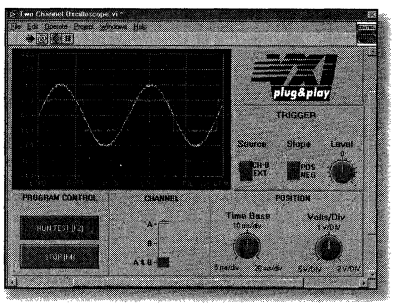

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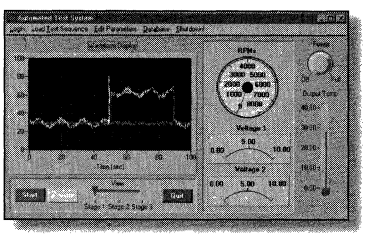


The new LabWindows/CVI instrument driver architecture brings fast execution of test programs for production test and full debugging capabilities for the test engineer. With rapid C code generation and all the tools you need for test, you build better systems faster!

New for LabWindows/CVI 5.0

- Automate instrument driver development with new Wizard tools
- Add functionality with ActiveX automation
- Use OpenGL for 3D visualization of results

And much more!

20 NEW Add-on Software Tools for LabVIEW 5.0

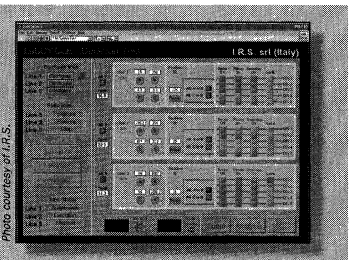
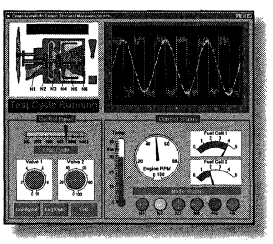


Photo courtesy of I.R.S.

Twenty new third-party add-on software tools take advantage of LabVIEW 5.0 technologies, including multithreading, ActiveX, and multilingual support, to offer complete solutions for test and measurement. Tools include software for increasing test throughput, quality assurance software, validation testers, and more!



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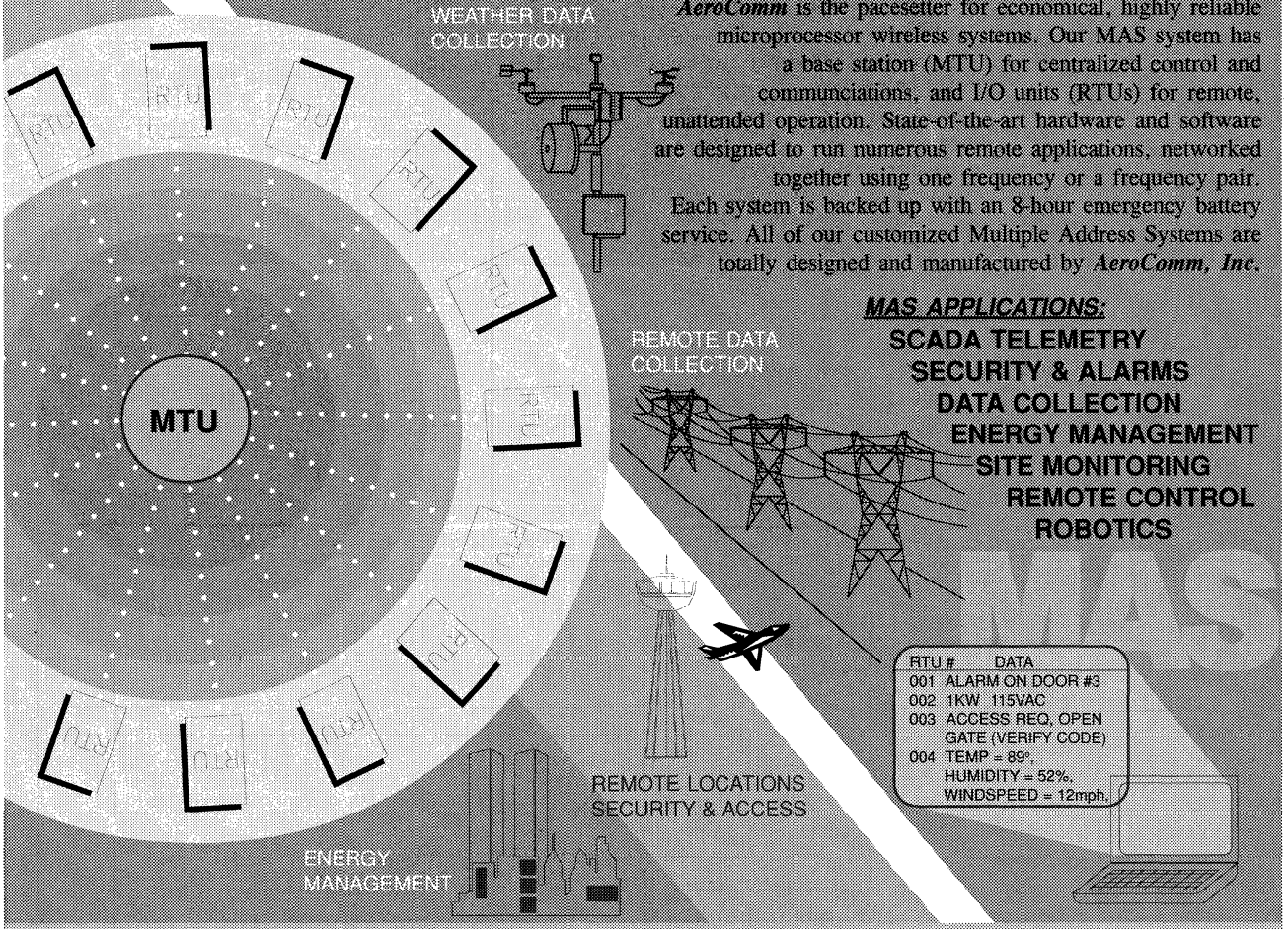

AeroComm is the pacesetter for economical, highly reliable microprocessor wireless systems. Our MAS system has a base station (MTU) for centralized control and communciations, and I/O units (RTUs) for remote, unattended operation. State-of-the-art hardware and software are designed to run numerous remote applications, networked together using one frequency or a frequency pair. Each system is backed up with an 8-hour emergency battery service. All of our customized Multiple Address Systems are totally designed and manufactured by ***AeroComm, Inc.***

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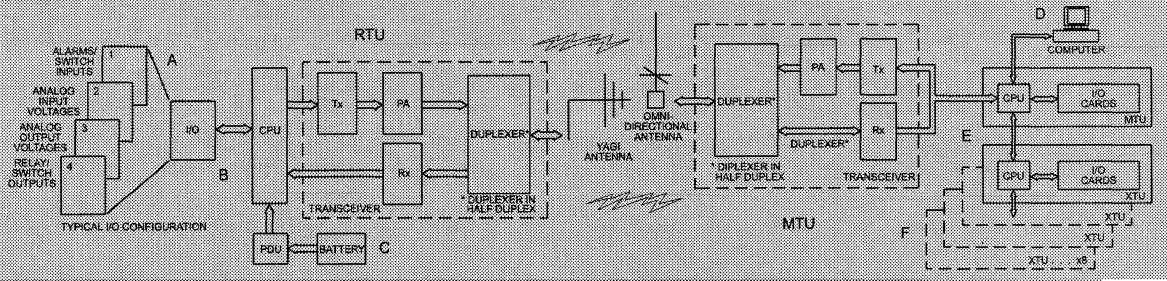
ENERGY MANAGEMENT
SITE MONITORING
REMOTE CONTROL
ROBOTICS

We use our own radios! See Section 1900 for AeroComm's selection of transmitters and receivers



The **Remote Terminal Unit** (RTU) supports four I/O cards (A) with eight I/O ports each for switch closures, opens, dc voltages or currents. RTUs can be configured to control and monitor selected functions at various locations. The RTU CPU (B) reports the status on either a polled or alarm basis. A UPS (of internal batteries) (C) provides emergency backup. Each RTU is uniquely identified via a programmable identification code.

The **Master Terminal Unit** (MTU) consists of (D) a personal computer providing the database which serves a number of remotes, alarms, or points to be monitored (ie: baud rate of the system, polling times, alarm response, etc.); (E) a Central Processing Unit (CPU) that controls the radio functions and normal protocol for full- or half-duplex configurations; (F) expansion units (XTUs) that monitor and echo I/O to and from the RTUs.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE CONSULT FACTORY FOR DETAILS ON ALL OUR PRODUCTS

eem SI UNITS

RELATIVE QUANTITY SYMBOLS

$\neq$	not equal to
$\approx$	approximately equal to
$\propto$	proportional to
$<$	smaller than
$\leq$	smaller than or equal to
$\ll$	much smaller than
$>$	larger than
$\geq$	larger than or equal to
$\gg$	much larger than
$\equiv$	identical to or equivalent
$\uparrow$	increases
$\downarrow$	decreases

PREFIXES FOR SI UNITS

Multiple	Prefix	Symbol
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p

Quantity	Symbol	SI Unit	Symbol	Derivation
acceleration	a	m s^{-2}	—	velocity/time
acceleration due to gravity	g	m s^{-2}	—	velocity/time
amount of substance	n	mole	mol	mole fraction (n) used
amplification factor	μ	*a ratio*	—	—
angle	$\theta_1,\varphi_1,\alpha_1$	—	—	—
angle of incidence	i	degree or radian	°	—
angle of refraction	r	degree or radian	°	—
angle, Bragg	θ	number	—	—
angle, critical	c	degree or radian	°	—
anode slope resistance	R_A	ohm	Ω	$\Delta V_a / \Delta I_a$
area	A	metres squared	m^2	$l \times b$
atomic number	Z	a number	—	number of protons
Avogadro constant	L, N_A	number	—	—
breadth	b	metre	m	fundamental unit
capacitance	C	farad	F	charge/p.d.
charge, electric	Q	coulomb	C	current × time
charge on electron	e	coulomb	C	$1{\cdot}6 \times 10^{-19}$ C
conductance	G	ohm^{-1}	Ω^{-1}	reciprocal of resistance
current, electric	I	ampere	A	fundamental unit
decay constant	λ	*a ratio*	—	—
density	ρ	kg m^{-3}	—	m/V
distance along path	s	metre	m	fundamental unit
efficiency	η	*a ratio*	—	work output/work input
electrochemical equiv.	z	g C^{-1}	—	mass/charge
electromotive force	E	volt	V	energy/charge
electron	e	—	—	—
energy	E	joule	J	N m
energy, kinetic	E_k	joule	J	N m. $E_k = 1/2mv^2$
energy, potential	E_p	joule	J	N m. $E_p = mgh$
Faraday constant	F	coulomb mol^{-1}	C mol^{-1}	96,500 C mol^{-1}
field strength, electric	E	V m^{-1}	—	potential gradient: p.d./dist.
field-strength magnetic	H	ampere-turns	—	current × no. of turns
flux, magnetic	Φ	weber	Wb	e.m.f/rate of change of flux
flux density	B	tesla	T	flux/area
focal length	f	metre	m	—
force	F	newton	N	kg m s^{-2}
free energy	ΔG	joule	J	—
frequency	f	hertz	Hz	oscillations/time
gas constant	r	joule	J	energy
half-life,radioactivity	$t_{1/2}$	second	s	fundamental unit
heat capacity	C	J K^{-1}	—	quantity of heat/temp. rise
heat of reaction	ΔH	joule	J	heat energy
heat capacity, specific	c	J K^{-1} kg^{-1}	—	heat capacity/mass
heat, quantity of	q	joule	J	energy

eem SI UNITS

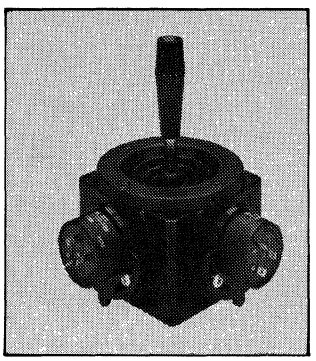
Quantity	Symbol	SI Unit	Symbol	Derivation
height	h	metre	m	fundamental unit
image distance	υ	metre	m	fundamental unit
inductance, mutual	M	henry	H	induced e.m.f./rate of change of current
inductance, self	L	henry	H	—
intensity of radiation	I	*a number*	—	—
latent heat	L	joule	J	quantity of heat
latent heat, specific	l	J kg^{-1}	—	quantity of heat
latent heat, molar	L_m	joule mol^{-1}	J	quantity of heat
length	l	metre	m	fundamental unit
magnetizing force	H	ampere-turns	—	—
magnetic moment	m	Wb m	—	torque in unit magnetic field
magnification, linear	m	*a ratio*	—	—
mass	m	kilogramme	kg	fundamental unit
mass number	A	*a number*	—	number of neutrons + protons
molar volume	V_m	(dm^3)	—	volume of 1 mole
molar solution	M	*a ratio*	—	moles/dm^3
moment of force	—	N m	—	force × perp. distance
neutron number	N	*a number*	—	number of neutrons
number	n	—	—	—
number of molecules	N	—	—	—
number turns on coil	n	*a number*	—	—
number order spectrum	p	*a number*	—	—
object distance	u	metre	m	fundamental unit
peak current	I_o	ampere	A	see current
peak e.m.f.	E_o	volt	V	see e.m.f.
period	T	second	s	fundamental unit
permeability	μ	H m^{-1}	—	henry/metre
permeability, vacuum	μ_o	H m^{-1}	—	—
permeability, relative	μ_r	*a ratio*	—	$\mu = \frac{\mu}{\mu_o}$
permittivity	ε	F m^{-1}	—	farad/metre
permittivity, vacuum	ε_o	F m^{-1}	—	farad/metre
permittivity, relative	ε_r	*a ratio*	—	$\varepsilon_r = \frac{\varepsilon}{\varepsilon_o}$
potential, electric	V	volt	V	energy/charge
potential difference	V	volt	V	energy/charge
power	P	watt	W	J s^{-1}
pressure	p	pascal	Pa	N m^{-2}: force/area
radius	r	metre	m	fundamental unit
reactance	X	ohm	Ω	E_0/I_0
refractive index	n	*a ratio*	—	—
resistance	R	ohm	Ω	p.d./current
resistivity, electrical	ρ	ohm-metre	—	resistance × length
relative density	d	*a ratio*	—	ρ_{sub}/ρ_{water}
r.m.s. current	$I_{r.m.s}$	ampere	A	see current
r.m.s. voltage	$V_{r.m.s}$	volt	V	see e.m.f.
slit separation	s	metre	m	fundamental unit
tension	T	newton	N	see force
temperature, Celsius	θ	degree C	°C	from kelvin
temp. interval	θ	degree	° or K	—
temp. absolute	T	kelvin	K	fundamental unit
thickness	d	metre	m	fundamental unit
time	t	second	s	fundamental unit
torque	T	Nm	—	see moment
turns ratio	T	*a ratio*	—	n_{sec}/n_{prim}
(unit of electricity)	—	kW h	—	kilowatt × hour
velocity	u,υ	ms^{-1}	—	distance/time
velocity, angular	ω	$second^{-1}$	s^{-1}	angle/time
velocity, e.m.waves	c	m s^{-1}	—	—
velocity of sound	υ	m s^{-1}	—	—
volume	V	metre cubed	m^3	l × b × h
wavelength	λ	metre	m	fundamental unit
work	w	joule	J	force x distance (Nm)
weight	W	newton	N	kg m s^{-2}or mg

CH PRODUCTS

The Joystick and Trackball controls in this catalog are designed for both the original equipment manufacturer (OEM) and the value added reseller (VAR). They are available in many sizes and configurations with optional features to suit most design requirements.

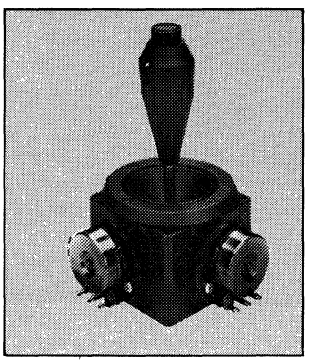
The precision analog Joysticks are the finger operated type, normally used to control rate and provide a linear voltage signal output. They are manufactured with four special blends of plastic to reduce the friction on the bearing surfaces allowing them to maintain their precision while providing many times the life cycles of the competition. The industrial grade trackballs are manufactured with custom designed noncontacting optical encoders for high reliability and long life. In order to help reduce your design time and effort, they include all of the interface electronics and industry standard output protocols.

PANEL MOUNT OR DESKTOP JOYSTICKS
Single, Dual, or Three Axis Joysticks With or Without Pushbuttons



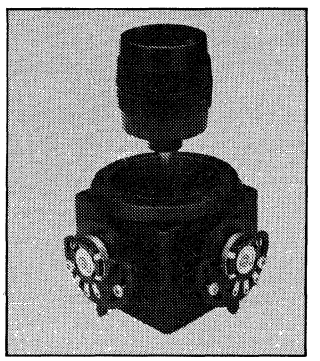
MODEL 100

The Model 100 is a two-axis joystick with a choice of five black stick handles. This unit is provided with a selection of mounting bezels to accommodate either front-or rear-panel mounting bezels. A rubber boot seal is optional. The Model 100 can also be configured as a single axis joystick with either spring centering or absolute positioning.



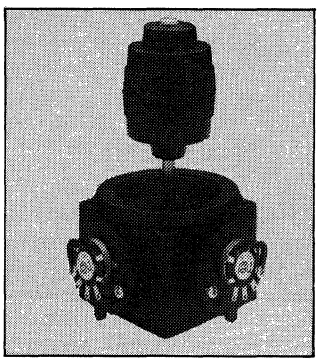
MODEL 200

The Model 200 Joystick is a two-axis joystick with a pushbutton switch mounted in the stick handle. All switches in the Model 200 assemblies are normally open, single pole/single throw, momentary contact switches. The switch leads are brought through the center of the stick shaft and out the back of the housing below the mounting surface. The standard handle and pushbutton color is black. Other pushbutton colors are available.



MODEL 300

The Model 300 is a three-axis joystick with a black spring-return-to-center textured knob on the stick handle providing the third axis. A 5K ohm potentiometer is housed within the knob. Three wire leads are brought through the center of the stick shaft similar to the Model 200 assemblies. The Option 7 control knob is a single-torsion spring action with positive stops. The Option 8 control knob is a double-scissor and extension type spring action with positive stops.

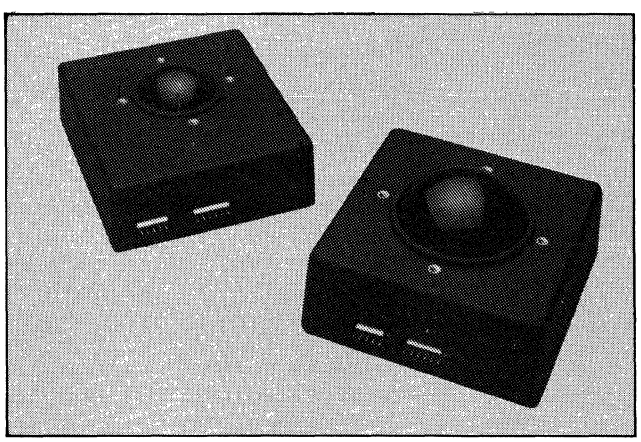


MODEL 400

The Model 400 is similar to the Model 300 (Option 8 Handle) with the addition of a pushbutton switch located on the end of the control knob (Option 9). The switch provides both tactile and audio feed-back. The switch is a normally open, single pole/single throw, momentary contact switch. Five wire leads are brought through the center of the stick shaft similar to the Model 200 and 300 assemblies. The standard handle and pushbutton color is black. A white pushbutton is available.

Panel Mount or Desktop Trackball for All Standard Interfaces

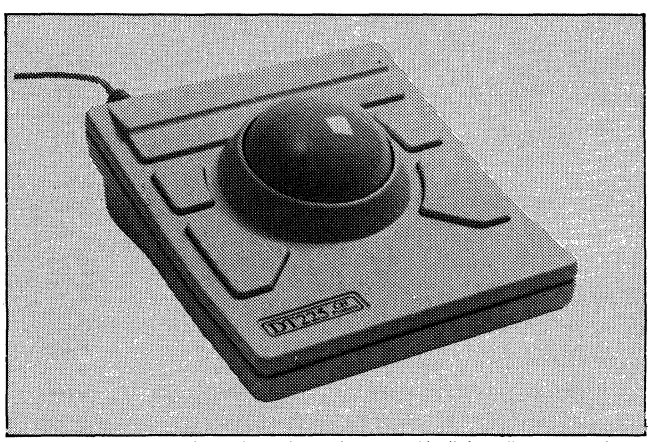
P150/P200 PANEL MOUNT



The P150 is our smallest Panel Mount Trackball requiring only 1.24 inches below panel depth for mounting. It has a precision 1.5 inch diameter ball and resolution options of 120, 240, or 480 PPR (pulses per revolution).

The P200 is our most popular Panel Mount Trackball requiring only 1.43 inches below panel depth for mounting. It has a precision 2.0 inch diameter ball and resolution options of 160, 320, or 640 PPR (pulses per revolution).

DT225 DESKTOP



The DT225 is our industrial grade Desktop Trackball for all pointing device needs where precision and reliability are of prime concern. Designed to work with most popular computers and protocol standards, the DT225 attaches directly to the computers' mouse port. Long life, no drift and a smooth running surface are guaranteed by the optomechanical design, stainless steel shafts and five point encased ball bearing support system. Enclosed in an IBM gray high impact plastic housing, the contoured case has four ergonomically placed buttons surrounding a large 2.25 inch IBM gray precision thermoset phenolic ball. Variable resolutions of 180, 360 and 720 PPR (pulses per revolution) are available. It is FCC approved and comes complete with a shielded cable assembly.

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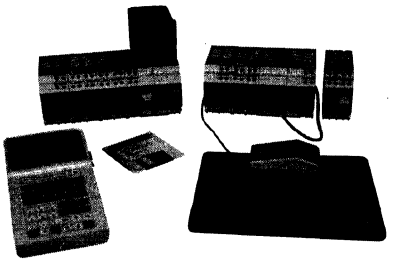

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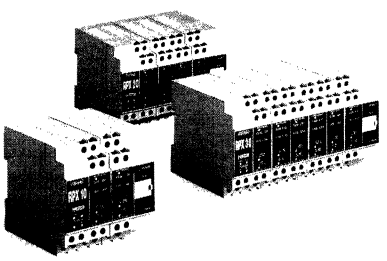
- Basic mathematical processing ability, including % and square root functions.
- High speed digital Input for counting applications.
- 32 internal timers and 32 internal counters
- PNP/NPN solid state or independent relay contact output.
- Watch dog timer for system integrity check

Many of the RPX PLCs are available with additional features such as;

- Expanded I/O via an extension module.
- Analog input and output capability.
- Internal 24 hour clock / calendar.
- Remote I/O data bus, compatible as slave or master device.
- Battery backup.

ASI Bus Remote I/O Controllers

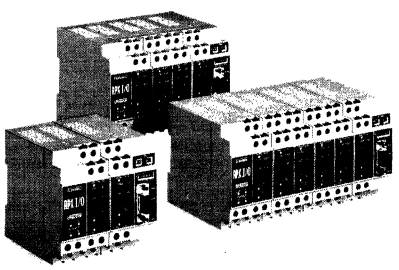


The RPX ASI PLC is the first ASI master PLC in the industry with the compact and low cost micro size package. The ASI bus provides a low cost, easy maintenance digital remote I/O network.

This PLC contains most of the features of the standard Crouzet RPX PLC as well as these ASI bus features;

- Up to 25 local I/O points on the master PLC.
- 31 remote ASI slaves per network.
- Supports standard digital and relay remote I/O points (up to 124 I/O) with the addition of the ASIO 20 or ASIO 67 products.
- Network length up to 100 meters.
- Maximum of 5 milliseconds to access all 124 remote I/O points.
- Power and communication share the same unshielded, untwisted pair for low cost installation.
- Slave addressing through software program.
- Available with relay or solid state outputs.

Remote I/O Controllers



Using a High Level bus protocol to control remote I/O points is ideal for applications that require complex data control, such as analog I/O, counters, temperature controls, and more. This same data bus can also be used to control simple digital I/O points.

A data bus can be created with a Crouzet PLC in conjunction with the C Bus extension module (Mod Bus compatible). The Crouzet remote I/O slave products can also be used on an existing Mod Bus, Profibus, or Optomux network.

There are many benefits to using a Crouzet high level bus network, some of these are;

- Long network length (up to 1060 meters).
- High number of I/O points (maximum of 4536).
- Available with different fieldbus protocols, Mod bus, Profibus, and Optomux.
- Expandable slave units.
- Remote analog I/O capability.

A few of the remote I/O devices offered by Crouzet are;

- Digital and analog I/O slaves.
- 7541 and 7542 programmable counters.
- MIC 48 temperature controller.
- Pneumatic valve bank.
- Bus extension modules.

Products and specifications subject to change without notice.
Consult factory for application assistance.

Crouzet Corporation 3237 Commander Dr., Carrollton, TX 75006-2506 • Tel: 972-250-1647 • 1-800-677-5311 • Fax: 972-250-3865

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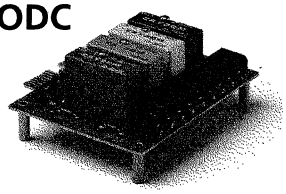
CRYDOM
Control over power

SERIES IAC, IDC, OAC, ODC



SOLID STATE OPTO-ISOLATED MODULES

Crydom I/O modules deliver electrically clean, photo-isolated, noise-free "output" interface from logic level control systems to external loads such as motors, valves, solenoids, etc.--or an "input" interface from the load or sensors to microprocessor or computer-based logic level systems. Designed for long, reliable service in demanding industrial environments.

Fast Fax No. 301, 302

5Vdc, 15Vdc, 24Vdc System Voltages

5 Vdc Models

Type	Voltage Type	Output Load Current Over Load Voltage	Input Voltage Range	Input Max. Load Current (mA)
IAC-5	AC, DC In	.1-100mA@.4-30Vdc	90-140Vac	10
IAC-5A	AC, DC In	.1-100mA@.4-30Vdc	180-280Vac	7
IDC-5	DC In	.1-100mA@.4-30Vdc	10-36Vdc	13
IDC-5B	DC In	.1-100mA@.4-30Vdc	4-16Vdc	20
IAC-5D	DC In	.1-100mA@.4-30Vdc	3-32Vdc	12
OAC-5A	AC Out	.02-3A@12-280Vac	3-6Vdc	20
OAC-5A	AC Out	.02-3A@12-280Vac	3-6Vdc	20
OAC-5A	DC Out	.02-3A@5-60Vdc	3-6Vdc	14
OAC-5A	DC Out	.02-1A@10-200Vdc	3-6Vdc	14

15 Vdc Models

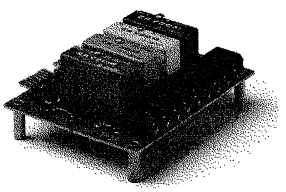
Type	Voltage Type	Output Load Current Over Load Voltage	Input Voltage Range	Input Max. Load Current (mA)
IAC-15	AC, DC In	.1-100mA@.4-30Vdc	90-140Vac	--
IAC-15A	AC, DC In	.1-100mA@.4-30Vdc	180-280Vac	--
IDC-15	DC In	.1-100mA@.4-30Vdc	10-36Vdc	--
ODC-5B	AC Out	.02-3A@12-280Vac	9-18Vdc	--
OAC-15A	AC Out	.02-3A@12-280Vac	9-18Vdc	--
ODC-15	DC Out	.02-3A@5-60Vdc	9-18Vdc	--
ODC-15A	DC Out	.02-1A@10-200Vac	9-18Vdc	--

24 Vdc Models

Type	Voltage Type	Output Load Current Over Load Voltage	Input Voltage Range	Input Max. Load Current (mA)
IAC-24	AC, DC In	.1-100mA@.4-30Vdc	90-140Vac	10
IDC-24	DC In	.1-100mA@.4-30Vdc	10-36Vdc	13
OAC-24	AC Out	.02-3A@12-280Vac	18-28Vdc	17
OAC-24A	AC Out	.02-3A@12-280Vac	18-28Vdc	17
ODC-24	DC Out	.02-3A@5-60Vdc	18-28Vdc	12
ODC-24	DC Out	.02-1A@10-200Vac	18-28Vdc	12

Operating Temp Range: **-40°C to 80°C** Isolation Voltage (Vrms): **4000**

SERIES 6



AC & DC MICROPROCESSOR I/O MODULES

Series 6 buffered output modules contain additional internal amplification to reduce drive requirements to a level suitable for the Mos devices used in many microprocessor systems. Models are available with either inverting or non-inverting inputs, for 5 and 15 volt logic.

Fast Fax No. 305

5V & 15V Logic

- ▶ **Inverting & Non-Inverting Inputs**
- ▶ **Printed Circuit Board Mounting**

UL, CSA APPROVED

Standard I/O Modules (5 Volt Models)

Type	Voltage Type	Input Current vs. Voltage	Max. Load Voltage	Max. Load Current
6101A*	DC In	7mA@32Vdc	30Vdc	25mA@80°C
6201A*	AC In	6mA@120Vac	30Vdc	25mA@80°C
6202A*	AC In	6mA@240Vac	30Vdc	25mA@80°C
6301A*	DC Out	15mA@5Vdc	60Vdc	3Adc@45°C
6401A*	AC Out	15mA@5Vdc	140Vac	3A RMS@45°C
6402A*	AC Out	15mA@5Vdc	280Vac	3A RMS@45°C
6102	DC In	6mA@180Vdc	30Vdc	25mA@80°C
6200	AC In	6mA@24Vac	30Vdc	25mA@80°C
6302	DC Out	12mA@5Vdc	200Vdc	1.5A@45°C

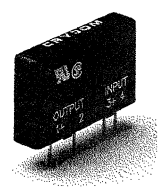
*In Compliance with NEMA 2-230 (Noise Immunity).

Buffered Output Modules (5 Volt Models)

Type	Voltage Type	Input Current vs. Voltage	Max. Load Voltage	Max. Load Current
6311	DC Out	75µA@0.8Vdc	60Vdc	3.5Adc@45°C
6321	DC Out	75µA@2.4Vdc	60Vdc	3.5Adc@45°C
6411	AC Out	75µA@0.8Vdc	140Vac	3.5A RMS@45°C
6412	AC Out	75µA@0.8Vdc	280Vac	3.5A RMS@45°C
6421	AC Out	75µA@2.4Vdc	140Vac	3.5A RMS@45°C
6422	AC Out	75µA@2.4Vdc	280Vac	3.5A RMS@45°C

Operating Temp Range: **-40°C to 80°C** Isolation Voltage (Vrms): **4000**

SERIES MIAC, MIDC, MOAC, MODC



MINI-PACK SOLID STATE OPTO-ISOLATED MODULES

The same excellent Crydom I/O module performance that delivers electrically clean, photo-isolated, noise-free "output" interface in a compact MINI-PACK. Designed for long, reliable service in demanding industrial environments.

5Vdc, 15Vdc, 24Vdc System Voltages

Fast Fax No. 301, 302

5 Vdc Models

Type	Voltage Type	Output Load Current Over Load Voltage	Input Voltage Range	Input Max. Load Current (mA)
MIAC-5	AC, DC In	.1-100mA@.4-30Vdc	90-140Vac	10
MIAC-5A	AC, DC In	.1-100mA@.4-30Vdc	180-280Vac	7
MIDC-5	DC In	.1-100mA@.4-30Vdc	10-36Vdc	13
MIDC-5B	DC In	.1-100mA@.4-30Vdc	4-16Vdc	20
MIAC-5D	DC In	.1-100mA@.4-30Vdc	3-32Vdc	12
MOAC-5A	AC Out	.02-3A@12-280Vac	3-6Vdc	20
MOAC-5A	AC Out	.02-3A@12-280Vac	3-6Vdc	20
MOAC-5A	DC Out	.02-3A@5-60Vdc	3-6Vdc	14
MOAC-5A	DC Out	.02-1A@10-200Vdc	3-6Vdc	14

15 Vdc Models

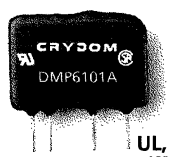
Type	Voltage Type	Output Load Current Over Load Voltage	Input Voltage Range	Input Max. Load Current (mA)
MIAC-15	AC, DC In	.1-100mA@.4-30Vdc	90-140Vac	--
MIAC-15A	AC, DC In	.1-100mA@.4-30Vdc	180-280Vac	--
MIDC-15	DC In	.1-100mA@.4-30Vdc	10-36Vdc	--
MODC-5B	AC Out	.02-3A@12-280Vac	9-18Vdc	--
MOAC-15A	AC Out	.02-3A@12-280Vac	9-18Vdc	--
MODC-15	DC Out	.02-3A@5-60Vdc	9-18Vdc	--
MODC-15A	DC Out	.02-1A@10-200Vac	9-18Vdc	--

24 Vdc Models

Type	Voltage Type	Output Load Current Over Load Voltage	Input Voltage Range	Input Max. Load Current (mA)
MIAC-24	AC, DC In	.1-100mA@.4-30Vdc	90-140Vac	10
MIDC-24	DC In	.1-100mA@.4-30Vdc	10-36Vdc	13
MOAC-24	AC Out	.02-3A@12-280Vac	18-28Vdc	17
MOAC-24A	AC Out	.02-3A@12-280Vac	18-28Vdc	17
MODC-24	DC Out	.02-3A@5-60Vdc	18-28Vdc	12
MODC-24	DC Out	.02-1A@10-200Vdc	18-28Vdc	12

Operating Temp Range: **-40°C to 80°C** Isolation Voltage (Vrms): **4000**

SERIES DMP



AC & DC MICROPROCESSOR I/O MODULES

Electrically identical to Crydom I/O modules, these AC and DC I/O modules are packaged in a hard, skin-tight epoxy conformal coating for excellent environmental protection and heat transfer. Pin-out matches Series 6.

UL, CSA APPROVED

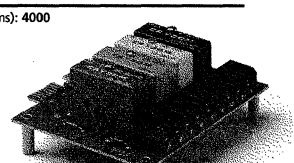
Fast Fax No. 303

- ▶ **Epoxy Conformal Coated**

Type	Voltage Type	Input Current vs. Voltage	Max. Load Voltage	Max. Load Current
DMP6101A	DC In	7mA@32Vdc	30Vdc	25mA@80°C
DMP6201A	AC In	6mA@120Vac	30Vdc	25mA@80°C
DMP6202A	AC In	6mA@240Vac	30Vdc	25mA@80°C
DMP6301A	DC Out	15mA@5Vdc	60Vdc	3Adc@45°C
DMP6402A	AC Out	15mA@5Vdc	280Vac	3A RMS@45°C

Operating Temp Range: **-40°C to 80°C** Isolation Voltage (Vrms): **4000**

SERIES PB



Crydom mounting boards accept standard I/O modules in any combination of input or output types. Modules are easily and quickly inserted without disturbing field wiring. Features include; LED status indicator, plug-in 5Amp fuse and 3.3K Ohm pull-up resistor for each module.

Fast Fax No. 306

Type	Module Positions I/O Channels	Connection Type
PB-4 (MS-4)	4	Screw Terminal
PB-4H (MS-4H)	4	26, 50 Pin Card Edge
PB-4R*	4	Screw Terminal
PB-8 (MS-8H)	8	26, 50 Pin Card Edge
PB-16A (MS-16H)	16	50 Pin Card Edge
PB-16T	16	Screw Terminal
PB-24 (MS-24H)	24	50 Pin Card Edge

Joysticks and Trackballs

Industrial Mouse® products for harsh environments

CTI's mouse replacement for all popular computers and workstations. Engineered rugged from the ground up, CTI's Industrial Mouse® products provide flawless operation for many years.

- Rugged, rated NEMA 4X, IP 67
- Reliable, field proven 10 years
- Full ±20° travel inductive joystick features solid stainless steel shaft and no moving electrical parts
- Full travel or raised silicone rubber gold contact switches
- Optional point and click pushbutton handle

DESKTOP
M90X9-N3

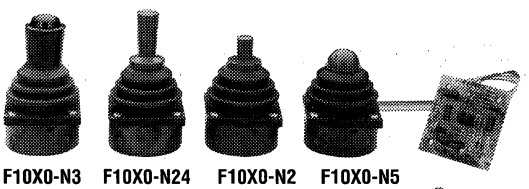
HAND HELD
M20X9

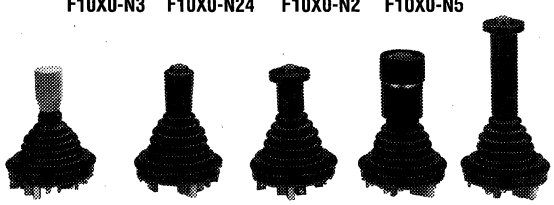
PANEL MOUNT
H20X9

Joysticks & trackballs for high reliability requirements

Choice of joystick handles and assemblies, travel to ±27°

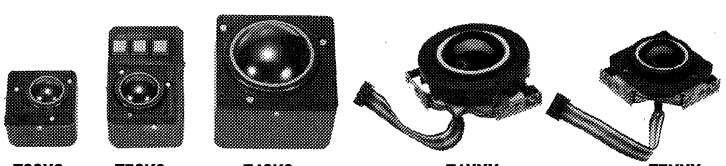
- Miniature joystick (F series) measures only 0.825" below panel
- 1, 2, or 3 axis models
- Analog, digital, or custom interfaces
- Optional zero position indicator switch
- Optional pushbutton handles

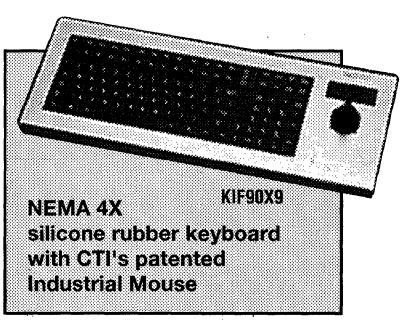

F10X0-N3 F10X0-N24 F10X0-N2 F10X0-N5


H0000 H0000-N32 H0000-N42 H0800 H0000-N62

Choice of trackball sizes and assemblies

- Desktop, panel mount, or sub-assemblies
- High reliability
- Water resistant

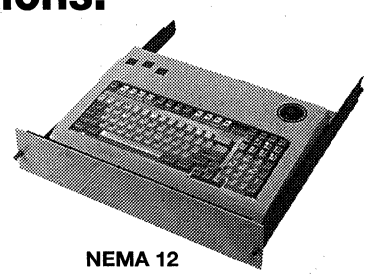

T60X0 T70X3 T40X0 T1XXX T7XXX



NEMA 4X
silicone rubber keyboard
with CTI's patented
Industrial Mouse

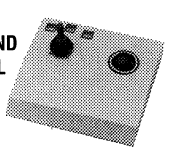
CTI integrated solutions:

- Sophisticated interfaces for any pointing device, mouse simulation
- Custom keyboard assemblies for shelf mounting in a 19" rack
- One year limited warranty
- Custom designs welcomed


NEMA 12
keyboard with
2" trackball, ready
for rack mounting.
3 1/2" fold-down panel.

See our two page ad in EEM Book B, Keyboards, section 5150.

DESKTOP
TRACKBALL
T80X3


TWO HAND
CONTROL
M70X3

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E-mail: sales@ctielectronics.com • http://www.ctielectronics.com

CURTIS

HOUR METERS & COUNTERS

LCD

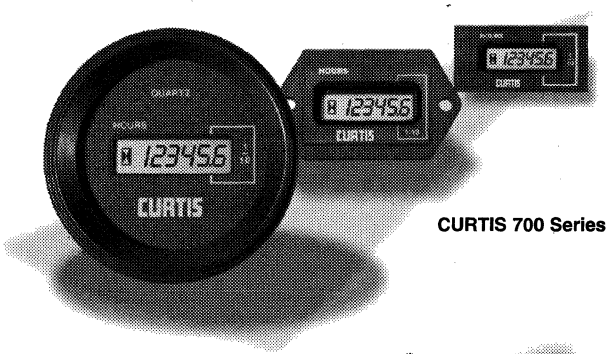
Available in six panel-mount case styles as well as PC-Board mount from 5VDC through 230VAC. Also available as resettable, backlit or with large digits. (Non volatile memory)

NON-DISPLAY

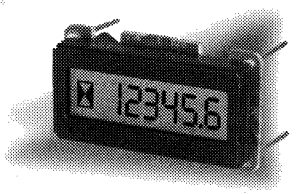
PC-Board or panel mount for commercial and military applications with a serial output to interface with Curtis hand-held reader or computer.

ANALOG

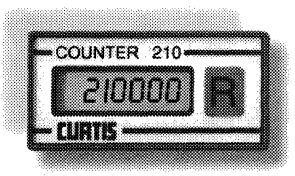
Small, inexpensive, PC-Board and panel mount electro-chemical hour meters. The basic unit is an ideal current/time integrator.



CURTIS 700 Series



CURTIS 700 Module



CURTIS MASSI 210

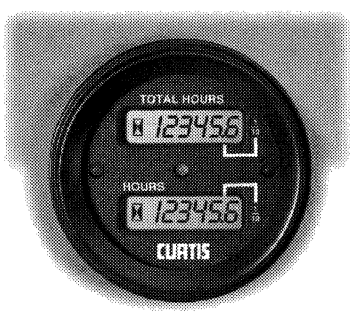
MAINTENANCE MONITORS

LCD

These units are factory programmed for a wide range of service intervals and provide a "traffic light" (green, yellow, red) indication of when service is due or overdue. Also features a control output which can be used as an equipment "lockout."

NON-DISPLAY

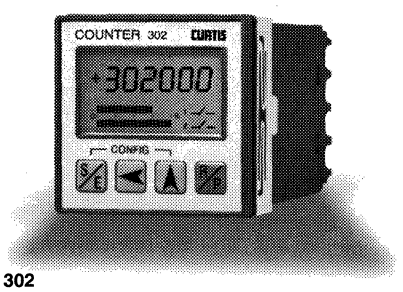
PC-board mount, 8-digit, up/down counter/hour meter with same maintenance features as the LCD units above. Ideal for embedded maintenance monitoring and reporting.



CURTIS 756

PRESET COUNTERS & TIMERS

Single and dual preset counters and timers with innovative bargraph scale to indicate process status. Easy to program, install and read. Batch counters and preset batch counters are also available.



CURTIS 302

CURTIS INSTRUMENTS, INC.
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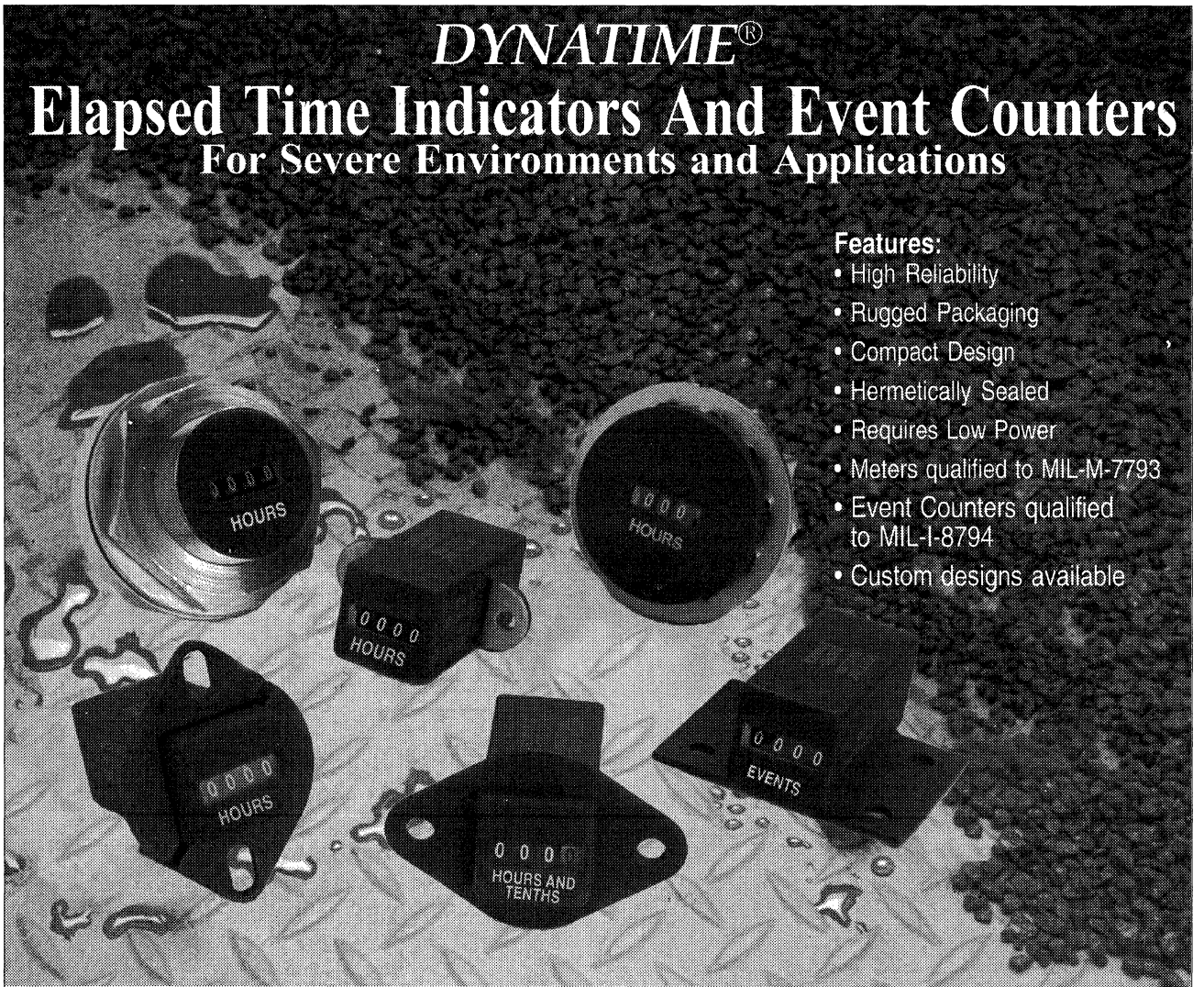
DYNATIME®

Elapsed Time Indicators And Event Counters

For Severe Environments and Applications



Features:

- High Reliability
- Rugged Packaging
- Compact Design
- Hermetically Sealed
- Requires Low Power
- Meters qualified to MIL-M-7793
- Event Counters qualified to MIL-I-8794
- Custom designs available

ELAPSED TIME INDICATORS —DC Series

DYNATIME® DC Versatility ... From TTL-compatible to traditional 28 VDC power, choose from the array of models built to match today's advanced systems architecture. All feature POWER MISER, expanded voltages, quartz accuracy-and the SHORT CASE to save space.

Qualified to MIL-M-7793 for 12 & 28 VDC power

—Model D16: MS21341 A, M7793/1 & /2 with short case and improved ratings.

—Model 16: MS21341 B & M7793/5 (was MS-17321) with long case and old ratings.

Low Voltage Meters

—Model D46: For 6 VDC & TTL Bus power.

ELAPSED TIME INDICATORS —AC Series

Choose from two proven 400 Hz families ... Synchronous Drive for traditional performance, or improved DYNATIME for ratings to match today's tougher equipment requirements. We also pack the same DYNATIME features into a subminiature case for 60 Hz applications.

Qualified to MIL-M-7793

—Model D92: M7793/3 & /4 For 115 V/60 Hz Power

—Model D95: M7793/6 & MS27651 For 115 V/400 Hz

—Model D25: MS27650 FOR 26 V/400 Hz

Qualified Synchronous Drive Models

—Model 95: M7793/6 (was MS-17322), MS27651

—Model 25: MS27650

EVENTS COUNTERS —4, 5, & 6 Digit

The STANDARD Counters offer proven performance for most Military and industrial requirements. Special ratings and configurations are also available. The ruggedized counters are specially assembled and filled with a dielectric lubricant, which dampens the effects of extreme vibration and thermal shock environments. Typically, these units are used on aircraft/ helicopter engines.

Standard Models per MIL-I-8974A

—Model B16: M8974/2 For 28 VDC power

Ruggedized

—Model L16 for 28 VDC Power

ELECTRODYNAMICS, INC.
MINELCO PRODUCTS

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GUARDIAN

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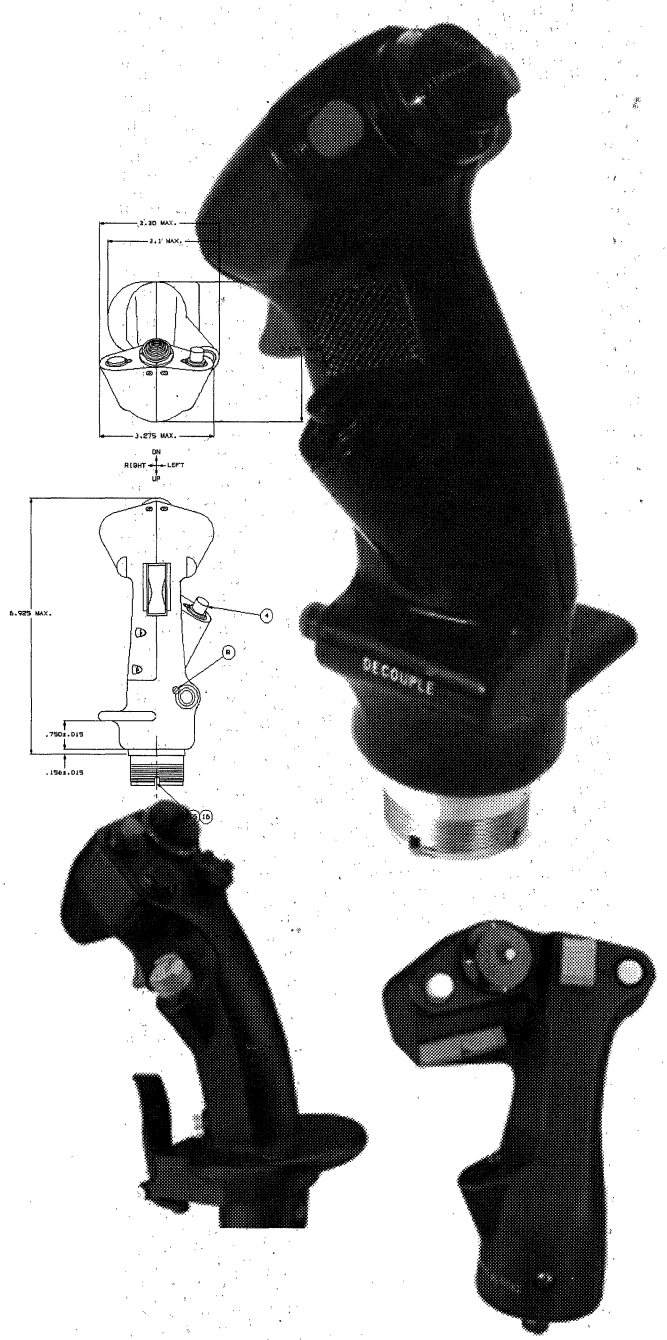
- ***Modular Control Grip Solutions***
- ***Simple or Complex Configurations***
- ***Positive Ergonomic Man-Machine Interface***
- ***Patented Switch Technology***
- ***Field Tested to Demanding Specifications***

MOTION CONTROL GRIPS

MODULAR COMPONENT SERIES



Introducing a modular solution to a wide range of motion control requirements. GUARDIAN'S new modular component series is designed to deliver multiple switching and directional control, all in one ergonomic package.

The Build-A-Grip concept allows the customer to add as much or as little switching sophistication to a standard grip shell. This translates into application specific capability without the high cost of a custom solution.

Contact GUARDIAN'S technical department for details on how to configure a control grip for your requirements @ **1-800-762-0369.**

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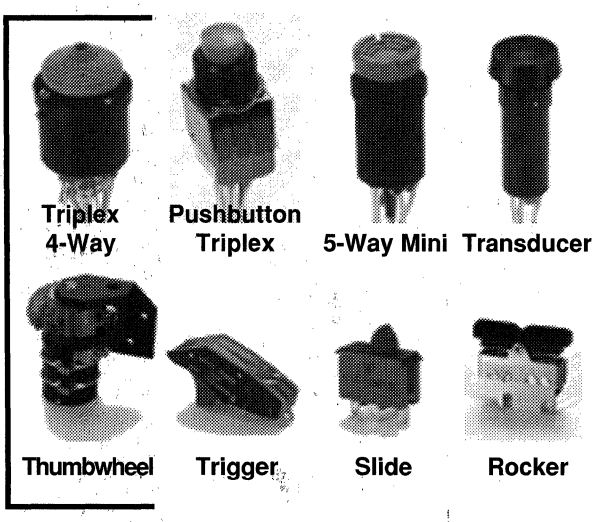
- **Specialized Industry Equipment**

Choose switch components for integration into the control grip solution that best meets your motion control requirements



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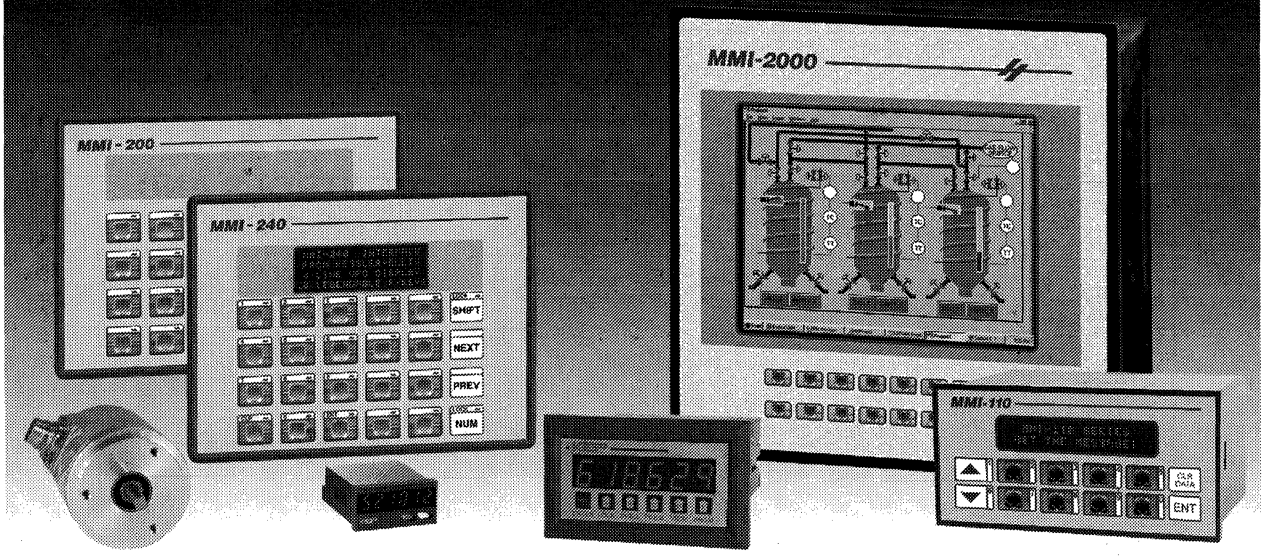
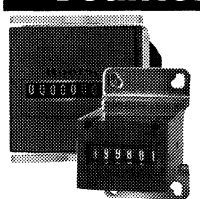
Automation & Display Products



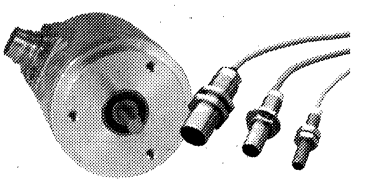
Counters • Ratemeters • Timers • Panel Meters • Sensors



Electromechanical Counters & Timers

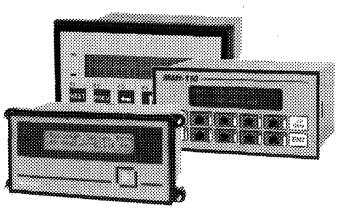
Electronic Counters, Timers & Ratemeters

Digital Panel Meters

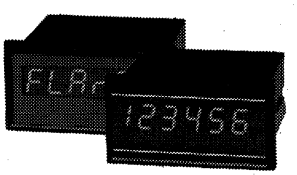


Encoders & Proximity Sensors

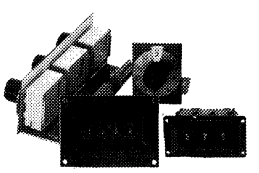
PLC Interfaces



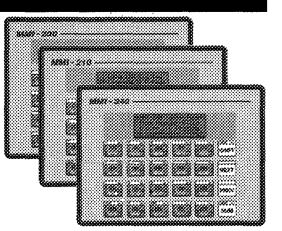
Intelligent Message Centers



Slave Displays

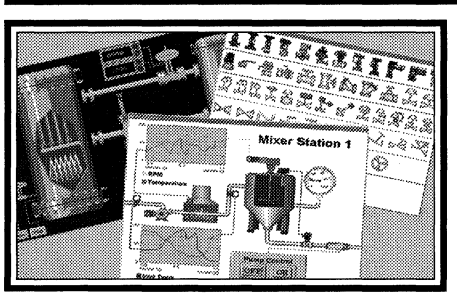


Thumbwheel Switches

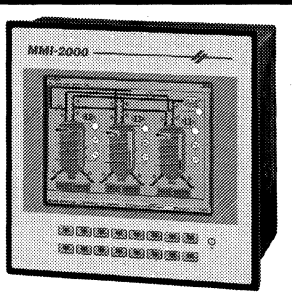


PLC Operator Interfaces

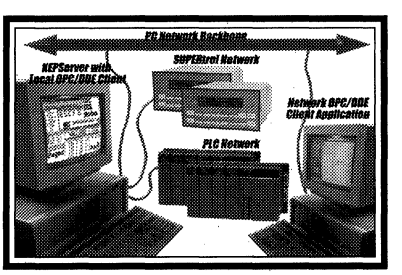
Industrial PC's & Automation Software



KEPware-Industrial Automation Software



Industrial PC's



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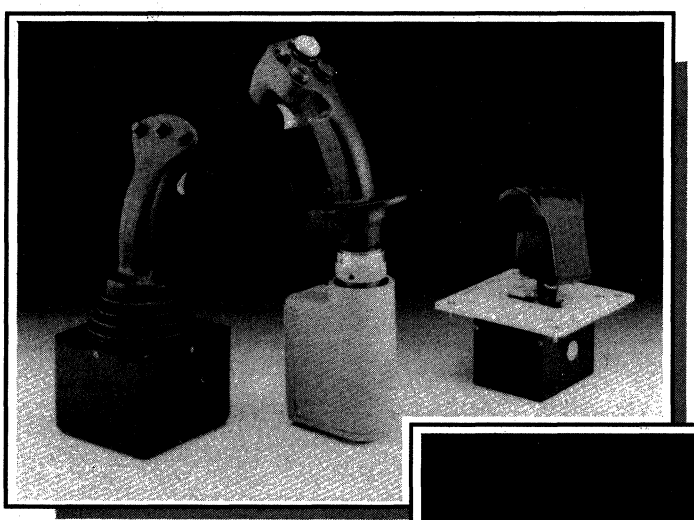

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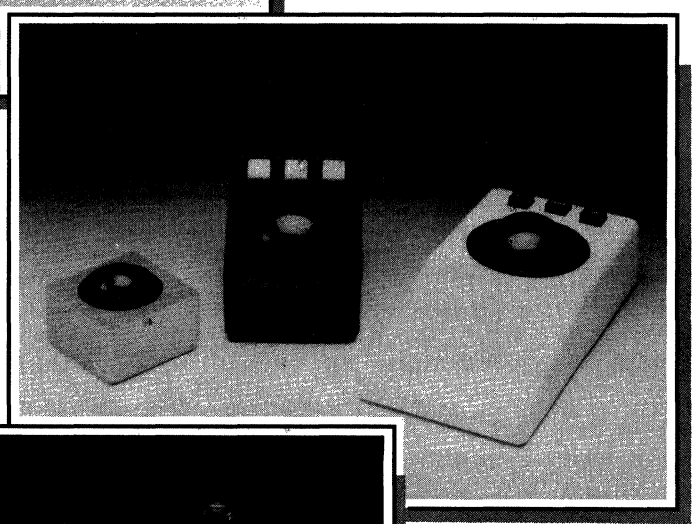
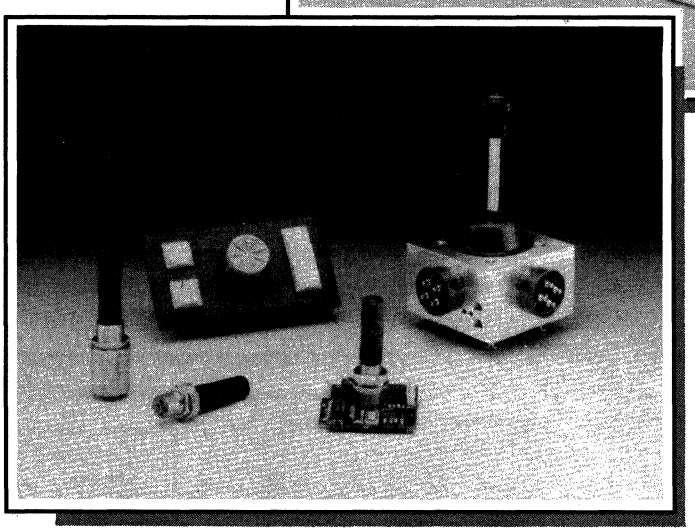


TRACKBALL CONTROLS
Panel Mounted and desktop sizes from 1" to 3 1/2"



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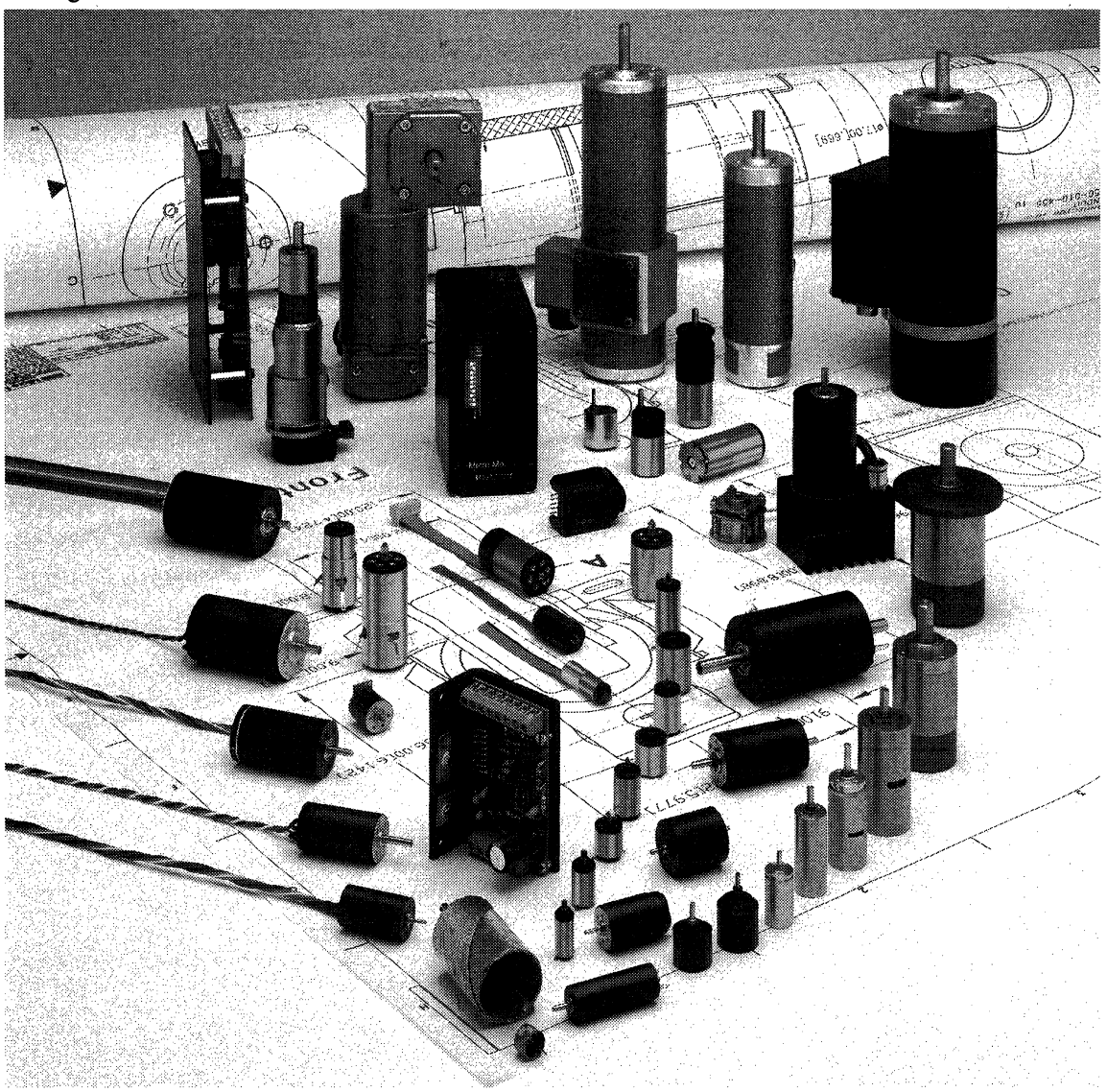

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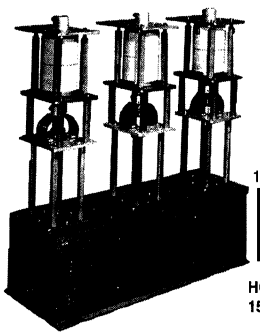
	Copper		Aluminum			60°C	80°C		
	Single-wire	Wire-bundled	Single-wire	Wire-bundled					
30	...	...	...	...	...	0.2	0.4	...	0.20
28	...	...	...	...	...	0.4	0.6	...	0.32
26	...	...	...	...	...	0.6	1.0	...	0.51
24	...	...	...	...	...	1.0	1.6	...	0.81
22	9	5	...	...	...	1.6	2.5	...	1.28
20	11	7.5	...	...	...	2.5	4.0	3	2.04
18	16	10	...	...	6	4.0	6.0	5	3.24
16	22	13	...	...	10	6.0	10.0	7	5.16
14	32	17	...	...	20	10.0	16.0	15	8.22
12	41	23	...	...	30	16.0	26.0	20	13.05
10	55	33	...	...	35	...	...	25	20.8
8	73	46	58	36	50	...	...	35	33.0
6	101	60	86	51	70	...	...	50	52.6
4	135	80	108	64	90	...	...	70	83.4
2	181	100	149	82	125	...	...	90	132.8
1	211	125	177	105	150	...	...	100	167.5
0	245	150	204	125	200	...	...	125	212.0
00	283	175	237	146	225	...	...	150	266.0
000	328	200	...	...	275	...	...	175	336.0
0000	380	225	...	...	325	...	...	225	424.0

HIGH VOLTAGE CONTROL DEVICES

HV VACUUM CONTACTORS &1 CYCLE CIRCUIT BREAKERS

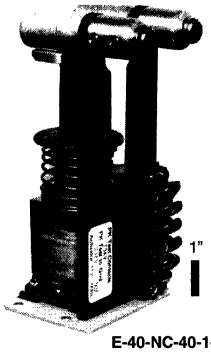
Vacuum switches, singlephase, three phase, upright or low profile, for high reliability sealed arc interrupting or crobar shorting. 208V to 200KV RMS operate. 50 to 4,000 amps continuous, 2,000 to 35,000 amps AC, 10 to 20,000 amps DC interrupt, 5,000 to 100,000 amps momentary and capacitor discharge.



HC3-75-110-1200-2-2
15KV POWER CLASS

HV RELAYS 1KV TO 300KV

HV relays of the air insulated type both for low and high current. This series has ratings from .1 to 200 amps continuous, 100 to 100,000 amps momentary and capacitor discharge. Peak test voltages from 5 to 300KV. Single or multipole. NO, NC and DT. Auxiliary contacts optional on all types. Latching, extended life and tungsten contacts also available for high current closing. Also usable in oil or insulating gas with increased ratings.

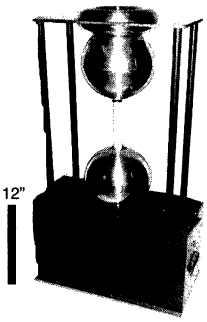


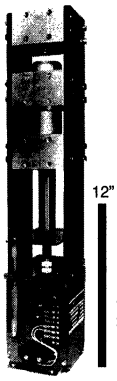
E-40-NC-40-1-0,
40KV PK TEST

HV SPHERICAL RELAYS

Extra high voltage low corona, transfer, polarity reversing and grounding relays of the air insulated type. Ratings up to 600KV PK at 100 amps continuous. Solenoid, motor or air cylinder operated and spring or gravity return.

SPST, DT, 2PST, DT
DH-300-NC-40-2-0-1
300KV PK TEST

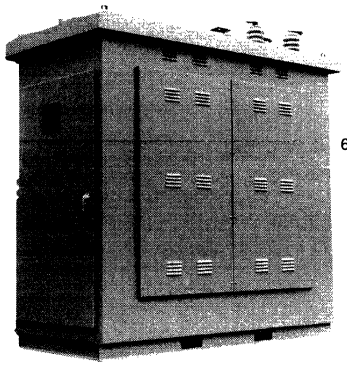




HIGH CURRENT SWITCHES

Models are available up to 20,000 amps continuous, and over 500,000 amps pulse, with voltage ratings of 6 volts to 300KV peak test. Many are air cylinder or motor operated for high contact force.

GD-27-DTP-40-1600-2-43,
27KV PK TEST



HIGH POWER HIGH SPEED HIGH VOLTAGE CONTROL AND STEP-START SYSTEMS

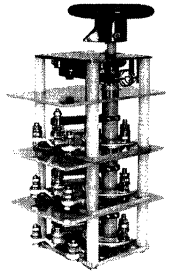
1/2 to 1 cycle sensing and interrupt vacuum circuit breakers. Metal enclosed for indoor or outdoor applications. 5KV-38KV.

200-1200AMPS CONTINUOUS
2000-28000AMPS INTERRUPT
5-15KV CLASS

HV ROTARY SWITCHES

Ratings from 5 to 150KV, 1 to 200 amps. Either manual or electrical operators, depending upon requirements. Position detents and interlocks to prevent opening under load.

R12-3P2T-12



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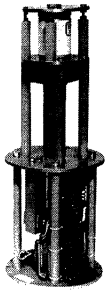

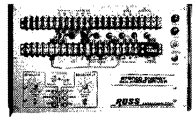

HBF51-NC-110
50KV PK TEST
200AMPS

HCB5-D-C-E

SOLENOID-SAVER® SOLENOID DRIVER/CONTROLLER

For AC 25 to 800Hz or DC high pull-in/low holding current Solenoids to prevent coil burnout, reduce coil temperature, eliminate AC Hum, & also, if specified, to allow low voltage, low current computer control, 4-10V, 5MA. Available also to delay deactivation on loss of power or to provide energy storage high speed activation by low power signals.

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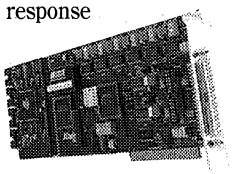

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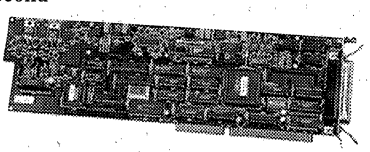

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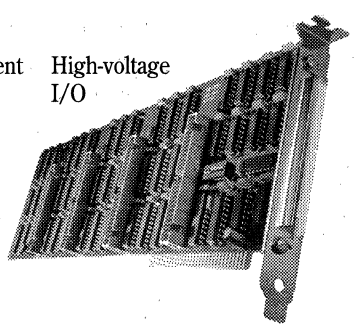

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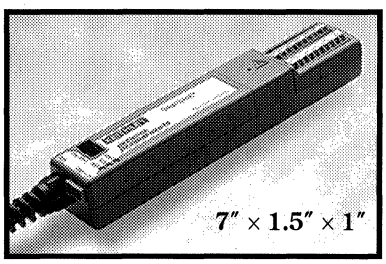

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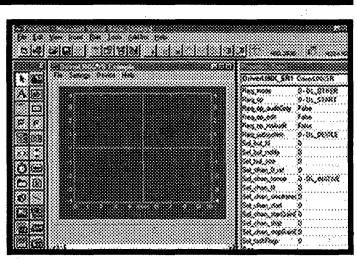

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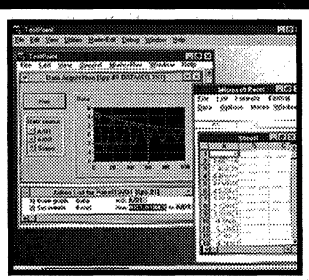

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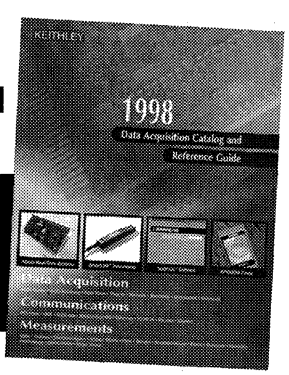

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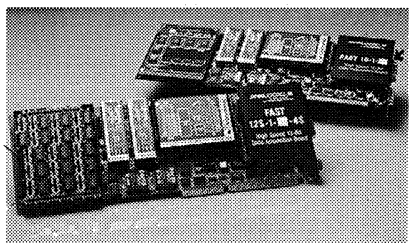
BOARDS, DATA ACQUISITION

Manufacturer	Starting EEM Page No.	Compatibility													Special Features
		EISA	ISA	Multibus	NuBus	PC104	PCI Bus	PCMCIA	S100	STD Bus	VXI C/Unibus	VME Bus	Bus	Other	
Analogic Data Conversion Products	D•1140		√				√								
Computer Conversions Corp.	D•1142	√		√						√		√		PC 104	Isolated Synchro Resolver I/O
Control Sciences, Inc.	D•1146											√			Synchro & Resolver digital and digital to synchro & resolver converter boards
Dataforth Corporation	D•1148	√*	√*	√*	√*	√*	√*	√*	√*	√*	√*	√*			Signal Conditioner Modules
Datel, Inc.	D•1152	√	√	√		√						√		Compact PCI	Analog input & output, "Streaming" architecture, sampling rates to 10 MHz, on-board DSP (C44 or C30), LabView, Hyperception and Win95/NT software
ILC Data Device Corp.	D•1154		√	√			√	√			√	√			
Keithley	D•1158		√				√							PCMCIA, USB	
National Instruments	D•1159		√				√	√			√			√	Up to 20 ms/s acquisition rates
North Atlantic Instruments, Inc.	D•1160		√							√	√	√		PC 104	
Omega Engineering	D•1165		√				√							PCMCIA	
Precision Filters, Inc.	D•1166											√		SCSI/ 1/2	Yes
Preston Scientific	D•1169											√		√	Yes
Universal Switching Corporation	D•1171												√	GPIB	VXI and GPIB Products

* Module available.

Only from Analogic...



Data Acquisition Boards Summary Sheet

Software drivers for popular packages available, including: LabVIEW®, LABTECH®, Snap-Master™, Turbolab™ and TestPoint™

Embedded Precision Data Acquisition – 3U Compact PCI Series with Windows NT

Model	Input Resolution	Input Channels	Sampling Rate	SSH	Output Channels	Output Resolution	FIFO	DIO
CPCI-16-1	16 Bit	16 SE or 8 Diff	200 kHz	0	2 Analog	16 Bit	4 kB	16
CPCI-16-4	16 Bit	4 Differential	4 x 200 kHz	4	None	–	4 x 4 kB	16
CPCI-14-1	14 Bit	2 Differential	2 x 10 MHz	2	2 DSP	N/A	32 kS	0

Embedded Precision Data Acquisition – PC/104 AIM Series

The ONLY source for your high performance embedded analog requirements

Model	Resolution	Analog Channels	Sampling Rate	FIFO	DIO	DMA	Interrupts	Operating Temperature	Power Req.
AIM12-1/104	12	16 SE or 8 Diff	100 kHz	256	16	Yes	Yes	0°C to +70°C	5V @ 0.5A
AIM16-1/104	16	16 SE or 8 Diff	100 kHz	256	16	Yes	Yes	0°C to +70°C	5V @ 0.5A
AIM16-1/104T	16	16 SE or 8 Diff	100 kHz	256	16	Yes	Yes	–40°C to +85°C	5V @ 0.5A
AIM16-2/104	16	16 SE or 8 Diff	200 kHz	256	16	Yes	Yes	0°C to +70°C	5V @ 0.5A

FAST High Performance – PC/AT FAST Series – 1 MHz Sampling Rate

Model	Resolution (Bits)	Analog Channels	Simultaneous Sample and Hold	Optional DSP Interface
FAST-12-1-X	12	4	Option 8/16 or 4 SSH Standard	1, 2, 4, 8 or DT-C/DSP-L
FAST-14-1-X	14	4	Option 8/16	1, 2, 4, 8 or DT-C/DSP-L
FAST-16-1-X	16	4	Option 8/16	1, 2, 4, 8 or DT-C/DSP-L

Data Acquisition System – PC/AT DAS Series

Model	Resolution Bits	Analog Channels	Sampling Rate	Simultaneous Sample and Hold	Memory Megasamples	Analog Output Channels/Bit	Digital I/O Channels/Bit
LS, MS, HSDAS-12	12	8DI/16SE	100, 200, 400 kHz	0, 2, 4 Standard	Opt. DAC	2/12	2/8
LSDAS-16-AC	16	8DI/16SE	50 kHz	–	–	–	2/8
LS, HSDAS-16	16	8DI/16SE	50, 200 kHz	–	Opt. DAC	2/12	2/8
DAS-12/50	12	8DI/16SE	50 kHz	–	–	2/12	2/8
DAS-12/125	12	8DI/16SE	125 kHz	–	–	2/12	2/8

Filter Boards – PC/AT

Model	X=Number of Channels	Y=Number of Gain Channels	Cutoff Freq. Range (S/W)	Number of Poles	Filter Type	Attenuation Slope	Passband Ripple
AAF-3/XGY	2, 4, or 8	0, 2, 4, or 8	0.1 Hz to 200 kHz	8	Optional	120 dB/octave(Cauer)	±0.05 dB
AAF-16	16	0	2 Hz to 200 kHz	8	Optional	>120 dB/octave	±0.05 dB(Cauer)

Amplifier Boards – PC/AT

Model	Channels	11Gain Steps	CMR	Freq. Range	Amp. Slew Rate	Input Impedance
PGA-16	16	0.5 to 1000	86 dB typ. @ G=1	DC to 1.2 MHz	9 V/ms typ.	4 MΩ Differential

Analog & Digital I/O – PC/AT

Model	Series	Function	Comments	Digital I/O CHs/Bit
SSH-8	Fast	8 DI, S&H	8 Channels per Board, Simultaneous Sample/Hold	–
MUX-16TC	DAS	16 DI/LL	Multiplexer System, Thermocouple and Low Level	–
MUX-16TC/EX	DAS	16 DI/LL	Multiplexer Expander	–
DASMUX-64	DAS	64SE/32DI	Multiplexer System, Hi Level Inputs	–
DASMUX-64/EX	DAS	64SE/32DI	Multiplexer Expander	–
DASMUX-64/5B	DAS	64SE/32DI	Multiplexer for 5B Signal Conditioners	–
DASMUX-64/5B/EX	DAS	64SE/32DI	Multiplexer Expander	–
DAC 812	–	8 Ch/12 Bit	Analog Output	3 / 8
CTRM-05/10	–	5 or 10 Ch	Counter Timer	8 Out; 8 In
PDIO-nn	–	Digital I/O Ports	Low Cost Digital I/O	24 / 48 / 72 / 96

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Tel: (978) 977-3000 • Fax: (781) 245-1274 • E-mail: dcpinfo@analogic.com • Technical Support: (800) 446-8936

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Component Summary Sheet

Sampling ADCs

Model	Bits	Speed	SNR	SFDR	Size	Architecture	Feature
ADC5020	18	144 kHz	100 dB	110 dB	4.0" x 3.0"	Module	High Resolution
ADC4322	16	2 MHz	86 dB	97 dB	2.4" x 1.6"	Hybrid	High Speed
ADC4320	16	1 MHz	89 dB	97 dB	2.4" x 1.6"	Hybrid	High Speed
ADC4325	16	500 kHz	91 dB	97 dB	2.4" x 1.6"	Hybrid	Low Noise
ADC4344	16	1 MHz	89 dB	99 dB	3.5" x 2.5"	Module	High Speed
ADC4216	16	1 MHz	84 dB	93 dB	3.0" x 2.0"	Module	Low Cost
ADC4345	16	500 kHz	92 dB	99 dB	3.5" x 2.5"	Module	Low Noise
ADC4346	16	400 kHz	89 dB	103 dB	4.5" x 3.8"	Module	Analog Solutions
ADC4357	16	200 kHz	86 dB	100 dB	4.0" x 3.0"	Module	Low Cost
ADC4355	16	100 kHz	92 dB	110 dB	4.0" x 3.0"	Module	Low Cost
ADC3110	14	2 MHz	80 dB	82 dB	5.0" x 3.0"	Module	Low Noise
ADC3214	14	1 MHz	76 dB	95 dB	3.0" x 2.0"	Module	Low Cost

A/D Digitizers

Model	Bits	Speed	Channels	Size	Architecture	Data Format	Feature
ADC5042	16-24	2-100 CPS	6	1" x 2"	Module	Parallel (µP interface)	Wide Dynamic Range
ADC5030	18	200,000 CPS	1	4" x 3"	Module	Parallel	High Speed/Resolution
ADC4356	16	142,000 CPS	1	4" x 3"	Module	Parallel	Low Noise

Sample-and-Hold Amplifiers

Model	Settling Time Accuracy	Hold Mode Noise	Size	Architecture	Feature
SHA2200	250 ns to 0.006% Max.	120 µV Max.	24-pin DDIP	Hybrid	High Speed
SHA2410	2.5 µs to 0.0015% Max.	35 µV Max.	14-pin DIP	Hybrid	Low Noise

Isolation Amplifiers

Model	Nonlinearity	Common Mode Isolation Voltage	Common Mode Rejection Ratio	Bandwidth	Feature
MP227A	±0.0075%	1000 VDC	160 dB @ 60 Hz	5 Hz	High CMRR
MP227A Mod 7	±0.0075%	1000 VDC	100 dB @ 60 Hz	110 Hz	Low Noise

DC-to-DC Converters for High-Speed, High-Resolution DAS Products

Model	Input DC Voltage	Output DC Voltage	Regulation	Noise Plus Ripple	Output Power	Feature
SP7005	+5V	±15V, +5V, –6V	±0.2%	5 mV p-p Max.	6W	Low Noise
SP7008	+5V	±15V, ±5V	±0.2%	5 mV p-p Max.	6W	Low Noise
SP7015	+5V	±15V, +5V	±0.4%	5 mV p-p Max.	6.75W	Low Noise

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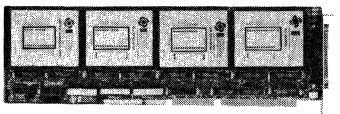
SYNCHRO/RESOLVER & ENCODER BUS CARDS

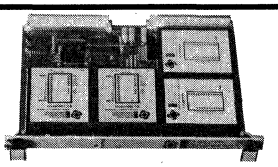
*IBM PC/AT (EISA BUS) "IB SERIES"

IB Cards' feature 10 channels of Converter, I/O, and Control functions. Converters feature Industry Std. Pin-outs, and can be mix/matched as req'd. Transformer Isolation on Signal & reference lines. Resolution: 1024 to 65,536 parts/turn. Includes Demo Software and driver segments in C, assembly and basic.



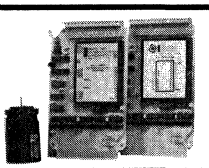
VME BUS "VB SERIES"

Same Features as above, Software independent, Register based A24:D16 VME Slaves. 12 Channels std. Cards available with fault diagnostics and self-test. Loop-Back Self-Test 16 Channel Digital to LVDT/RVDT simulator too!. Industrial and Military Grade Models. 6U std.



STD BUS "STB SERIES"

One-2 Channel cards, any function per card. Lowest cost I/O bus. I/O and Memory addressing, Expanded addressing supported. High/Low Byte priority selectable. Double Buffered Outputs. Terminal Blocks or Mil spec. connectors on I/O.



ABSOLUTE MOTION CONTROL "ALL BUS CARDS"

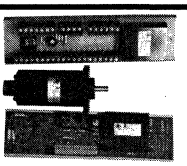
All CCC Absolute Encoder Cards & Synchro and Resolver to Digitals; are available with "Real-Time" Incremental Encoder Outputs for Direct Compatibility with all Mfg's Bus based motion Control Cards. Absolute preset, offset, verification, and electronic homing routines allow these cards to Enhance any Motion Control with; Ultra-reliable position feedback & True Absolute Position Control.

ABSOLUTE PLC ENCODERS/NEW PLUG-IN 1771CCC'S

These encoders include both a terminalized remote decoder & a rugged/reliable electromagnetic transducer. Control logic guarantees synchronized data transfer to any PLC.– These Ultra-Reliable systems provide true absolute position data. Furthermore, they are ideally suited for electronically noisy environments, long cables, shock/vib. & temp extremes.

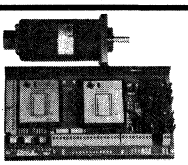
SNAPTRAK ENCODERS

Resolution 100 to 65,536 parts/turn. Basic full function system, +12 or +15VDC power in, Buffered 5V TTL or Open Collector 5-30VDC logic outputs. All digital output formats, BIN, BCD, Gray Code, Absolute & Incremental available. Remote offset option.



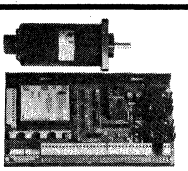
TRACK II ENCODERS

Valued added system, +24VDC power in, field-selectable 5, 15 or 24VDC logic level outputs. Opto-Isolated PLC Handshake, Position status LED's & Remote Zero-set Std. BCD, Binary, Gray Code outputs, Incremental output option. Rotary differentials & Limit Switch outputs available. Resolution: 4096 parts/turn.



MULTITRACK ENCODERS

Multiturn absolute encoder system. Resolution 65,536 representing 1-128 turns full absolute range of travel. All Features Std. +24VDC power-in, field selectable 5,15 or 24 VDC logic level outputs, binary data, Opto-Isol. PLC handshakes for data latch, watchdog, and multiplex enable. Real-time incremental outputs too. Status LED's, & remote zero set. Built-in test & cable disconnect.



DC SNAPTRAK ENCODERS

DC Snaptrak units feature analog 0-10VDC, ±10VDC and 4-20ma. current loop outputs, +12 or +24VDC power. High reliability electromagnet (no wear) pot replacers. 1000' long cables. Rotary differentials available too!

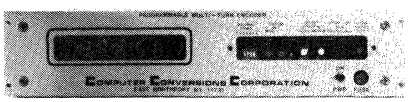
BUS CONVERTER FUNCTIONS

STANDARD SELECTIONS:

- ☐ ABSOLUTE ENCODER SYSTEMS
- ☐ SYNCHRO/RESOLVER TO DIGITAL
- ☐ DIGITAL TO SYNCHRO/RESOLVER
- ☐ SYN/RES CONTROL TRANSFORMERS
- ☐ MULTISPEED/MULTITURN SYS'S
- ☐ SYNCHRO/RES. DIFFERENTIALS
- ☐ ACTIVE CONTROL DIFFERENTIALS
- ☐ ABS. & INCREMENTAL OUTPUTS
- ☐ DC SIN/COS VECTOR GENERATOR
- ☐ DIGITAL MODULATORS & DEMOD'S
- ☐ COORDINATE CONVERTERS
- ☐ LVDT/RVDT CONVERSION
- ☐ A/D & D/A CONVERTERS
- ☐ MULTISPEED DIG. TO SYNCHRO

BUS FEATURES/OPTIONS

- ☐ TRANSFORMER ISOLATED I/O, NO GROUND LOOPS POSSIBLE! PRESERVES BUS INTEGRITY!
- ☐ NO EXTERNAL XFORMERS REQ'D.
- ☐ SYN./RES. REFERENCE SUPPLY
- ☐ REFERENCE POWERED UNITS
- ☐ BUS POWERED UNITS
- ☐ COMBINATION FUNCTIONS
- ☐ OEM CONFIGURATIONS
- ☐ SELF-TEST, & BUILT-IN-TEST
- ☐ MULTIPLEXED CONVERTERS
- ☐ 18 BIT 20 SEC. CONVERTERS
- ☐ 25 VA SYNCHRO POWER AMP'S
- ☐ STEPPERS/SERVO'S W/FEEDBACK



MULTITURN ENCODERS

Convert from 1 to 1024 turns of shaft input into 1,000 to 4,194,304 unique position locations. These true absolute encoders that retain their position information forever, regardless of any motion during a power outage. The encoder transducer is a highly reliable, environmentally sound, dual speed, rotary transformer.

TMDS–PC SERIES

PC card 4.5 x 6.5" & 64, 128, or 1024 turn position transducer, resolution 1024 to 16,384 part/turn. Buffered +5VDC TTL logic, parallel binary formats, three-state & data latch control lines, separate dual data ports opt. +12 and +15VDC power.

TMSAI SERIES

5 digit scaled panel mount LED readout, 9.5"W x 2.5"H x 8"D and with a size 23 Nema 12 transducer. Scaled BCD output & 16 bit binary output. 10, 36, 64, 100, 128 turns. 115VAC Power.

TMRE–CIM SERIES

1 million part full function readout system, 10,000 parts/turn, 100 turns full range, excellent for rack & pinion systems, adjustable datum point, pushbutton offsets, 5-30VDC BCD outputs, 115VAC power.

TMDS SERIES

2–1024 turns, resolution 100 to 65,536 per turn. Outputs optional. 4, 5, or 6 digit scaled readouts, operator offset options, panel or rack mount decoders. BCD binary, analog, gray code, RS232/422/485 serial, pulse-width, or bus compatible outputs, units with incremental & absolute outputs, multi-channel systems too!

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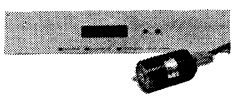
SYNCHRO CONVERTERS/DISPLAYS/ENCODERS

STANDARD LOW COST UNITS TO SATISFY ALMOST ANY SYNCHRO/RESOLVER OR SHAFT INTERFACING REQUIREMENT

SYNCHRO/RESOLVER TO BCD Series SBC

INPUT: 11.8/90V RMS L-L, 60 or 400Hz. Ref: 26/115V RMS **OUTPUT:** 3, 4 or 5 decade BCD-scaleable unipolar or bipolar **ACCURACY:** ±30, ±6, or ±2 minutes of arc ±1 LSB. **PACKAGE:** 2.6″ x 3.1″ x .82″H module. **OPTIONS:** Choice of Scale factors, Zero offset adjustments (±5%).

MULTITURN ABSOLUTE ENCODERS Series MDS90



INPUT: MULTI-TURN Shaft angle position. **OUTPUT:** 4, 5, or 6 Digit LED Display +BCD or Binary Data. **ACCURACY:** Up to ±1 pt. in 100,000. **PACKAGE:** Size 23 Pickoff with full or half rack electronics. **OPTIONS:** Zero Offset, NEMA 12 Housings, Presets, power supplies.

TYPICAL UNITS

Multiturn Encoders	Output Code	Resolution Counts/360°	Revolution for Full Count	Data Range
MDS90-DBC-16	Binary	2^{10}	64	2^{16}
MDS90-DBC-10	BCD	1000	10	10,000
MDS90-DBC-100	BCD	1000	100	100,000

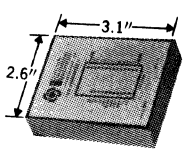
LOW COST ANGLE INDICATOR Series AI540

INPUT: 11.8/90V RMS L-L, 60 or 400Hz, Ref: 26/115V RMS +115V 60Hz power. **OUTPUT:** 3, 4 or 5 Digit .5″H LED Display (Unipolar or Bipolar) **ACCURACY:** ±3, ±6 or ±30 minutes of arc, ±1 LSB. **PACKAGE:** (A) 5.5″W x 7.5″L x 2.0″H panel mount (DC supplies included); (B) 9½″W x 1¾″H half rack mounting (DC supplies included). **OPTIONS:** Choice of scale factors, Zero offset adjustment (±5°).

TRANSFORMER ISOLATED MULTIPLEXED SYNCHRO TO DIGITAL Series MSI

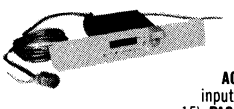
INPUT: 11.8/90V RMS L-L 60 or 400Hz, Ref. 26/115V RMS, up to 128 channels. **OUTPUT:** 14 Bits parallel binary or 4 decade BCD **ACCURACY:** ±4.6 minutes of arc ±.5 LSB. **PACKAGE:** (A) Central Converter 2.6″ x 3.1″ x .43″H module; (B) Four channel input module 2.6″ x 3.1″ x .43″H module. **OPTIONS:** (A) Scale Factor choice on BCD output. (B) Linear DC output. (C) Systems mounted on PC boards or racks

MULTISPEED SYNCHRO TO DIGITAL ONE MODULE Series SDT



INPUT: 11.8/90V RMS L-L, 60 or 400Hz Ref: 26/115V RMS **SPEEDS:** 10, 16, 18, 32, 36, 64. **OUTPUT:** 16 Bits parallel binary and velocity. **ACCURACY:** ±.01 or ±.005 degrees **PACKAGE:** One 2.6″ x 3.1″ x .82″H module. **OPTIONS:** (A) Systems packaged on PC cards or racks; (B) 6 Digit Display

ABSOLUTE ENCODERS Series DS90



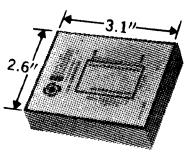
INPUT: Shaft angle position coupled to "DIGI-SHAFT" system; **OUTPUT:** four digit (.5″H) LED display (0 to 9999) +BCD or Parallel binary data (ANY SCALE FACTOR DESIRED); **ACCURACY:** ±1 part in 3600 (single turn) From shaft input to digital output; **PICKOFF:** Resolver (Size 8, 11, or 15); **PACKAGE:** (A) 5.44″W x 7.00″ x 1.75″H; (B) Full or half rack; **OPTIONS:** Multichannels, Zero offset, Presets, DC output, Multiturn units with 5 digit (99999) output, NEMA 12 Housings.

TYPICAL UNITS (single Turn)

Pt. No.	Output	Counts/360°
DS90-DB-12	Binary Data	2^{12}
DSR90-36-BC	0-3599 display +BCD data	3600
DSR90-10	0–999 display	1000
DSR90-25-BC	0 to ±2500 display +BCD data	±2500

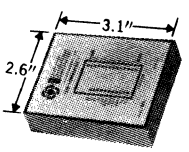
FULL SCALE OUTPUTS OF UP TO 9999 AVAILABLE
MULTITURN UNITS WITH UP TO 999999 FULL SCALE OUTPUTS AVAILABLE

SOLID STATE CONTROL TRANSFORMER Series SCT



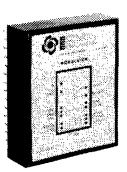
DIGITAL INPUT ANGLE (ϕ): 14, 12, or 10 bits parallel binary. **SYNCHRO RESOLVER INPUT ANGLE (θ):** 11.8/90vrms L-L, 60 or 400Hz. **OUTPUT:** E out=(V ref ±7%) sin (θ-ϕ) Sin wt; **GRADIENT:** .4 or 1vrms/degree. **RANGE:** ±7 or ±12.5 degrees; **ACCURACY:** ±4, ±15, or ±30 minutes of arc. **PACKAGE:** 2.6″ x 3.1″ x .82″H Module.

SOLID STATE CONTROL DIFFERENTIAL TRANSFORMER Series SCDX



DIGITAL INPUT ANGLE (ϕ): 14, 12, or 10 bits parallel binary. **SYNCHRO/RESOLVER INPUT ANGLE (θ):** 11.8/90vrms L-L, 60 or 400Hz. **OUTPUT:** (1) 9.2K (ϕ) Sin (θ-ϕ) Sin wt. [7vrms.] (2) 9.2K (ϕ) Cos (θ-ϕ) Sin wt. [7vrms.] **ACCURACY:** ±4, ±15 or ±30 minutes of arc. **PACKAGE:** 2.6″ x 3.1″ x .82″H.

MINIATURE MODULATORS Series MOD500



INPUT: 0 to ±10 OR ±100V DC and 26V/115V RMS reference. **OUTPUT:** 0 to 7V RMS (other voltages available). **ACCURACY:** ±.2% **F.S.: NULL:** ±.1% F.S. **PACKAGE:** (A) 2.6″ x 3.1″ x .625″ Module. (B) 1.3″ x 1.3″ x .42″H module. **OPTIONS:** Gain+Zero adjust, external output transformers.

MINIATURE DEMODULATORS Series D400

INPUT: 0 to 5, 10, 25 or 100V RMS, 400 to 5000Hz, 5/26V RMS, reference. **OUTPUT:** 0 to ±5 or ±10V DC. **ACCURACY:** ±.2, .3 or .5% **F.S.: NULL:** ±.1% F.S. **PACKAGE:** (A) 1.3″ x 1.3″ x .42″H module. (B) 1.75″ x 1.75″ x .6″H module

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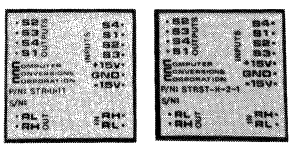
SYNCHRO CONVERTERS/DISPLAYS/ENCODERS

STANDARD LOW COST UNITS TO SATISFY ALMOST ANY SYNCHRO/RESOLVER OR SHAFT INTERFACING REQUIREMENT

MINIATURE SYNCHRO/RESOLVER TO DIGITAL
Series HSDC

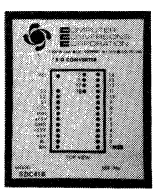
INPUT: 11.8V/90V rms L-L, 60 or 400Hz. Ref: 26/115V rms. **OUTPUT:** 16, 14 or 12 bits parallel binary. **ACCURACY:** ±2, ±4 OR ±8.5 minutes of arc. **PACKAGE:** A: 2.23 x .78 x .6"H module.
B: 1.1 x 2.1 x .7"H. C: 1.9 x 2.1 x .4"H
TRANSFORMER ISOLATION AVAILABLE
.4" H Models too!

MINIATURE SYNCHRO TO RESOLVER CONVERTERS (SCOTT T TRANSFORMERS) – Series ST



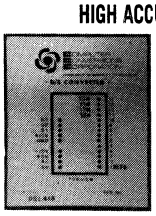
INPUT: 11.8V/90V rms L-L, 60 or 400Hz. Ref: 26/115V rms. (optional) **OUTPUT:** 6V or 2V rms, **ACCURACY:** ±1, ±2 ±4 minutes of arc. **PACKAGE:** 1.3 x 1.3 x .4" COMPATIBLE WITH ALL MONOLITHIC RESOLVER TO DIGITAL CONVERTERS.

HIGH ACCURACY SYNCHRO TO DIGITAL
Series USD



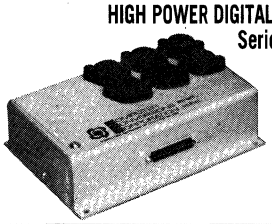
INPUT: 11.8V/90V rms L-L, 60 or 400Hz. Ref: 26/115V rms. (optional) **OUTPUT:** 18 bits parallel binary. **ACCURACY:** ±.005 Degrees. **PACKAGE:** 2.6 x 3.1 x .8"H module. **OPTION:** 6 digit BCD output.
20 Bit. 20 sec. Models available too!

HIGH ACCURACY DIGITAL TO RESOLVER
Series UDR



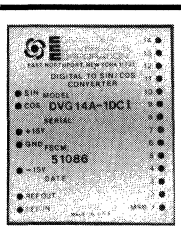
INPUT: 18 bits parallel binary and 26V/115V 60 or 400Hz reference. **OUTPUT:** 7V rms, 60 or 400Hz, capable of driving 2K ohm load. **ACCURACY:** ±.005 degrees. **PACKAGE:** 2.6 x 3.1 x .8"H module. **OPTION:** 1. 6 Digit BCD input. 2. Separate power amplifier modules.

HIGH POWER DIGITAL TO SYNCHRO/RESOLVER
Series DSPH



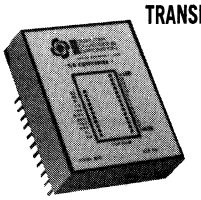
INPUT: 16, 14, 12 or 10 bits parallel binary and 115V 60 or 400Hz reference. **OUTPUT:** 90V rms, 60 or 400Hz capable of driving 25 or 50VA loads. **ACCURACY:** ±3, 6 or 10 minutes of arc. **PACKAGE:** 5.1 x 7.4 x .6"H. Bulkhead mounting aluminum case with short circuit protection, current limiting & thermal cutoff. Models up to 300VA.

VECTOR GENERATOR
Series DVG



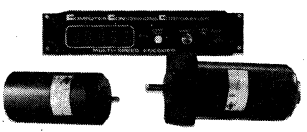
INPUT: 14 bit parallel binary & Reference 10V DC or 7V rms plus power ±15V DC. **OUTPUT:** ±10V DC sine & cosine. DC to 2.5KHZ load – 2K ohms minimum. **REFERENCE OUTPUT:** ±10V DC. **ACCURACY:** ±4 minutes of arc or ±.1% of full scale. **PACKAGE:** 2.6 x 3.1 x .43"H module.

ANALOG DEVICES REPLACEMENT SYNCHRO CONVERTER MODULES TRANSFORMER ISOLATED



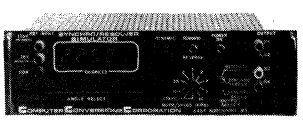
CCC has exact equivalents to almost all Analog Devices Synchro to Digital & Digital to Synchro Converters. Upon request a detailed cross reference can be supplied. These are the only EXACT TRANSFORMER ISOLATED equivalents available.

MULTISPEED HIGH ACCURACY ANGLE INDICATORS
Series AIM



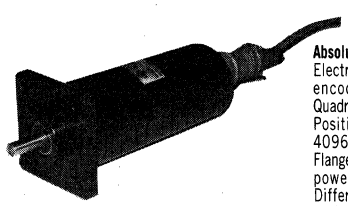
INPUT: 11.8V/90V rms L-L, 60 or 400Hz. Ref: 26/115V rms & 115V 60Hz power. **SPEED RATIO:** 1, 8, 10, 16, 18, 32, 36, 64 & 128. **OUTPUT:** 5 or 6 digit .5" LED display (uni-polar or bi-polar) & 5 or 6 digit BCD digital data (optional). **ACCURACY:** ±.002, ±.005, OR ±.01 degree. **PACKAGE:** a: 9.5 x 8 x 2.0"H. b: 19 x 12 x 3.5"H. **OPTION:** Choice of scale factor, other speed ratios, watchdog timer, tristate, binary and BCD output data simultaneously, dimmer.

SYNCHRO/RESOLVER SIMULATORS
Series SRS



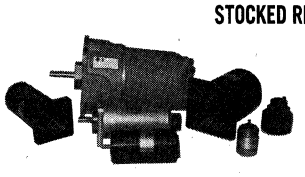
INPUT: Up to 18 bits digital parallel binary or 6 digits BCD, or manual 6 digit thumbwheel switches. Power: 115V 60Hz. **OUTPUT:** 11.8V or 90V rms L-L 60 or 400Hz capable of driving up to 25VA loads. Dynamic range, .125 to 16 RPS. Display 5 or 6 digits .5"H LED of input or output angle. **ACCURACY:** ±.002, ±.005, OR ±.01 degrees. **PACKAGE:** Bench mount: 12 x 13 x 3.25"H, Portable case: 9 x 12 x 12 (splashproof) **OPTION:** Multispeed synchro input and bus board interface.

UNI-CODER



Absolute & Incremental Outputs. No External Electronics, Ultra-Reliable electromagnetic encoder with Real-Time Incremental Quadrature Square & Serial/Shifted Absolute Position Data in one. **Resolution:** 1024 – 4096 parts/turn. Nema 12, Size 25 std. Flange mount. Single +5 VDC, or 10-30 VDC power-in. Isolated Multidrop RS485 Differential outputs. Replaces Disposable Opticals. Model #UN-1, **$495**. OEM Qty's.

STOCKED RESOLVERS



Size 11 • NEMA 13 • Two-Speed Multiturn • Geared • Explosion-Proof • Radiation Resistant • Converters • Readouts • Encoders

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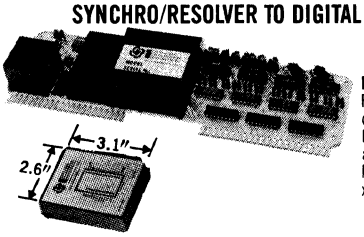
SYNCHRO/RESOLVER TO DIGITAL Series SDC40/60

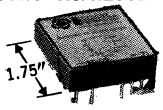


INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** 16, 14, 12, or 10 Bits parallel binary or BCD. **ACCURACY:** ±1, ±4, ±6 or ±30 minutes or arc. **PACKAGE:** (A) 2.6" x 3.1" x .42"h Module (B) 2.6" x 3.1" x .82"h or (C) 4.5" x 6.5" x .75"h repairable PC card.

SYNCHRO/RESOLVER TO LINEAR DC Series SLD200

INPUT: 11.8/90vrms L-L, 60 or 400 Hz., Ref: 26/115vrms. **OUTPUT:** (A) –10 to +10 vdc linear with angles from –180° to +180° (standard) (B) o to +10V DC linear with angle from 0° to 360° (special) (C) –10 to —10 vdc linear with angles from –90° to +90°. **ACCURACY:** ±6 minutes of arc at input speeds up to 1440°/sec, or ±15, ±30, ±60 minutes of arc. **PACKAGE:** (A) 2.6" x 3.1" x .82" Module; (B) 3.06" x 2.6" x 3.18"H Can; (C) 4.5" x 6.5" x .75"H repairable PC card.

SYNCHRO/RESOLVER TO SINE-COSINE DC Series SD100

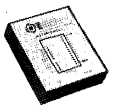


INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** ±10 sin θ vdc; ±10 cos θ vdc. **ACCURACY:** ±2 or ±4 minutes of arc. **PACKAGE:** 1.75" x 1.75" x .6"h or 3" x 3" x .625"h Module.

INVARIANT SYNCHRO/RESOLVER TO SINE-COSINE Series SD100 I

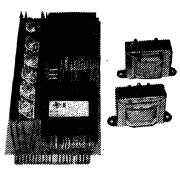
INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** ±10 sin θ vdc, ±10 cos θ vdc. **ACCURACY:** ±4 minutes of arc. **INVARIANCY:** A ±10% change in the input or reference voltage results in a ±.5% change in the individual DC outputs. **PACKAGE:** 3" x 3" x .625"h Module.

DIGITAL TO LVDT Series DLV



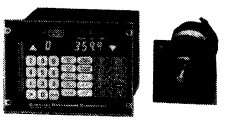
INPUT: Two 14 Bit offset binary or two's complement. **OUTPUT:** 0–7V RMS at 3KHz (2000 ohm minimum load). **ACCURACY:** ±.1% of Full Scale. **PACKAGE:** 2.6" x 3.1" x .43"H Module.
LVDT to Digital available too!

SYNCHRO/RESOLVER POWER AMPLIFIERS Series SPA



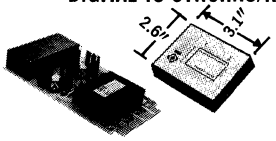
INPUT: 7V RMS L-L to 90V RMS L-L, 60 to 400Hz Synchro and 26V RMS to 115V RMS Reference input. **OUTPUT:** 7V RMS L-L to 90V RMS L-L Synchro capable of driving loads up to 125 VA. **ACCURACY:** ±3 or ±10 minutes of arc. **PACKAGE: (A)** 2.6" x 3.1" x .82"H module (1–5VA); **(B)** 4.5" x 9.25" PC card (5 to 25VA); **(C)** 5.2" x 6.0" x .75"H pc card (10 to 25VA); **(D)** 5.1" x 7.4" x 2.6"H max bulkhead mount metal case (25 to 125 VA)

PROGRAMMABLE LIMIT SWITCH Series PLS1000



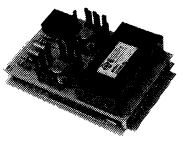
INPUT: Single, Multiturn or Linear Resolver. **RESOLUTION:** Field Scaleable to 1 part in 4096/turn. **OUTPUTS:** 16 & 1 fault, field select TTL or DC to 50V, Solid State and Electro-mechanical relay boards. **DISPLAY:** 8 character electro fluorescent and status LEDs. **SPEED:** 5 us throughput fully loaded, 3000 RPM. **FUNCTIONS:** Hi/Low setpoints, dwells, timers, tach, cycle count RS232 I/O, force outputs, offsets, 5 speed advance. **MEMORY:** Non-volatile EEPROM 10–100 programs, serial buffer. **SIZE:** 7.4" x 6.2" x 4.5" panel mount or 14" x 12" x 10" Nema 13.

DIGITAL TO SYNCHRO/RESOLVER Series DSC40/60



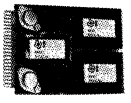
INPUT: 14, 12 or 10 bits parallel binary and 26/115 vrms reference. **OUTPUT:** 11.8/90 vrms L-L, 60 or 400 Hz capable of driving 1VA, 2VA, 5VA (up to 3 TRS) or 25VA loads. **ACCURACY:** ±4, ±15, or ±30 minutes. **PACKAGE:** A) 2.6" x 3.1" x .6"h. B) 2.6" x 3.1" x .82"h module. C) PC card with edge connector (5VA and 25VA units). 10KHz. Models too!

DC ANGLE TO SYNCHRO/RESOLVER Series LDS500



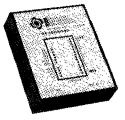
INPUT: ±10V DC or ±100V DC representing ±180° of angle. **OUTPUT:** 11.8/90V RMS L-L, 60 or 400Hz capable of driving up to three size 11 T.R.'s (75 Ohms L-L). **ACCURACY:** ±15 or ±30 minutes of arc. **PACKAGE:** (A) 4.5" x 9.25" x 2.0"H repairable PC board with 22 pin edge connector. (B) 2.6" x 3.1" x 1"H module (1.5VA Output).

DC SIN COS TO SYNCHRO DRIVERS Series DCS400



INPUT: ±10 vdc representing sin θ and cos θ. **OUTPUT:** 11.8/90 vrms L-L, 60 or 400 Hz capable of driving up to three size 11 T.R.'s (75 ohms L-L). **ACCURACY:** ±6, ±15, ±30 minutes of arc. **PACKAGE:** A) 4.5" x 6.5" x .8"h repairable PC Card. B) 4.5" x 9.25" x 1"h PC Card.

DIGITAL to SYNCHRO/RESOLVER Series DSP REFERENCE POWERED



INPUT: 14 or 12 bits parallel binary and 115V **RMS REF:** 60 or 400Hz. **OUTPUT:** 90 V L-L 60 or 400Hz capable of driving 4.5VA. **ACCURACY:** ±4 minutes of arc. **PACKAGE:** 2.6" x 3.1" x .82"H. No external transformer required.

ADDITIONAL PRODUCTS:

- Hi Speed Multiplexed Synchro to Digital
- Multiplexed Encoders
- Multiplexed Synchro to Linear DC
- Digital Sine/Cosine to Synchro
- Modular Encoders
- Standard Bus S/D & D/S
- Two Speed Digital to Synchro
- Synchro Reference Supply
- Selsyn to Digital/DC
- Azimuth Change Pulse Conv.
- BCD to Binary Converters

ALL SYNCHRO INPUT/OUTPUT UNITS

- Available in 0°C to 70°C or –55°C to +85°C temperature range
- TTL compatible output and inputs or CMOS, or LP Shottky
- Operate from ±15 v, or ±15 and +5 vdc
- Transformer isolated inputs/outputs
- Solid State construction — 883 Level B Available
- CAN BE MADE FIELD OR FACTORY REPAIRABLE
- Available hermetically sealed and to MIL SPECS (E-5400)
- Deliver: Stock to 4 weeks (small quantity)

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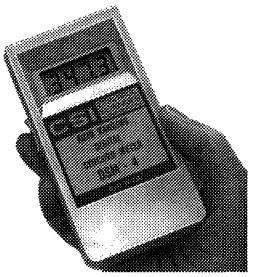
Measure, align or check out synchro and resolver systems with these rugged instruments

The world's first handheld Digital Synchro Meter . . . the DSM-4™
NSN: 6625-01-376-4375

- Auto-ranges to accept all standard military synchro signals
- 7-14/54-108 volt stators
- 47 - 1200Hz frequency range
- Large 0.5" 4-digit LCD display
- ±0.2° degree accuracy (±0.1° near zero)
- Rugged, battery powered



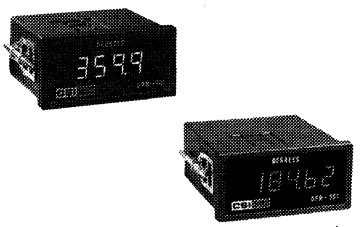
The world's first handheld Digital Resolver Meter . . . the DRM-4™
NSN: 6625-01-390-6513

- Dual-range switch provides wide voltage input
- 3.5-7.0/7.0-14 volt stators
- 30 to 2600Hz frequency range
- Large 0.5" 4-digit LCD display
- ±0.2 degree accuracy (±0.1 near zero)
- 70mv input option for low-level VOR testing
- Rugged, battery powered

The Industry's *smallest and lightest* synchro and resolver panel meters . . .

The four decade DPM-401

- Bright 0.56" LED 4 digit display
- Only 1.9" x 3.8" x 3.1" deep
- ±0.2 degree accuracy (±0.1° near zero)
- Single +5 volt power supply
- Bipolar and Unipolar operation



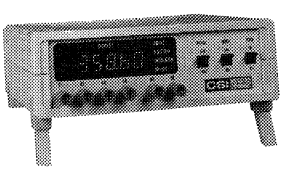
The five decade DPM-501

- Bright 0.56" LED 5 digit display
- Single or two-speed inputs
- Only 1.9" x 3.8" x 4.1" deep
- ±0.01/0.03 degree accuracy
- Single +5 volt power supply
- Loss of signal, reference, and tracking alert

High accuracy, *auto-ranging*, wideband synchro and resolver Angle Position Indicator, the AP-501

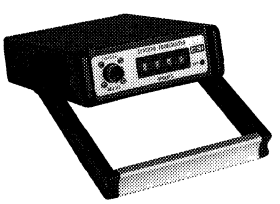
NEW!

- Auto-ranging synchro/resolver input
- 47 - 3000Hz excitation frequency
- Bright 0.56" 5-digit LED display
- Automatic phase shift compensation
- Binary and BCD outputs
- ±0.03 degree accuracy
- Loss of signal, reference, tracking alert
- Bipolar and Unipolar operation
- Optional half-rack mount
- Optional analog output
- Universal 85-265 VAC power, 47-440Hz



Simulate roll, pitch or any synchro angle with our handheld, reference powered decade synchro transmitter . . . the DST-400

- ±0.1 degree resolution
- Push-wheel switches
- Reference powered
- ±4 minute accuracy
- 1.5VA output power @ 60Hz
- 4.5VA output power @ 400Hz



VME1686 synchro/resolver to digital card

1 to 6 channels, 12, 14 and 16 bit resolution. Built-in-test warns of loss of signal, reference, or tracking. 6U single card slot.

NEW!

VME1683 synchro/resolver to digital card

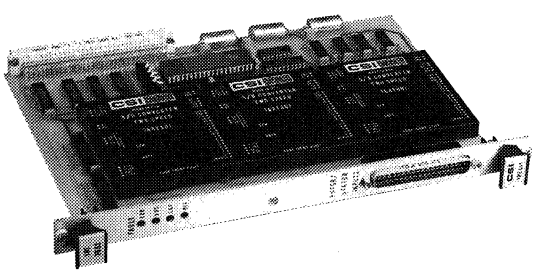
1 to 3 channels, single and two-speed inputs (or any mix thereof), 16 bit resolution. Built-in-test warns of loss of signal, reference, or tracking. 6U single card slot.

VME1923 digital to synchro card.

1 to 3 channels, 14 bit resolution, reference powered, 4.5VA, 400Hz or 1.5VA, 60Hz. Accuracy is ± 4 minutes of arc. 6U double card slot.

VME 2923 digital to synchro/resolver card

Low profile digital to synchro/resolver card. 1 to 3 channels, 14 bit resolution, 1.5VA, 400Hz. Accuracy is ± 4 minutes of arc. 6U single card slot.



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synchro and resolver conversion modules, micro-modules, and related products

CSI

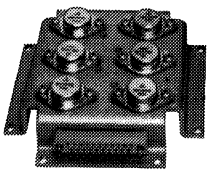
Over 25 years of commitment to building the best synchro and resolver converter products available anywhere; and earning customer confidence that Control Sciences delivers . . . on time, every time!

Synchro/Resolver to Digital Converters, Single-Speed Tracking

10, 12, 14 and 16 bit resolution (card mounting) in industry-standard and micro-module packages. Commercial, Industrial and Military temperature range products available.

Synchro/Resolver to Digital Converters, Two-Speed Tracking

16 and 20 bit resolution (card mounting) in industry-standard packages. Commercial, Industrial and Military temperature range products available.

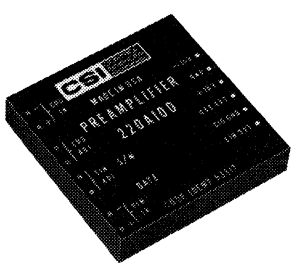


Digital to Synchro/Resolver Converters

12, 14 and 16 bit resolution; 1.5, 4.5, 5.0, 25, and 125 VA (Card Mounting, Card Assemblies, Systems)

Synchro Amplifiers

3VA card mounting
15VA airborne, reference powered
25VA bulkhead mounting
Airborne 1/2 ATR packages



Special Functions

Binary/BCD and BCD/Binary angle code converters
Inductosyn to Digital Converters, 12 to 16 bit, tracking
LVDT/RVDT to Digital Converters, 11 and 14 bit, tracking
Oscillators, Sinewave, 1 to 5VA output power, 400 to 10KHz
Resolver to Encoder Converter (A quad B plus Zero Marker)
Solid-State Control Transformers, 12 and 14 bit resolution
Solid-State Differential Control Transformers, 13 and 14 bit

Alternate Source Converters

Control Sciences offers a number of converters that are pin-for-pin replacements for products manufactured by ILC/DDC, Analog Devices, Natel Engineering and other manufacturers. Call/FAX/or E-mail our applications engineering for immediate assistance.

SEE US ON THE WEB!

***Visit our website for regularly updated new product information and application notes* - http://www.controlsciences.com**

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Dataforth Corporation, established in 1984, is a worldwide leader in the design and manufacture of signal conditioning and data communications products for industrial and institutional markets.

Signal Conditioning Products

SCM products protect valuable measurement and control signals and equipment from the dangerous and degrading effects of noise, transient power surges, internal ground loops, and other hazards present in industrial environments. We offer several families of analog and digital I/O products and accessories, including our new DIN-rail mounted DSCA series of "*instrument-class*" signal conditioners, plus full customer service and applications support. We invite you to contact us for complete technical information about our products and how they might help meet your current or future design requirements.

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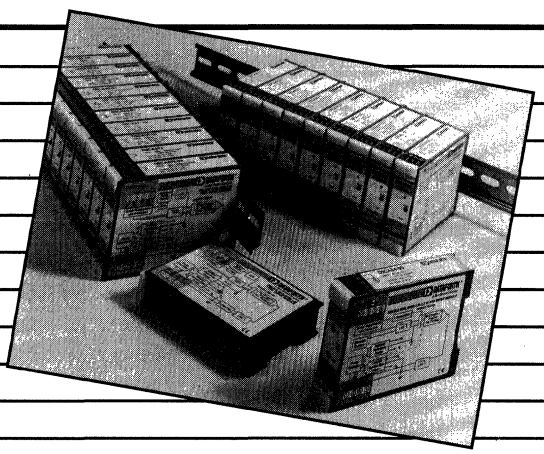
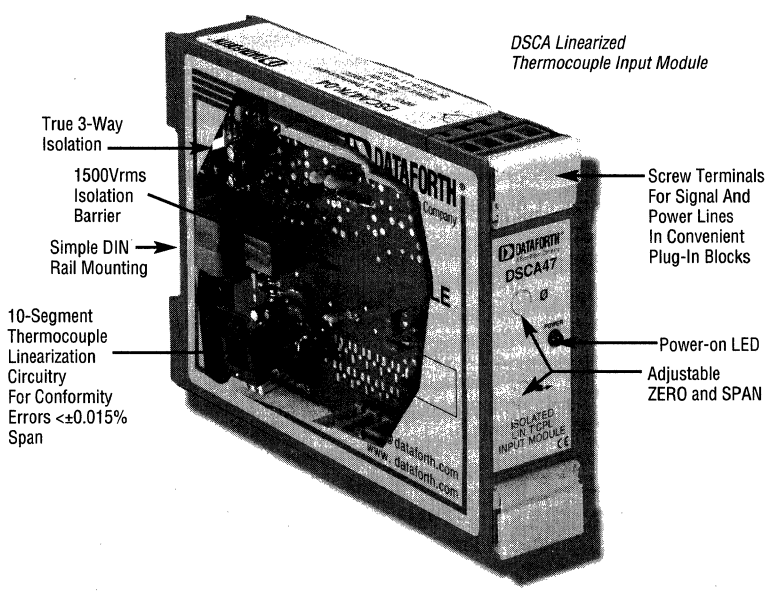
- **DIN-rail Mounted**
- **True 3-Way Isolation**
- **±0.01% Linearity**
- **Highest Performance at Lowest Cost**
- **±0.05% Accuracy**
- **1500Vrms Isolation**
- **240VAC Input Protection**
- **ANSI/IEEE C37.90.1-1989 Transient Protection**

DSCA30	Analog mV Input Modules
DSCA31	Analog V Input Modules, 4Hz BW
DSCA32	mA Input Modules
DSCA34	Linearized 2,3, Wire RTD Input Modules
DSCA36	Potentiometer Input Modules
DSCA37	Nonlinearized Thermocouple Input Modules
DSCA38	Strain Gage Input Modules
DSCA39	mA Output Modules
DSCA40	Analog mV Input Modules, Wide BW
DSCA41	Analog V Input Modules, Wide BW
DSCA42	2-Wire Transmitter Interface Modules
DSCA43	DC Transducer Input Modules
DSCA45	Frequency Input Modules
DSCA47	Linearized Thermocouple Input Modules
DSCA49	V Output Modules



DSCA Linearized Thermocouple Input Module



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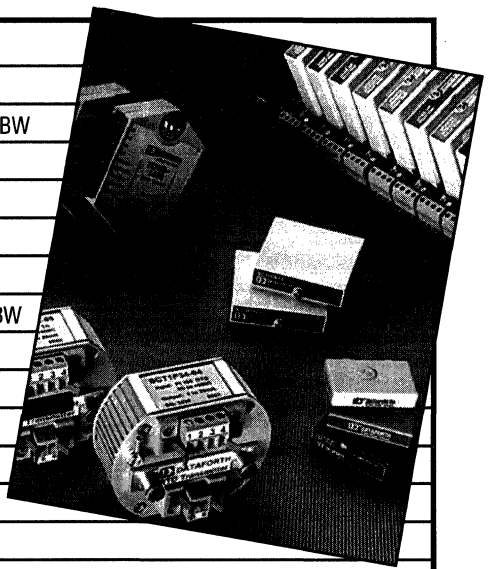
SCM5B Isolated Signal Conditioning Products

- **Form, Fit, Functional 5B Equivalents**
- **ANSI/IEEE C37.90.1-1989 Transient Protection**
- **95dB NMR**
- **±0.05% Accuracy**
- **1500V Isolation**
- **±1µV/°C Drift**
- **CSA Certified, FM Approved**
- **CE Compliant**

SCM5B30/31	Analog Voltage Input Modules, 4Hz BW
SCM5B32	Current Input Modules, 4Hz BW
SCM5B34/35	Linearized 2-,3-, 4-Wire RTD Input Modules, 4Hz BW
SCM5B36	Potentiometer Input Modules, 4Hz BW
SCM5B37	Thermocouple Input Modules, 4Hz BW
SCM5B38	Strain Gage Input Modules, 4Hz or 10KHz BW
SCM5B39	Current Output Modules, 400Hz BW
SCM5B392	Matched Pair Servo/Motor Controller Drivers, 1KHz BW
SCM5B40/41	Analog Voltage Input Modules, 10KHz BW
SCM5B42	2-Wire Transmitter Interface Modules, 100Hz BW
SCM5B43	Displacement Transducer Input Modules
SCM5B45	Frequency Input Modules
SCM5B47	Linearized Thermocouple Input Modules, 4Hz BW
SCM5B49	Voltage Output Modules, 400Hz BW
SCM5B Accessories	1-, 2-, 8-, 16-Channel, Multiplexed, Non-multiplexed Backpanels; DIN Rail Mounts, Cables, Power Supplies, 19-inch Racks, Jumpers, Resistors, Cold Junction Compensation Circuits



SCM7B Series Isolated Process Control Signal Conditioning Products

- **Low Cost**
- **Form, Fit, Functional Equivalents To Older Designs**
- **ANSI/IEEE C37.90.1-1989 Transient Protection**
- **Wide 14-35VDC Supply Range**
- **5-Pole Filtering**
- **1500V Isolation**
- **CE Compliant**
- **±0.05% Accuracy**

SCM7B21/30/31	Voltage Input Modules, 3Hz, 300Hz BW
SCM7B33	Process Voltage Input Modules, 100Hz BW
SCM7B32	Process Current Input Modules, 100Hz BW
SCM7B35	2-Wire Transmitter Interface Modules, With Loop-Power, 100Hz BW
SCM7B34/34N	Linearized 2-, 3-Wire RTD Input Modules, Pt and Ni, 3Hz BW
SCM7B37	Thermocouple Input Modules, 3Hz BW
SCM7B38	Strain Gage Input Modules, Narrow and Wide BW
SCM7B47	Linearized Thermocouple Input Modules, 3Hz BW
SCM7B22	Voltage Output Modules, 400Hz BW
SCM7B39	Current Output Modules, 100Hz BW
SCM7B Accessories	1-, 2-, 4-, 8-, 16-Channel Standard and DIN Backpanels; 19-inch Racks; Cables; Resistors

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SCM9B Series Isolated, Intelligent Signal Conditioning Products

- **500Vrms Input Isolation**
- **15 Bit Measurement Resolution**
- **Programmable Scaling/Linearization**
- **Converters Transparent To Host**

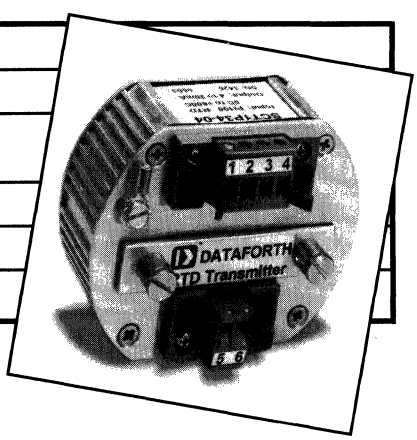
	SCM9B-1000/2000 SENSOR-TO-COMPUTER MODULES
SCM9B-1100/2100	Voltage Input Modules
SCM9B-1200/2200	Current Input Modules
SCM9B-1300/1400	Thermocouple, RTD Input Modules
SCM9B-1500-2600	Bridge, Timer, Frequency, and Digital Input Modules
	SCM9B-3000/4000 COMPUTER-TO-ANALOG OUTPUT MODULES
SCM9B-3100/4100	Voltage Output Modules
SCM9B-3200/4200	Current Output Modules
	SCM9B-A1000/A2000/A5000 CONVERTERS/REPEATERS
SCM9B-A1000	RS-232C/RS-485 Converter/Repeater (VAC)
SCM9B-A2000	RS-232C/RS-485 Converter/Repeater (DC)
SCM9B-A2400	Radio Modem Converter Module
	ACCESSORIES
	24-, 64-point Digital I/O Boards; 8-, 14-Channel Backpanels; Utility, Data Logging Software

SCT1P Isolated Two-Wire Transmitters

- **1500Vrms Transformer Isolation**
- **±0.05% Accuracy**
- **Process Current Output**
- **Low Cost**
- **CE Compliant**

SCT1P isolated 2-wire transmitters condition and send analog signals from sensors located in the "field" to monitoring and control equipment, usually computers, located thousands of feet away in central control areas. SCT1P models accept a wide range of inputs, including millivolt, volt, milliamp, thermocouple, RTD, potentiometer, and slidewire. They operate on power from a 2-wire output signal loop, modulating the supply current to represent the input signal within a 4 to 20 milliamp range.

SCT1P30/31	Analog Voltage Input Transmitters, 4Hz BW
SCT1P32	Current Input Transmitters, 4Hz BW
SCT1P34	Linearized 2- or 3-Wire RTD Input Transmitters (4-Wire, other RTD on request), 4Hz BW
SCT1P36	Potentiometer Input Transmitters, 4Hz BW
SCT1P37	Thermocouple Input Transmitters, 4Hz BW
SCT1P47	Linearized Thermocouple Input Transmitters, 4Hz BW



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MINIGLOSSARY
BASIC
EBCDIC CODE

Bit Positions 4, 5, 6, 7	Second Hexadecimal Digit	Digit Punches	00				01				10				11				
			00	01	10	11	00	01	10	11	00	01	10	11	00	01	10	11	Bit Positions 0, 1
			00	01	10	11	00	01	10	11	00	01	10	11	00	01	10	11	Bit Positions 2, 3
			0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	First Hexadecimal Digit
			12				12	12		12	12	12		12	12				Zone Punches
				11				11	11	11		11	11	11		11			
					0		0		0	0	0		0	0			0		
			9	9	9	9	9	9	9	9									Digit Punches
			①	②	③	④	⑤	⑥	⑦	⑧					⑨	⑩	⑪	⑫	
0000	0	8-1	NUL	DLE	DS		SP	&	-									0	8-1
0001	1	1	SOH	DC1	SOS				⑬		a	j			A	J	⑭	1	1
0010	2	2	STX	DC2	FS	SYN					b	k	s		B	K	S	2	2
0011	3	3	ETX	TM							c	l	t		C	L	T	3	3
0100	4	4	PF	RES	BYP	PN					d	m	u		D	M	U	4	4
0101	5	5	HT	NL	LF	RS					e	n	v		E	N	V	5	5
0110	6	6	LC	BS	ETB	UC					f	o	w		F	O	W	6	6
0111	7	7	DEL	IL	ESC	EOT					g	p	x		G	P	X	7	7
1000	8	8		CAN							h	q	y		H	Q	Y	8	8
1001	9	8-1		EM							;	r	z	`	I	R	Z	9	9
1010	A	8-2	SMM	CC	SM		¢	!	⑮	:									8-2
1011	B	8-3	VT	CU1	CU2	CU3	.	$	,	#									8-3
1100	C	8-4	FF	IFS		DC4	<	*	%	@									8-4
1101	D	8-5	CR	IGS	ENQ	NAK	(	)	_	'									8-5
1110	E	8-6	SO	IRS	ACK		+	;	>	=									8-6
1111	F	8-7	SI	IUS	BEL	SUB	I	¬	?	"									8-7
			12				12				12	12		12	12	12		12	Zone Punches
				11				11				11	11	11		11	11	11	
					0				0		0		0	0	0		0	0	
			9	9	9	9									9	9	9	9	

Card Hole Patterns

①	12-0-9-8-1	⑤	No-Punches	⑨	12-0	⑬	0-1
②	12-11-9-8-1	⑥	12	⑩	11-0	⑭	11-0-9-1
③	11-0-9-8-1	⑦	11	⑪	0-8-2	⑮	12-11
④	12-11-0-9-8-1	⑧	12-11-0	⑫	0		

Control Character Representations

ACK	Acknowledge	EOT	End of Transmission	PF	Punch Off
BEL	Bell	ESC	Escape	PN	Punch On
BS	Backspace	ETB	End of Transmission Block	RES	Restore
BYP	Bypass	ETX	End of Text	RS	Reader Stop
CAN	Cancel	FF	Form Feed	SI	Shift In
CC	Cursar Control	FS	Field Separator	SM	Set Mode
CR	Carriage Return	HT	Horizontal Tab	SMM	Start of Manual Message
CU1	Customer Use 1	IFS	Interchange File Separator	SO	Shift Out
CU2	Customer Use 2	IGS	Interchange Group Separator	SOH	Start of Heading
CU3	Customer Use 3	IL	Idle	SOS	Start of Significance
DC1	Device Control 1	IRS	Interchange Record Separator	SP	Space
DC2	Device Control 2	IUS	Interchange Unit Separator	STX	Start of Text
DC4	Device Control 4	LC	Lower Case	SUB	Substitute
DEL	Delete	LF	Line Feed	SYN	Synchronous Idle
DLE	Data Link Escape	NAK	Negative Acknowledge	TM	Tape Mark
DS	Digit Select	NL	New Line	UC	Upper Case
EM	End of Medium	NUL	Null	VT	Vertical Tab
ENQ	Enquiry				

Special Graphic Characters

¢	Cent Sign
.	Period, Decimal Point
<	Less-than Sign
(	Left Parenthesis
+	Plus Sign
I	Logical OR
&	Ampersand
!	Exclamation Point
$	Dollar Sign
*	Asterisk
)	Right Parenthesis
;	Semicolon
¬	Logical NOT
-	Minus Sign, Hyphen
/	Slash
,	Comma
%	Percent
_	Underscore
>	Greater-than Sign
?	Question Mark
:	Colon
#	Number Sign
@	At Sign
'	Prime, Apostrophe
=	Equal Sign
"	Quotation Mark

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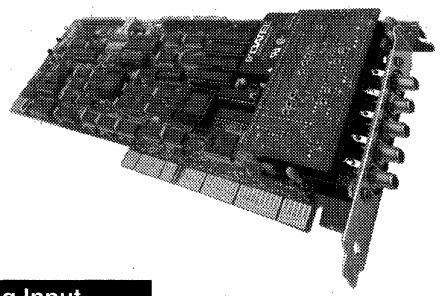
DATA ACQUISITION BOARDS



PCI, PC/ISA Bus

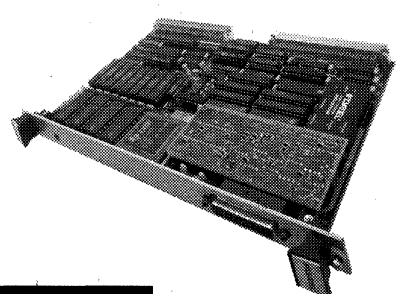
- A/D resolutions to 16 bits; Sampling rates to 25MHz
- On-board A/D FIFO memory for gapless data "streaming" to disk or memory with no lost samples
- On-board DSP's (C44 or C30) for data pre-processing
- 2 to 16-channel, simultaneous sampling (1 A/D per channel)
- Very low harmonic distortion and wide input bandwidth
- DOS, Windows, Windows 95 and Windows NT software
- National Instruments LabVIEW® and Hyperception drivers

Analog Input

Bus	Model	Channels	Speed	Resolution	Data Memory	Notes	Fax Code
PCI	PCI-416 Series	To 16SE/8D A/D	To 10MHz	12/14/16 bits	8k samples	PCI bus, continuous nonstop data streaming to system RAM.	40010
	PCI-431 Series	To 32SE/16D A/D	To 25MHz	12/14/16 bits	To 2M samples	On-board 320C44 50MHz DSP, PCI bus master, streaming design Hyperception block-diagram signal processing for Win95/NT.	40020
	PCI-441 Series	32SE/16D A/D	200kHz	16 bits	512 samples	Low-cost, PCI bus master, signal-conditioning inputs for strain guages/RTD's/4-20mA/bridges, autocalibration, PGA, Win95/NT.	40031
PC/ISA	PC-411/412 Series	16SE/8D A/D	To 83kHz	12/14/16 bits	512 samples	4 simultaneous D/A (PC-412), DMA, interrupt, digital I/O.	42010
	PC-414 Series	To 16SE/8D A/D	To 10MHz	12/14/16 bits	16k samples	2-16 channel simultaneous sampling, streaming design.	42020
	PC-430 Series	To 16SE/8D A/D	To 10MHz	12/14/16 bits	To 4M samples	On-board 320C30 DSP, "no programming" library, 512kb SRAM.	42050
	PC-440	32SE or 16D Input Channel Expander slave board - cascadable to 256 channels. MUX, signal conditioner, PGA.					42070

Analog Output

Bus	Model	Channels	Speed	Resolution	Data Memory	Notes	Fax Code
PC/ISA	PC-422A/B	8/16 D/A	330kHz	12 bits	None	16-channel simultaneous update, programmable timer/interrupt.	42040
	PC-462	4 D/A, 4 A/D	Programmable Power Supply board. Isolated outputs: ±6V @ 1A, ±20.5V @ 250mA.				42080
	PC-420	2-channel, 40MHz Arbitrary Waveform Generator board, 64ks waveform memory, 8 filters. Windows virtual instrument.					42030
	PC-423A/B	4-channel, 12-bit, buffered, streaming DAC board, 1k/8k FIFO memory per channel, 1MHz update rate.					42045



VME Bus

- A/D resolutions to 16 bits; Sampling rates to 10MHz
- On-board A/D FIFO memory for gapless data "streaming" to disk or memory with no lost samples
- On-board DSP (40MHz C30) for data pre-processing
- 2 to 16-channel, simultaneous sampling (1 A/D per channel)
- Very low harmonic distortion and wide input bandwidth
- 6U VME "double height" format
- Ideal for DSP and FFT's

Analog Input

Model	Channels	Speed	Resolution	Data Memory	Notes	Fax Code
DVME-611/612 Series	32SE/16D A/D	To 400kHz	12/14/16 bits	None	Expandable to 160 channels, software gain amplifier.	43010
DVME-613 Series	16SE/8D isolated	To 40kHz	12/14/16 bits	None	Protected inputs, digital I/O, interrupt, A/D clock.	43020
DVME-614 Series	To 16SE/8D A/D	To 10MHz	12/14/16 bits	16k samples	2-16 channel simultaneous sampling, streaming design.	43030
DVME-630 Series	To 16SE/8D A/D	To 10MHz	12/14/16 bits	To 4M samples	On-board 320C30 DSP, "no programming" library, 512kb SRAM.	43090
DVME-641/645	Input MUX Channel Expanders, slave to DVME-611. 8-channel simultaneous sampling.					43100

Analog Output

Model	Channels	Speed	Resolution	Data Memory	Notes	Fax Code
DVME-628	8 D/A	167kHz	12 bits	--	Selectable 4-20mA loops or voltage output.	43080
DVME-626V	6 D/A	67kHz	16 bits	--	±0.005% non-linearity.	43070
DVME-622A/B	8/16 D/A	330MHz	12 bits	--	16-channel simultaneous update, programmable timer/interrupt.	43050
DVME-691	Rack-mount signal conditioner screw terminator with flat cables for A/D and D/A.					43140
DVME-660	48-line digital I/O, programmable in/out, timer, interrupt, external trigger, comparator.					43130

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SAMPLING A/D CONVERTERS

SAMPLING ANALOG-TO-DIGITAL CONVERTERS

Resolution	Model ①	Sampling Rate (MHz)	Input Range(s) (Volts)	DNL (LSB's)	No Missing Codes ③	SNR (dB)	THD (–dB)	Power Supplies (Volts)	Power Dissipation (Watts)	Package ⑥	MIL-STD-883 Screening	Fax Code
10 12 Bits②	ADS-325A ②	20	+2 to +4	±0.5	Yes	54	65	+5	0.15	48-Pin LQFP	No	10010
	ADS-112	1	±5, 0 to +10	±0.5	Yes	72	78	±15, +5	1.3	24-Pin DDIP	Yes	11010
	ADS-CCD1201 ④	1.2	0 to +10	±0.25	Yes	73	84	±15, +5 ④	1.7	24-Pin DDIP	No	11020
	ADS-117	2	±5, 0 to +10	±0.5	Yes	70	73	±15, +5	1.6	24-Pin DDIP	Yes	11030
	ADS-CCD1202 ④	2	0 to +10	±0.25	Yes	72	76	±15, +5 ④	1.75	24-Pin DDIP	No	11040
	ADS-118	5	±1	±0.5	Yes	69	71	±5	1.3	24-Pin DDIP	No	11050
	ADS-118A	5	±1.25	±0.5	Yes	69	71	±5	1.3	24-Pin DDIP	No	11050
	ADS-119	10	±1.5	±0.5	Yes	69	68	±5	1.8	24-Pin DDIP	Yes	11060
14 Bits	ADS-916 ⑤	0.5	0 to +10	±0.5	Yes	81	90	±15, +5 ⑤	1.6	24-Pin DDIP	No	12010
	ADS-926 ⑤	0.5	±5	±0.5	Yes	80	90	±15, +5 ⑤	1.3	24-Pin DDIP	Yes	12020
	ADS-917 ⑤	1	0 to +10	±0.5	Yes	79	85	±15, +5 ⑤	1.7	24-Pin DDIP	No	12030
	ADS-927 ⑤	1	±5	±0.5	Yes	79	90	±15, +5 ⑤	1.6	24-Pin DDIP	Yes	12040
	ADS-941	1	±5, 0 to +10	±0.5	Yes	80	85	±15, +5	2.8	32-Pin TDIP	No	12050
	ADS-919 ⑤	2	0 to +10	±0.5	Yes	77	74	±15, +5 ⑤	1.8	24-Pin DDIP	No	12060
	ADS-929 ⑤	2	±5	±0.5	Yes	78	79	±15, +5 ⑤	1.7	24-Pin DDIP	Yes	12070
	ADS-942	2	±5, 0 to +10	±0.5	Yes	75	80	±15, +5	2.9	32-Pin TDIP	No	12080
	ADS-942A	2	±5, 0 to +10	±0.5	Yes	75	80	±15, ±5	2.2	32-Pin TDIP	No	12090
	ADS-943	3	±2	±0.5	Yes	79	80	±5	1.7	24-Pin DDIP	Yes	12100
	ADS-944	5	±1.25	±0.5	Yes	76	77	±15, +5, –5.2	2.95	32-Pin TDIP	Yes	12110
	ADS-946	8	±2	±0.5	Yes	77	75	±5	2.0	24-Pin DDIP	Yes	12120
	ADS-945	10	±1.25	±0.5	Yes	78	80	±15, +5, –5.2	4.2	Custom DIP	No	12130
	ADS-947	10	±2	±0.5	Yes	76	76	+5, –5.2	2.0	24-Pin DDIP	No	12140
	ADS-949	12.8	±2	±0.5	Yes	76	75	+5, –5.2, +15	2.0	32-Pin TDIP	No	12150
16 18 Bits⑦	ADS-930	0.5	±5, 0 to –10	±0.75	Yes	83	89	±15, +5	3.5	40-Pin TDIP	No	13010
	ADS-931	1	±2.75	±0.5	Yes	87	89	±5	1.85	40-Pin TDIP	No	13020
	ADS-937	1	±5, 0 to –10	±0.5	Yes	87	89	±15, ±5	1.1	32-Pin TDIP	No	13040
	ADS-932	2	±2.75	±0.5	Yes	86	88	±5	1.85	40-Pin TDIP	No	13030
	ADS-933	3	±2.75	±0.5	Yes	85	84	±5	1.85	40-Pin TDIP	No	13050
	ADS-951 ⑦	1	±5	±0.5	Yes	89	89	±15, ±5	1.25	32-Pin TDIP	No	13100

Listed specifications are typical at TA = +25°C, with nominal supplies, unless otherwise indicated. ① DATEL offers "MC" (0 to +70°C) and "MM" (–55 to +125°C) versions of each model. ② The ADS-325A has 10-bit resolution. All other devices in this section of the table are 12-bit converters. ③ Guaranteed over the full military temperature range (–55 to +125°C). ④ The ADS-CCD1201/2 have been optimized for electronic-imaging applications. They are pin-compatible and operate from either ±12V or ±15V supplies. ⑤ ADS-916, 917, 919, 926, 927 and 929 are all pin-compatible and operate from either ±12V or ±15V supplies. ⑥ Most devices available in SMT packaging. Contact DATEL for details. ⑦ The ADS-951 has 18-bit resolution. All other devices in this section of the table are 16-bit converters.

FLASH ANALOG-TO-DIGITAL CONVERTERS

Model ①	Resolution (Bits)	Guaranteed Conversion Rate	Differential Linearity Error, Max. (LSB's)	Integral Linearity Error, Max. (LSB's)	Input Range (Volts)	Power Supplies (Volts)	Power Dissipation (mW)	Package ②	Fax Code
ADC-207	7	20MHz	±0.5	±1	0 to +5	+5	250	18-Pin DIP M 24-Pin CLCC M	15010
ADC-228 ③	8	20MHz	±0.5	±0.5	0 to +5	+5, ±15	1.5 ④	24-Pin DDIP H	15030
ADC-305	8	20MHz	±0.5	±0.5 ⑤	0 to +2	+5	60	24-Pin DIP/SOP M	15050
ADC-320	8	35MHz	±0.5	+1.3/–1.0	0 to –2	+5	80	32-Pin PQFP M	15060
ADC-321	8	50MHz	±0.5	±1.5	0 to +2	+5 or +3.3	125	32-Pin PQFP M	15080
ADC-318	8	120MHz	±0.5	±0.5	0 to +2	+5 or ±5	760	48-Pin PQFP M	15070

Listed specifications are typical at TA = +25°C, with nominal supplies, unless otherwise indicated. ① MIL-STD-883 screening available on ADC-207 and ADC-228.
② M = Monolithic, H = Multi-chip-module hybrid. ③ The ADC-228 is a "complete" flash A/D with reference, input buffer, 3-state output, etc. ④ Watts. ⑤ Listed specification is a typical.

ELECTRONIC IMAGING

CDS-1401/1402

- **Fax codes: 15100** (CDS-1401), **15102** (CDS-1402)
- Complete correlated double sampling functions
- Sampling rates to 1.25/5MPPS at 14 bits
- Small 24-pin DDIP or SMT packages

ADS-CCD1201/1202

- **Fax codes: 11020** (CCD1201), **11040** (CCD1202)
- Imaging specific A/D's; ±0.25LSB DNL
- 12-bit resolution; Sampling rates to 1.2/2MHz
- Small 24-pin DDIP or SMT packages

ADCDS-1403

- **Fax code: 12105**
- Complete solution combining preamp, CDS & A/D
- 14-bit resolution; Sampling rates to 3MHz
- Small 32-pin DIP; Low noise/power/cost

Other DATEL data acquisition components include: D/A converters, S/H amplifiers, Multiplexers, Op Amps and Active Filters.

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PRIME PRODUCTS

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DDC is the leading supplier of data conversion, communication and interface products for military, commercial, industrial and space-level applications. This representative listing highlights key components, boards, cards and software from DDC's extensive product line, including: MIL-STD-1553 data bus products and supporting software; synchro/resolver converters and instruments; power hybrid circuits, motor and motion controllers; ARINC 429/629 commercial avionics components, interfaces, boards and software; solid-state power controllers; A/D and D/A converters.

For additional information about DDC's products or services call us, fax us, or visit our Web site.

1553 DATA BUS PRODUCTS

MODEL	*TYPE*	*PACKAGE*	*DESCRIPTION/FEATURES*
BU-61688/89 MINI-ACE-PLUS	Advanced Communication Engine (ACE) BC/RT/MT Series	1" Square MCM (Multi-Chip Module)	The Mini-ACE-PLUS integrates BC/RT/MT, two 5-volt-only transceivers, complete 1553A/B, Notice 2 / STANAG-3838 Protocol, Memory Management, Processor Interface Logic, and 64K x 16 words of RAM in a choice of Pin Grid Array (PGA) or Quad Flat Pack packages. This product operates with 10/12/16/20 MHz clock inputs.
BU-65179 MINI-ACE-PLUS	RT Only	1" Square MCM (Multi-Chip Module)	The Mini-ACE-PLUS RT integrates two 5-volt-only transceivers, complete 1553A/B, Notice 2 / STANAG-3838 Protocol, Memory Management, Processor Interface Logic, and 4K x 16 words of RAM in a choice of Pin Grid Array (PGA) or Quad Flat Pack packages. This product supports RT Auto Boot and 10/12/16/20 MHz clock inputs.
BU-61580 ACE Series	BC/RT/MT	1.9 x 1 x 0.150" 70-Pin Ceramic DIP, Flat Pack or G Lead	Fully integrated 1553A/B (Notice 2) McAir BC/RT/MT. Includes dual transceiver plus complete protocol, memory management, processor interface, and 4K x 16 internal RAM. Supports a wide variety of interfaces to host processor and external RAM. Includes many advanced architectural features including BC retries and programmable intermessage gap times, RT subaddress double buffering and circular buffers, a message monitor, and a simultaneous RT/Monitor mode.
BU-65170 ACE Series	RT Only		
BU-61582 SP'ACE	BC/RT/MT	SP'ACE SERIES	BC/RT/MT with 16K x 16 RAM with enhanced radiation hardness and screening for space and other high-rel applications.
BU-61588 MINI-ACE BU-65178 MINI-ACE	BC/RT/MT RT Only	1 x 1 x 0.150" 70-Pin Ceramic DIP, Flat Pack or G Lead	Fully integrated 1553A/B (Notice 2) McAir BC/RT/MT. Includes dual transceiver plus complete protocol, memory management, processor interface, and 4K x 16 internal RAM. Supports a wide variety of interfaces to host processor and external RAM. Includes many advanced architectural features, including BC retries and programmable intermessage gap times, RT Subaddress double buffering and circular buffers, a message monitor, and a simultaneous RT/Monitor mode.
BU-61590 UNIVERSAL ACE	BC/RT/MT	1.9 x 2.1 x 0.25" 78-Pin DDIP	Same as above, however, UNIVERSAL ACE supports all platforms using 1553 today with built-in Universal Transceivers.
BU-65550	PCMCIA BC/RT/MT	3.375 x 2.125" Type II	ACE based BC/RT/MT MIL-STD-1553B (Notice 2) dual redundant terminal; PCMCIA Type II module.
BU-65551			Ruggedized version with internal isolation transformers.
BUS-63100II Series Transceivers	Universal Transceiver and 1553 Transceivers	1.26 x 1.26 x 0.17" Hybrid or 36-Pin DDIP Hybrid	Universal Transceiver conforms to MIL-STD-1553A/B and McDonnell Douglas A-3818, A-5232, A-5232, A-4905, and A-5690. Dual redundant monolithic low power transceivers. Listed on MIL DWG No. 5962-87579. Conforms to MIL-STD-1553 A/B. High S/N ratio, internal filtering. Drives Harris 15530 directly. Complete isolation, including separate power and signal connections. SEAFAC tested. Eliminates non-standard part approval when specified by the Military Drawing number.
BUS-65153	Dual Redundant RTU (STIC)	70-Pin DDIP, Ceramic Package 1.9 x 1.0 x 0.2"	Complete dual redundant MIL-STD-1553A/B Notices 1 and 2 /1760. The Small Terminal Integrated Circuit (STIC) Remote Terminal, includes CMOS Protocol and BiPolar low-power MK II transceivers, timing control logic, and latchable RT address.
BUS-65142	Dual Redundant RTU	1.9 x 2.1 x 0.25" DDIP 1.6 x 2.2 x 0.17" Flat Pack	Complete dual redundant 1553 RT. Complete 1553 transceiver and protocol implementation, including mode codes, SEAFAC testing, and other high-rel applications.
BUS-65144			
BUS-61553	BC/RT/MT (AIM-HY)	1.9 x 2.1 x 0.25" DDIP 1.6 x 2.2 x 0.17" Flat Pack	BC/RT/MT with enhanced radiation hardness and screening for space, and other high-rel applications.
BU-65528	VME/VXI Bus Controller, RemoteTerminal or Bus Monitor	9.2 x 6.3 x 0.4" VME Eurocard	VME/VXI, 6U size card which supports all MIL-STD-1553 message formats mode codes; uses ACE protocol. This board can support 1, 2, 3 or 4 dual redundant and separate 1553 channels with VME/VXI interface.
BU-65527 (Militarized)			
BU-65539	IBM® PC AT RT/BC/MT	6.5 x 4.2" IBM PC Card	MIL-STD-1553B RT/BC/MT interface on an IBM PC AT half-size card; uses ACE protocol.
BUS-65517II BUS-65519 BUS-65520	IBM PC XT/AT Test and Simulation IDEA Cards	13.125 x 4.2" IBM PC Card	Full-size PC card. Simultaneously simulates a Bus Controller, an Active Monitor, and up to 31 remote terminals. Provides comprehensive error injection/detection. Fully dual redundant 1553A/B. Includes user-friendly menu-driven software. Optional C Pascal runtime libraries and menu-driven PTP production test, VTP validation test, and simulations card.
BUS-65518	IBM PC AT Half-Slot IDEA Card	6.5 x 4.2" IBM PC Card	Half-size PC card. Simultaneously simulates a Bus Controller, an Active Monitor, and up to 31 remote terminals. Provides comprehensive error injection/detection. Fully dual redundant 1553A/B. Includes user-friendly, menu-driven software. Optional C Pascal runtime libraries and menu-driven PTP production test, VTP validation test, and simulations card. Supports Windows 3.1X, '95 and NT.

NOTE: ALL TRADEMARKS USED HEREIN ARE THE PROPERTY OF THEIR RESPECTIVE OWNERS.

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PRIME PRODUCTS (contd.)

SOLID-STATE POWER CONTROLLERS

MODEL	TYPE	PACKAGE	DESCRIPTION/FEATURES
RP-210XX SSP-21116	Solid-State Power Controllers	2.74 x 1.34 x 0.33" DIP 2 x 3 x 0.33" DIP	The DDC 28 V and 270 VDC SSPCs replace electromechanical circuit breakers while offering solid-state reliability. 1-25 amps at 28 V and 1-15 amps for 270 V.
SSP-21120	Module	1.9 x 2.1 x 0.25" 78-Pin DDIP	The 28 V, 80 amp module replaces electromechanical circuit breakers while offering solid-state reliability.

DIGITAL-TO-ANALOG (D/A) CONVERTERS

MODEL	RESOL.	F.S. SETTLING TIME VOLTAGE	F.S. SETTLING TIME CURRENT	LINEARITY ERROR	PACKAGE	OPERATING TEMP. RANGE	POWER DISSIPATION	DESCRIPTION/FEATURES
DAC-02320	12 Bit	200 nsec	—	±1/2 LSB	24 Pin DDIP Hybrid	-55°C to +125°C	2.2 W	Deglitching D/A with 15 MHz update.
DAC-02306 DAC-02307	14 Bit	— 350 nsec	50 nsec —	±0.006% FSR	24-Pin DDIP Hybrid	-55°C to +125°C	1.8 W	Latched voltage DAC. Settles to ±0.05% FSR for a full scale step change in 350 nsec. High accuracy with low impedance voltage output.
DAC-02310	14 Bit	1.5 µsec.	—	±0.01% FSR	24-Pin DDIP Hybrid	-55°C to +125°C	1.7 W	14-bit deglitched D/A converter with 10 MHz update rate, and 50 mV-nsec differential glitch energy.

ANALOG-TO-DIGITAL (A/D) CONVERTERS

MODEL	RESOL.	CONVERSION TIME	LINEARITY ERROR	PACKAGE	OPERATING TEMP. RANGE	POWER DISSIPATION	DESCRIPTION/FEATURES
ADC-00300	12 Bit	500 nsec	±0.025% FSR	40-Pin TDIP Hybrid	-55°C to +125°C	3.0 W	2 MHz word rate; includes T/H and all timing circuits.

SAMPLE/HOLD AND TRACK/HOLD AMPLIFIERS

MODEL	ACQUISITION TIME (F.S. CHANGE)	LINEARITY ERROR	PACKAGE	APERTURE JITTER	DROOP RATE	OPERATING TEMP. RANGE	DESCRIPTION/FEATURES
THA-05203	150 nsec	±0.005% FSR	24-Pin DDIP Hybrid	100 psec	1.0 mV/µs	-55°C to +125°C	-74 dB feedthrough.

SYNCHRO INSTRUMENTS

MODEL	FUNCTION	RESOLUTION	ACCURACY	PACKAGE	DESCRIPTION/FEATURES
AP-30711/12	Angle Indicator	to 0.001°	to ±0.004°	1.7" High ('711) Panel 3.5" High('712) 1/2 Rack	Wide band 47-1200 Hz, automatic gain ranging, bit fault monitor, synthesized reference, programmable inputs, 0-360° or ±180°, IEEE-488 option.
SM-31210	Angle Simulator	to 0.001°	to ±0.003°	14.6 x 9.5 x 3.5" Instrument	Synchro or resolver angle simulator with high accuracy, wide band operation (47 Hz to 10 kHz). Front panel or remote I/O. Dynamic rate, auto stepping and IEEE-488.
SIM-36010	Synchro/ Resolver to16-Bit Simulator	to 16 Bits	to ±25 sec	Full-Size IBM PC Card	Capable of synchro or resolver output signals of either 11.8, 26, or 90 volts L-L at a drive of 1.5 VA. 26 or 115 Vrms reference inputs. Programmable dynamic rotation feature CW or CCW from 0.17°/sec up to 30.5 rps. External rate clock and direction inputs are provided for non-linear motion requirements. Demo software is available.
API-36005	Angle Indicator to 20 Bits	to 20 Bits	to ±18 sec	Full-Size IBM PC Card	Accepts synchro/resolver signals for 11.8, 26, or 90 volts L-L. Reference inputs of either 26 or 115 Vrms. Fully transformer isolated. Input frequency range of 360 Hz to 5000 Hz. Built-in single angle self-test feature for confidence testing.

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PRIME PRODUCTS (contd.)

SYNCHRO-TO-DIGITAL (S/D) & RESOLVER-TO-DIGITAL CONVERTERS

MODEL	RESOLUTION	ACCURACY	PACKAGE	TRACKING RATE	DESCRIPTION/FEATURES
RD-19230	10,12,14, or 16 Bit	To ±2.3 min.,	64-Pin Plastic Quad Flat Pack	To 1152 rps	Low-cost, industrial monolithic resolver-to-digital converter. Synthesized reference, built-in encoder emulation and other programmable features.
RDC-19220	10,12,14, or 16 Bit	To ±2.3 min.	44-Pin PLCC 0.7 x 0.7 x 0.2 40 Pin DDIP 2.0 x 0.6 x 0.2"	To 1152 rps	Low-cost, monolithic programmable resolver-digital and LVDT-to-digital converter with tach grade velocity output. Available in military and industrial models
SD-14550DX SD-14620DX	10 to 16 Bit	To ±1 min.	34-Pin 1.0 x 0.8 x 0.2" 54 Pin 1.5 x 0.8 x 0.2"	To 160 rps	Low-cost, small, one (SD-14550DX) and two (SD-14620DX) channel, +5-Volt-only, programmable resolution, BIT, quality velocity output, synchro and resolver inputs.
SDC-14560 SERIES	10 to 16 Bit	0.05% of F.S.	36-Pin DDIP	0.61 to 160 rps	Pin programmable for 10, 12, 14 or 16 bits of resolution. Features include velocity output to 0.25% linearity, BIT output, synthesized reference, and CT operation. Models for synchro or resolver inputs.
SD-15900	To 22 Bit	N/A	Plastic J-Lead or Ceramic PGA	N/A	Two-speed synchro or resolver combiner. Ratios of 1 x 4, 8, 16, 18, 32, 36 or 64.
SDC-14570/75 SDC-14600/05 SDC-14610/15	14 Bit/16 Bit	To ±2.3 min.	1.0 x 0.8 x 0.2" 28 Pin DDIP 36 Pin DDIP	To 10 rps	Small, low-cost, one, two and three channel synchro- or resolver-to-digital converters, with BIT or velocity outputs.
SDC-634A	14 Bit	To ±2.6 min.	2.6 x 3.1 x 0.4" Module	10 rps	Low profile (0.4) industry standard. All common inputs. Transformer isolated.
SDC-36016	10 to 16 Bit	To ±2.3 min.	Full-Size IBM PC Card	To 1200 rps	Synchro/resolver interface for IBM PC/XT/AT. Provides up to four channels of synchro and/or resolver and a high quality velocity output voltage. Also available as instrument-grade, angle position indicator - API-36005.

Note: Also available - VME/VXI component and instrument grade cards, dual and triple channel S/Ds, and multispeed converters.

DIGITAL-TO-SYNCHRO (D/S) & DIGITAL-TO-RESOLVER (D/R) CONVERTERS

MODEL	RESOLUTION	ACCURACY	PACKAGE	OUTPUT DRIVE	DESCRIPTION/FEATURES
DSC-10510	16 bit	±2 minutes	40-Pin TDIP	7 VA	High-power hybrid D/S with µP compatible latched input. Can be used for driving CT, CDX, and TR loads..
DRC-10520	16 bit	±1 minute	32-Pin TDIP	2 VA	High-power hybrid D/R with µP compatible latched input. AC or DC power amps. Protected output. BIT output.
DRC-11524	16 bit	±2 minute	36-Pin DDIP	15 mA	Pin-programmable synchro or resolver. Direct coupled for DC SIN/COS or rotating PPI applications, low ±2% scale factor variation.
DSC-36020	16 bit	To ±1 minute	Full-Size IBM PC Card	To 15 mA	Provides up to six channels of synchro and/or resolver outputs. Uses DSC-11524. Also available as instrument-grade synchro/resolver simulator, SIM-36010.
DSC-36022	14 bit	To ±4 minutes	Full-Size IBM PC Card	To 4.5 VA	Up to four channels of high-power, 1.5 to 4.5 VA, synchro or resolver outputs..
DSC-644	14 bit	±4 minutes	2.6 x 3.1 x 0.5" Module	1.5 VA	Low profile industry standard pinout. Metal heat sink, current limited and transient protected. Internal 400 Hz transformers. Low scale factor variation.
DSC-544	14 bit	±4 minutes	2.6 x 3.1 x 0.8" Module	4.5 VA	Powered from ref., metal heat sink, all internal transformers. Short-circuit and transient protected. Thermal cutoff.

BRUSH AND BRUSHLESS MOTOR DRIVES

MODEL	TYPE.	BREAKDOWN VOLTAGE	OUTPUT CURRENT	ON-RESISTANCE Vce Sat.	PACKAGE	DESCRIPTION/FEATURES
PWR-82330	N-Channel	100 V (drain/source)	5 A	0.10 ohms	2.6 x 1.4 x 0.25"	3-phase, low-power smart motor drive.
PWR-82331	N-Channel	200 V (drain/source)	30 A	0.11 ohms	3.0 x 2.1 x 0.39" Copper Flat Pack	3-phase, smart power motor drive with internal drive circuitry and power supply.
PWR-82340	N-Channel	200 V (drain/source)	30 A	0.11 ohms	3.0 x 2.1 x 0.39" Copper Flat Pack	Smart power brush motor drive with internal drive circuitry.
PWR-82341	N-Channel	100 V (drain/source)	5 A	0.10 ohms	1.8 x 1.4 x 0.25"	Low-power smart brush motor drive.
PWR-82333	IGBT	500 V	30 A	3.0 V	3.0 x 2.1 x 0.39" Copper Flat Pack	3-phase, high voltage motor drive with internal drive circuitry and power supply.
PWR-82342	IGBT	500 V	30 A	3.0 V	3.0 x 2.1 x 0.39" Copper Flat Pack	High-voltage brush motor drive with internal drive circuitry and power supply.
PWR-82520	N-Channel	100 V	10 A	0.1 ohms	2.6 x 1.4 x 0.25"	Complete 3-phase BLDC torque controller.
PWR-82332	N-Channel	400 V	19 A	0.25 ohms	3.0 x 2.3 x 0.395"	3-Phase radiation-tolerant motor drive for space (SSQ-22691).
PW-82351	IGBT	600 V	50 A	2.0 V	4.25 x 2.9 x 0.9"	3-Phase isolated motor drive with current sense, short circuit, power supply, commutation logic.

Note: Low and high power D/S or D/R card assemblies are available.

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PRIME PRODUCTS (contd.)

COMMERCIAL AVIONICS

MODEL	TYPE	PACKAGE	DESCRIPTION/FEATURES
DD-03182	ARINC 429 Line Driver	16-Pin DIP 0.785 x 0.291 x 0.180" 16-Pin SOIC 0.397 x 0.297 x 0.092" 28-Pin PLCC 0.490 x 0.490 x 0.175" 14-Pin SOIC 0.230 x 0.340 x 0.065"	The DD-03182 device is a line driver that receives ARINC 429 formatted data and transmits it on the ARINC 429 data bus. The device has short-circuit protection from aircraft power as well as programmable slew and data rate. It is a pin-for-pin alternate for the Harris/Holt components. DD-03182VP-201 available without fuse.
DD-03201	96-Channel Discrete-To-Digital Interface ASIC	1.1 x 1.1 x 0.1"	The DD-03201 device is a 96-channel discrete-to-digital interface ASIC that is incorporated in the DD-03296 device. All features are identical to the DD-03296 except for the HIRF isolated inputs.
DD-03282	ARINC 429 Transceiver	40-Pin DIP 2.05 x 0.52 x 0.20" 44-Pin PLCC 0.685 x 0.685 x 0.180" 44-Pin PQFP 0.537 x 0.537 x 0.093"	The DD-03282 device is a two-channel Rx and a one-channel Tx in accordance with ARINC Specification 429. It provides an interface between a standard avionics type serial digital data bus and 16-bit-wide digital data buses. It is a pin-for-pin alternate for the Harris/Holt components.
DD-03296	96-Channel Discrete-To-Digital Interface (HIRF Protection)	2.3 x 2.3 x 0.21"	The DD-03296 device is a 96-channel discrete-to-digital interface with universal HIRF-isolated inputs to handle 28 V/Open, Open/Gnd, and 28 V/Gnd signals. The device features built-in self-test, mismatch and bounce detection, fault isolation and tolerance. The output can either interface with an 8/16-bit microprocessor or to an ARINC 429 data bus.
DD-00429	ARINC 429 Microprocessor Interface	0.87 x 0.87 x 0.063"	The DD-00429 provides a complete and flexible interface between a microprocessor and an ARINC 429 data bus.
DD-42900	ARINC 429 Microprocessor Interface with Rx and Tx	64 Pin DIP or Flat Pack 2.000 x 2.600 x 0.137"	The DD-42900 device provides a complete and flexible interface between a microprocessor and an ARINC 429 data bus. It contains 4 Rx's, 2 Tx's and RAM/FIFO's. Chip Sets are also available.
DD-42916X SERIES	ARINC 429 VX Interface Modules	VXI B and C Size Cards	The DD-42916X Series devices are ARINC 429 VXI B or C size cards that contain 8 Rx channels and 8 programmable TX/Rx channels. Options include time stamping and data bus analyzer capacity.
DD-42940 SERIES	ARINC 429 PCMCIA Interface	PCMCIA TYPE II	The DD-42940 Series provides a Type II PCMCIA interface with 4 Rx and 0-2 Tx ARINC 429 channels.
DD-429XRP1/5 SERIES	ARINC 429 PC Interface Cards	Full-Size/Half-Size PC Cards	The DD-429XRP1 Series are full-size ARINC 429 PC cards that can be configured as either a 1 Tx + 2 Rx, 2 Tx + 4 Rx, 4 Tx + 4 Rx or 8 Tx + 4 Rx cards. The DD-429XRP5 Series are half-size 429 cards that can be configured as either a 1 Tx + 2 Rx or 2 Tx + 4 Rx cards. A "C" Library SW package and diagnostic SW is included with each card.
DD-42988V0-300	ARINC 429 VME Interface Cards	VME Card	The DD-42988V0 Card is an ARINC 429 VME card that contains 8 Rx channels and 8 programmable Tx/Rx channels. An on-board processor allows the users to perform sorting and manipulation of the raw ARINC 429 data without loading down the host processor.
DD-42988P1	ARINC 429 PC Interface card	Full-Size PC Card	The DD-42988P1 Card contains 8 low-speed Rx channels and 8 programmable Tx/Rx channels. Its on-board processor allows the user to perform data manipulation without loading down the host processor.
DD-42953/62/63	Software	31/2" Floppy Disk	The DD-42962/63 (PC) and DD-42953 (PCMCIA) Data Analyzer Software is a Windows-based package used to analyze and communicate on the ARINC 429 bus (supports Windows 95, NT).
DD-42904	Software	31/2" Floppy Disk	The DD-42904 software is compatible with the ARINC 429 Williamsburg protocol. This protocol is used for file transfers between airborne systems.
DD-42905/52	Software	31/2" Floppy Disk	The DD-42905 (PC) and DD-42952 (PCMCIA) ARINC 615 Data Loader Software is used for uploading data to airborne computers.
DD-62930 Series	ARINC 629 PC Interface Card	Full-Size PC Card	The DD-62930 series are single-channel cards that can be used for a simple communications card to a complete bus analysis tool.
DD-6294X SERIES	ARINC 629 VME/VXI Interface Modules	VME/VXI B and C Size Cards	The DD-6294X cards support one or two ARINC 629 Channels. It can be used for a simple communications card to a complete bus analysis tool.
DD-62991S0	Software	31/2" Floppy Disk	The DD-62991 Data Bus Analyzer Software is a Windows 3.1-based package that provides comprehensive 629 analysis including time tagging, filtering, triggering, error injection, as well as dynamic data transmission.

Contact DDC for other ARINC 429/629 software packages available. (Windows NT, LabView, LabWindows, Windows 95).

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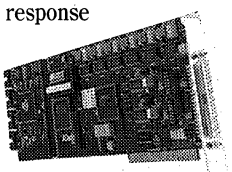

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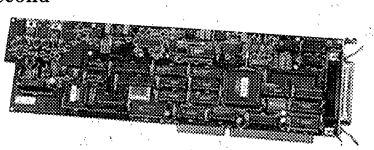

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24–96 TTL/NMOS/CMOS-compatible I/O lines

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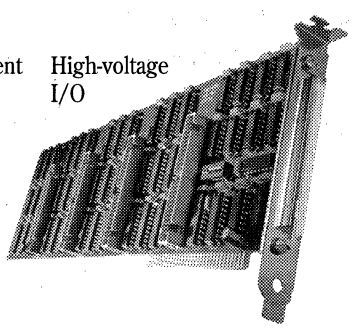

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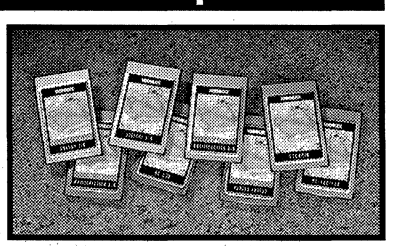

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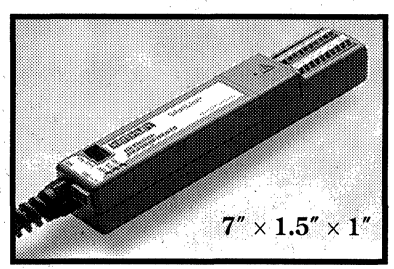

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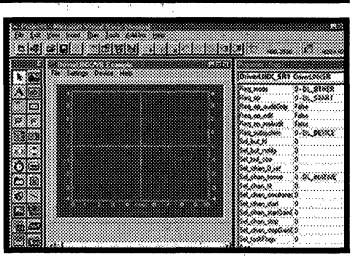

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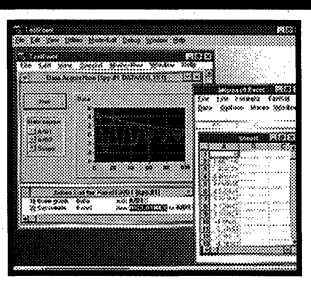

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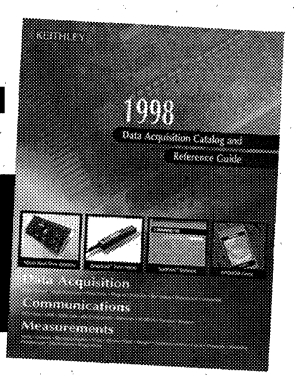

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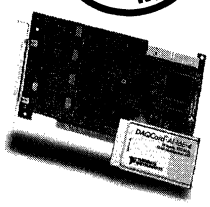

Widest Selection of PC Data Acquisition Available

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Product Family	Sample Rate	Input		Output		Digital I/O Lines	Starting Price*
		Channels	Bits	Channels	Bits		
6110E	5 MS/s	up to 4	12	2	16	8	$2,195
6070E	1.25 MS/s	up to 64	12	2	12	8	$1,795
6040E	500 kS/s	16	12	2	12	8	$995
6030E	100 kS/s	up to 64	16	2	12	8	$1,495
6020E	100 kS/s	16	12	2	12	up to 32	$795
6011E	20 kS/s	16	16	2	12	8	$995
1200	100 kS/s	8	12	2	12	24	$595
700	100 kS/s	16	12	–	–	16	$595

Digital I/O

Product Family	Maximum Rate	Lines	Range	Hand-Shaking	Pattern Generation	Pattern and Change Detection; Triggering	Starting Price*
6533	Up to 76 Mbytes/s	32	TTL	✓	✓	✓	$595
DIO-96	Static I/O	96	TTL	✓	–	–	$295
DIO-24	Static I/O	24	TTL	✓	–	–	$195
OPDIO-16	Optically isolated I/O	16	24 V	–	–	–	$245
ER-8/16	Relay I/O	8/16	250 Vrms 30 VDC	–	–	–	$495

Timing I/O

Product	Counters	Counter/Timer Rate	Resolution Bits	Digital I/O lines	Starting Price*
PC-TIO-10	10	7 MHz	16	16	$335

Analog Output

Product Family	Analog Outputs	Update Rate (S/s)	Resolution Bits	Range	Current Output Ranges	Digital I/O	Starting Price*
AO-6/10	6 or 10	300 k	12	±10, ±Vref, 0-10, 0-Vref	4 to 20 mA	8	$895
AO-2DC	2	–	12	±5, 0-10 V	0 to 20 mA	16	$325

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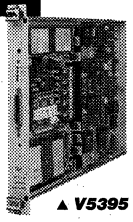
VXI Synchro/Resolver, LVDT/RVDT, D/A, AC Power Controllers

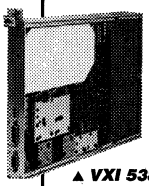
VXIbus Instruments on a "C" size card. Message based. "Plug & Play". All with wraparound self test.

SYNCHRO/RESOLVER-TO-DIGITAL/DIGITAL-TO-SYNCHRO/RESOLVER



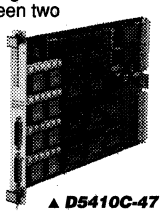
VXI 5395 Two Single Speed or One Two Speed S/D and D/S
Programmable for either single speed or dual speed inputs and outputs, 2.2 VA output, 20 bit resolution, 0.003° accuracy, 47 Hz-2 kHz frequency. Built-in 2.2 VA reference generator. Simulator can rotate to 1000°/sec, programmable ratios from 1:1 to 1:50. Transformer isolated.

▲ *V5395*



VXI 5390 One 0.001° S/D and Two 0.001° D/S Channels
Provides two programmable 0.001° synchro/resolver stimulus and one autoranging 0.001° synchro/resolver measurement channel. Stimulus can be programmed for CW or CCW rotation and for slewing between two angles.

▲ *VXI 5388*

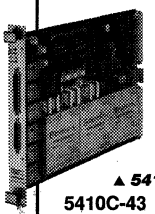


A5410C-30-1 One 0.001° S/D and Two 0.01° D/S Channels
Provides two programmable 0.01° synchro/resolver stimulus and one autoranging 0.001° synchro/resolver measurement channel. Transformer isolation.

▲ *D5410C-47*

VXI 5388 One 0.001° S/D and One 0.001°D/S Channel
Provides one programmable 0.001°synchro/resolver stimulus and one autoranging 0.001 synchro/resolver measurement channel. Stimulus can be programmed for CW or CCW rotation and for slewing between two angles. 47 Hz to 10 kHz.

5410C-56-1 ▶



D5410C-47 Eight Synchro/Resolver-to-Digital Channels
14 bit or 16 bit resolution. 3 arc minute accuracy. Scan capability to measure all channels at the same time. High-speed data transfer. Trigger capability. Transformer isolation.

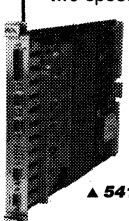
▲ *5410C-89*

5410C-43 Three Synchro/Resolver-to-Digital Channels
Programmable for either five individual or one single speed and two two-speed channels. Transformer isolation. 16 bit resolution. Two-speed accuracy to 2.5 arc seconds.

5410C-89 Three Synchro/Resolver-to-Digital and Three Digital-to-Synchro/Resolver Channels
Auto ranging measurement. 0083° measurement accuracy. .0055° stimulus accuracy. All D/S channels can be rotated. Trigger capability. High-speed data transfer. Transformer isolation.

D5410C-66 ▶

5410C-42 Seven Digital-to-Synchro/Resolver Channels
Programmable for either Seven individual or One single and Three two-speed channels. 16 bit resolution. 30 arc sec. accuracy. Programmable gear ratio (to 100:1) and speed of rotation. Trigger. High-speed data transfer. Transformer isolation.



5410C-113 One Synchro/Resolver Measurement & One Control Transformer Output
One 18 bit Synchro/Resolver Measurement and One 14 bit Control Transformer Channel. .0083° measurement accuracy. Transformer isolation.

▲ *5410C-55*

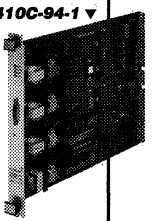
DIGITAL-TO-ANALOG

5410C-55 Twelve Digital-to-Analog Channels
16 bit resolution. Monotonic. Remote sensing. Trigger. 60 mA per channel, single output up to 410 mA. Either ±10 VDC or ±16.384.

5410C-57 Eight Isolated Digital-to-Analog Channels
16 bit resolution. Monotonic. Remote sensing. 50 mA per channel. Isolated outputs.

5410C-129-1 Eight Isolated Multiplying DACS
16 bit resolution. Monotonic. Remote sensing. 30 mA per channel. Programmable for either standard or multiplying mode.

5410C-94-1 ▼



POWER SUPPLIES & CONTROLLERS

5410C-60-1 AC Power Supply Controller
Provides one single phase and one three phase output. Programmable voltage, frequency (300-3500 Hz), current limiting and forty perturbations. DC input control. Phase locks with external supply. Transformer isolation. SCPI programming.

5410C-94-1 Programmable Power Supply; 2.5 VA per Channel
One oscillator source and four AC output channels with self test. Transformer isolation. Programmable voltage and frequency. 300 Hz to 3500 Hz. Meets IEEE-488.2. SCPI programming.

5410C-95-1 Programmable Power Supply; 2.5 VA to 30 VAC
Four separate AC output channels with self test. Transformer isolation. Programmable voltage and frequency. 300 Hz to 3500 Hz. Can be in-phase or out-of-phase with an external source. Meets IEEE-488.2. SCPI programming.

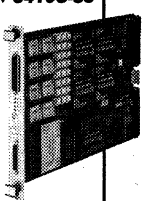
5410C-139 Programmable Power Supply; 2.5 VA to 115 VAC per Channel
Four separate AC output channels with self test. Transformer isolation. Programmable voltage and frequency. 300 Hz to 3500 Hz. Meets IEEE-488.2. SCPI programming.

5410C-121-REF 5VA Reference Supply
Stable and reliable transformer isolated reference source. Customer can specify any output voltage from 2.0 to 230 Vrms. 360 Hz to 10 kHz.

BROAD BAND AMPLIFIER

5410C-56-1 Four (4) Isolated Channels.
DC to 150 kHz. Gain programmable from 1 to 10. 90 Vp-p max. output voltage. Meets IEEE-488.2.

5410C-83 ▼



LVDT/RVDT MEASUREMENT & STIMULUS

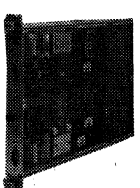
5410C-59 16 Channel LVDT/RVDT Stimulus
14 bit resolution. Transformer isolation. Ratiometric or absolute conversion.

5410C-83 8 Channel Differential Programmable LVDT/RVDT Stimulus
14 bit resolution. Output and excitation are programmable. Transformer isolation. Ratiometric conversion. Flat over 360 Hz to 20 kHz.

D5410C-66 16 Channel LVDT/RVDT Measurement
14 bit resolution. 0.15% FS accuracy. 360 Hz to 10 kHz. Ratiometric conversion. Scan capability to measure all selected channels at the same time. High speed data transfer. Trigger capability. Transformer isolation.

PHASE ANGLE VOLTMETER

VXI 227 Phase Angle Voltmeter - Wide Band (10 Hz to 100 kHz)
Isolated auto ranging inputs: 3 mV to 300 V. Measures Total, Fundamental, In-phase, Quadrature, Phase Angle and Ratio. 360° offset capability.



VXI 227 ▲

2nd HARMONIC FUEL FLOW SIGNAL CONDITIONER

5410C-148 Accepts the output from a second harmonic fuel flow transmitter and translates that information into a linear DC output. Single or dual channels.

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(See Volume D page D•1246 for Synchro/Resolver/LVDT/Instrumentation)

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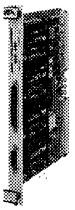
Many units are available with I/O at front panel or P2. All are single slot width & 160 mm deep, except as indicated.

SYNCHRO/RESOLVER-TO-DIGITAL (6U & 3U)

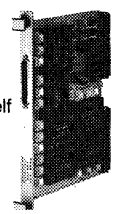
6112 Up to Twelve Single Speed or Six Multi Speed Syn/Rsl-to-Digital Channels w/5 VA Reference Supply
(Front Panel or P2 I/O) 10,12, 14, 16, or 22 bit resolution with up to 1152 rps tracking rate. Single speed accuracy to ±1 arc min. 50 Hz to 10 kHz. Transformer isolation. Auto phase Correction to ±45°. Wrap-around self test. 5 VA reference supply. Diagnostics. Latch feature. Can be configured as 12 individual channels or as 6 multi speed channels or any combination thereof. Ratios are any integer value from 1:1 to 256:1. Programmable 10, 12, 14 or 16 bit resolution to allow user to optimize resolution for higher tracking rates. Optional 22 bit resolution for dual speed mode.



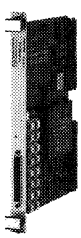
▲ *6108*

6108 Up to Eight Single Speed or Six Multi Speed Syn/Rsl-to-Digital Channels w/5 VA Reference Supply
(Front Panel or P2 I/O) 14, 16 or 22 bit resolution with up to 72 rps tracking rate. Single speed accuracy to ±2 arc minutes. 50 Hz to 10 kHz. Transformer isolation. Self test. Diagnostics. Velocity output. 5 VA Reference supply. Latch feature. Can be configured as 8 individual channels or as 4 multi-speed channels or any combination thereof. Ratios are any integer value from 1:1 to 127:1. Optional programmable 14 or 16 bit resolution. Optional 22 bit resolution for dual speed mode.

6106 Up to Six Syn/Rsl-to -Digital Channels with Linear DC Outputs & 5 VA Reference Supply
(Front Panel or P2 I/O) 14 or 16 bit resolution. Accuracy to ±2 arc minutes. 50 Hz to 10 kHz. Transformer isolation. Self test. Linear DC outputs proportional to Syn/Rsl angle with 0.1° accuracy and full range digital offset capability. Latch feature. Reference, signal and tracking loss detection. Optional 5 VA reference supply. Power selectable from either P1 or Front Panel.



▲ *5410C-61*



▲ *5410C-21*

5410C-21 Eight MUX Synchro/Resolver-to-Digital Channels
(Front Panel I/O)14 bit resolution. ±6 arc minute accuracy. 360 Hz to 2045 Hz. Transformer isolation. Self test.

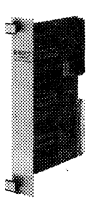
5410C-61 Up to Six Synchro/Resolver-to-Digital Channels with Velocity Output
(Front Panel or P2 I/O) 14 or 16 bit resolution with 25 rps tracking rate. Accuracy to ±3 arc minutes. 50 Hz to 10 kHz. Optional velocity output. Transformer isolation. Self test.

5410C-111 Four Synchro/Resolver-to-Digital with Velocity Output and Turns Counters
(Front Panel I/O)16 bit resolution with 25 rps tracking rate. ±3 arc minutes accuracy. 2 turns counters. 50 Hz to 10 kHz. Optional velocity outputs. Transformer isolation. Self test.

5410C-8 Three Synchro/Resolver-to-Digital Channels
(Double Slot) 16 bit resolution. ±40 arc seconds accuracy. 360 Hz to 2.5 kHz. Transformer isolation.

A5410C-16 Two Synchro/Resolver-to-Digital Channels with 5 VA Reference Supply
(Double Slot) 16 bit resolution. ±40 arc seconds accuracy. 360 Hz to 2.5 kHz. Transformer isolation.

5410C-91 Dual Two-Speed S/D with Reference Supply & Incremental (A & B) Outputs
(Front Panel I/O) 23 bit resolution. ±.067° accuracy. Transformer isolation. Self test.

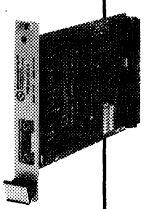


▲ *A5410C-16*

A5411C-5 Two Synchro/Resolver-to-Digital Channels
(Front Panel I/O) 14 or 16 bit resolution. To ±3 minute accuracy. 360 to 10 kHz. Transformer isolation. Self test. 3U Size.

DIGITAL-TO-SYNCHRO/RESOLVER (6U)

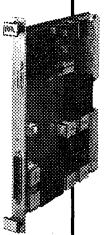
6208 Eight (1.2 VA) Digital-to-Synchro/Resolver Channels with 5 VA Reference Supply
(Front Panel or P2 I/O) 16 bit resolution. ±30 arc seconds accuracy. 360 Hz to 10 kHz. Short-circuit proof outputs. Transformer isolation. Wraparound self test. Optional 5 VA reference supply and user programmable two speed configuration.



▲ *5411C-5*

5410C-93 Up to Five Digital-to-Synchro/Resolver Channels with 1.2 VA Drive Capability
(Front Panel or P2 I/O) 16 bit resolution. ±4 arc minutes accuracy. 360 Hz to 10 kHz. Short-circuit proof outputs. Transformer isolation. Self test.

EK5410C-93 Up to Three D/S Channels with 5 VA Drive Capability to Drive Torque Receivers
(P2 I/O) 14 bit resolution. ±6 arc minutes accuracy. 360 Hz to 440 Hz. Short-circuit proof outputs. Transformer isolation. Self test.



5410C-93 ▶

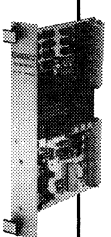
5410C-92 Up to Four Digital-to-Synchro/Resolver Channels with 1.2 VA Drive Capability
(Front Panel I/O) 16 bit resolution. ±1 arc minute accuracy. Short-circuit proof outputs. Self test. Transformer isolation.

5410C-35 Up to Four Digital-to-Synchro/Resolver Channels
(Front Panel I/O) 16 bit resolution. ±30 arc seconds accuracy. 360 Hz to 3 kHz. Short-circuit proof outputs. Transformer isolation. Self test.

5410C-15 Three 60 Hz Digital-to-Synchro/Resolver Channels with 1.2 VA Drive Capability
(Double Slot) 14 bit resolution. ±4 arc minutes accuracy. 50 Hz to 400 Hz. Short-circuit proof. Transformer isolation.

5410C-17 One High Power Synchro Driver (5 VA)
(Double Slot) 14 bit resolution. ±4 arc minute accuracy. Drives 3 TR's in parallel. Short-circuit proof. Wraparound. Self test.

5411C-15 One Digital-to-Synchro/Resolver Channel with 1.2 VA Drive Capability
(Double Slot) 14 bit resolution. ±6 arc minute accuracy. 60/400 Hz. Short-circuit proof. Transformer isolation. 3U Size.



5410C-17 ▲

5411C-16 Two Digital-to-Synchro/Resolver Channels
(Front Panel I/O) 16 bit resolution. ±2.5 arc minutes accuracy. 360 Hz to 10 kHz. Short-circuit proof. Transformer isolation. 3U Size.

DIGITAL-TO-SYN/RSL, SYN/RSL-TO-DIGITAL COMBINATION

6301 Four (1.2 VA) Digital-to-SYN/RSL Channels & Four SYN/RSL-to-Digital Channels with 5 VA Reference Supply
(Front Panel or P2 I/O) Stimulus Section: 16 bit resolution. ±30 arc seconds accuracy. 1.2 VA drive capability. Short-circuit proof outputs. 360 Hz to 10 kHz. Measurement Section: 10, 12, 14 or 16 bit resolution. Accuracy to 1 arc minute. 50 Hz to 10 kHz. Auto phase correction to ±45°. Latch feature. Programmable resolution to allow user to optimize resolution for higher tracking rates. Common: Transformer isolation, wraparound self test. Diagnostics to include reference, signal, and tracking loss detection. Optional 5 VA reference supply.

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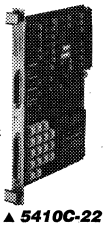
(See Volume D page D•1246 for Synchro/Resolver/LVDT/Instrumentation)

VMEbus Products / Commercial, MIL or Hi-Rel (con't)

Many units are available with I/O at either Front Panel or P2. All are single slot width and 160 mm deep, except as indicated.

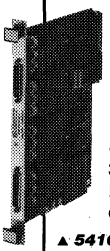
5410C-36 Two Digital-to-Synchro/Resolver Channels & One Synchro-to-Digital Channel
(Double Slot) Two 14 or 16 bit synchro output channels and one 14 or 16 bit input channel. Stimulus accuracy to ±1 arc minute. Measurement accuracy to ±40 arc seconds. 360 Hz to 2045 Hz. Transformer isolation. Self test.



▲ *5410C-22*

LVDT/RVDT MEASUREMENT & STIMULUS

5410C-22 Up to Sixteen Channel LVDT/RVDT Measurement with DC Outputs
(Front Panel I/O) 16 Multiplexed LVDT/RVDT Input Channels. 14 bit resolution. 2's complement or offset binary data format. DC outputs to drive strip chart recorders. 360 Hz to 5000 Hz. Transformer isolation. Self test.



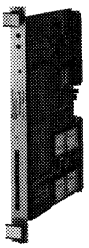
▲ *5410C-62*

6408 Eight Channel LVDT/RVDT Measurement with 5 VA Reference Supply
(Front Panel or P2 I/O) 14 bit resolution. 0.15% FS accuracy. 360 Hz to 10 kHz. Ratiometric conversion. Transformer isolation. Latch feature. Self test. Diff/Sum or Diff/Ref measurement capability. Optional 5 VA reference supply.

5410C-62 Up to 10 Channel LVDT/RVDT Ratiometric Stimulus
(Front Panel I/O) Ten LVDT/RVDT Stimulus channels. 14 bit resolution. 360 Hz to kHz. Transformer isolation.

D/A & A/D (6U)

5410C-44 ▶

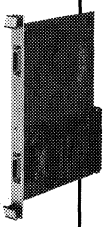


5410C-44 Six D/A & Eight MUX A/D Channels
(P2 I/O) 12 bit resolution. 1 µs slew rate. Wraparound self test.

5410C-104 Eight D/A & Eight MUX A/D Plus One Multiplying D/A
(P2 I/O) 12 bit resolution. 1 µs slew rate. Wraparound self test. 220 mm deep.

5410C-133 Eight Programmable 200 mA Current Sources
(Front Panel I/O)

REFERENCE/EXCITATION SUPPLIES



5410C-REF 5 VA Reference Supply. 2.0 to 115 Vrms (360 Hz to 10 kHz)
(Front Panel I/O) ±2% voltage tolerance, ±1% frequency tolerance. Single or dual supplies on one card 6U size.

5411C-REF 5 VA Reference Supply. 2.0 to 115 Vrms (360 Hz to 10 kHz)
(Front Panel I/O) ±2% voltage tolerance, ±1% frequency tolerance. 3U size.

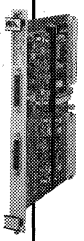
5410C-REF ▲

PULSE WIDTH MODULATED POWER AMPLIFIERS

5410C-112 Pulse Width Modulated Power Amplifier
(Front Panel or P2 I/O) Three high-reliability current controlled PWM amplifiers that drive brush or brushless DC motors. Three separate channels, 8A at 75 VDC. 6U x 4 HP x 220 mm deep.

SPECIAL PRODUCTS (6U)

5410C-158 Up to 32 Opto-Isolated, High Current, Solid State Switched Outputs
Up to 32 low side opto-isolated switched outputs with diagnostics. Short-circuit and transient protection. Short-circuit, open-circuit, over-temperature, fault and overload detection. Switch read-back state. Drive capability of 2 amps continuous @ 85°C.



5410C-75 Six Programmable Resistor Channels
(Front Panel or P2 I/O) Up to six programmable resistor output channels. Can be used to simulate resisitive transducers (e.g. thermocouple, TAT probe, etc.). Output is always a true resistor. 12 bit resolution. Various resistence ranges and wattages are available. Wraparound self-test.

5410C-158 ▶

5410C-103 Isolated Digital I/O. 28 Inputs, 16 Outputs
(P2 I/O) 220 mm deep.

5410C-105 Magnetostrictive
(P2 I/O) Accepts six Temposonics Inputs and converts that data into position and velocity information.

PCbus & PC/104

PCbus SYNCHRO/RESOLVER-TO-DIGITAL

7108 Eight Single Speed or Four Multi Speed Synchro/Resolver-to-Digital Channels with 5 VA Reference Supply
10, 12, 14, 16 or 22 bit resolution with up to 1152 rps tracking rate. Single speed accuracy to ±1 arc minute. 50 Hz to 10 kHz. Transformer isolation. Auto phase correction to ±45°. Self test. Diagnostics to include reference, signal and tracking loss detection. Latch feature. Can be configured as 8 individual channels or as 4 multi-speed channels or any combination thereof. Ratios are user programmable for any integer value from 1:1 to 255:1. Programmable 10, 12, 14 or 16 bit resolution to allow user to optimize resolution for higher tracking rates. 5 VA reference supply (optional). 22 bit resolution for two speed mode (optional).

5672C-2 Up to Six Synchro/Resolver-to-Digital Channels
14 or 16 bit resolution. Accuracy to ±3 arc minutes. 50 Hz to 10 kHz. Transformer isolated. Self test. Reference and signal loss detection.

PCbus DIGITAL-TO-SYNCHRO/RESOLVER

7208 Eight (1.2 VA) Digital-to-Synchro/Resolver Channels with 5 VA Reference Supply
16 bit resolution. ±30 arc second accuracy. 360 Hz to 10 kHz. Transformer isolated. Short-circuit proof outputs. Optional 5 VA reference supply, wraparound self test and user programmable two speed configuration.

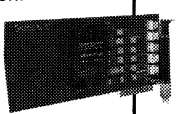
5691C Up to Six Digital-to-Synchro/Resolver Channels
16 bit resolution. ±2 arc minute accuracy. Transformer isolated. Reference loss detection. Optional wraparound self test.

5713C Up to Six (1.2 VA) Digital-to-Synchro/Resolver Channels
1.2 VA drive capability. 16 bit resolution. ±4 arc minutes accuracy. Transformer isolated. Optional wraparound self test. Reference loss detection.

▲ *5713C*

PCbus LVDT/RVDT MEASUREMENT AND STIMULUS

5672C-1 Up to Four Channels LVDT/RVDT Measurement
4 multiplexed LVDT/RVDT input channels. 12 bit resolution. Ratiometric conversion. Transformer isolated. Self test.



5692C Up to Ten Channels LVDT/RVDT Stimulus
14 bit resolution. 0.05% Full scale accuracy. Ratiometric conversion. Transformer isolated.

▲ *5672C-1*

PCbus REFERENCE/EXCITATION SUPPLY

5707C-REF 5 VA Reference/Excitation Supply
2.0 to 115 Vrms. 360 Hz to 10 kHz. ±2% Voltage tolerance. ±1% Frequency tolerance.

PC/104 MODULE SYNCHRO/RESOLVER-TO-DIGITAL

5718 Four Synchro/Resolver-to-Digital Channels
14 or 16 bit resolution. Accuracy to 3 arc minutes. 50 Hz to 10 kHz. Transformer isolated. Self test. Reference and signal loss detection.

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(See Volume D page D•1246 for Synchro/Resolver/LVDT/Instrumentation)

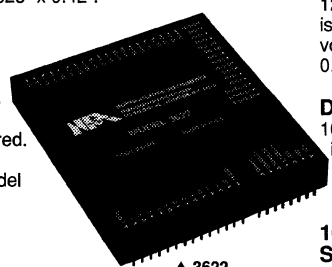
Synchro/Resolver Conversion Modules Commercial or Military

SYNCHRO/RESOLVER-TO-DIGITAL

3622 Six Separate Synchro/Resolver-to-Digital Channels
12,14 or 16 bit resolution. Accuracy to ±3 arc minutes. 47 Hz to 10 kHz. Separate reference inputs. Compact size: 2.5" x 2.8" x 0.39".

L1651 Synchro/Resolver-to-Digital Tracking Converter
12,14 or 16 bit resolution. Accuracy to ±3 arc minutes. 47 Hz to 10 kHz. Transformer isolation. No 180° latch-up. Optional velocity output. Low profile. Size: 3.125" x 2.625" x 0.42".

A1663 ±19.8 Arc Seconds Synchro/Resolver-to-Digital Tracking Converter
18 bits resolution. ±19.8 arc seconds accuracy. Transformer isolation. No 180° latch-up. No -15 V supply required. Accepts ±45° phase shift. Pin-for-pin replacement for the former Natel model SD570*XS and RD570*XS. Several frequencies and voltages available. Size: 4.625" x 3.125" x 1.0".

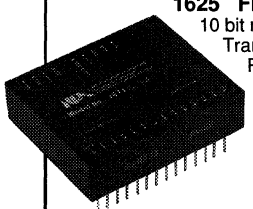


▲ 3622

E1661 ±40 Arc Seconds Synchro/Resolver-to-Digital Tracking Converter
16 bit resolution. ±40 arc seconds accuracy. Transformer isolation. Accepts ±45° phase shift. No 180° latch-up. No -15 V supply required. Several frequencies, voltages and enclosure types available. Size: 3.125" x 2.625" x 0.82".

1662 4 - Decade Synchro/Resolver-to-BCD Tracking Converter
0.1° (4 decade BCD) resolution. ±6 arc minutes accuracy. Transformer isolation. Either 0-359.9 or ±179.9 available. No 180° latch-up. No -15 V supply required. Several frequencies, voltages and enclosure types available. Size: 3.125" x 2.625" x 0.82".

1625 Flux Valve-to-Digital Converter
10 bit resolution. ±21 arc minutes accuracy. Transformer isolation. No -15 VDC required Reference voltage: 26 Vrms at 400 Hz. Signal input voltage: 52 mV to 375 mV @ 800 Hz. Size: 3.125" x 2.625" x 0.42".



▲ A1633

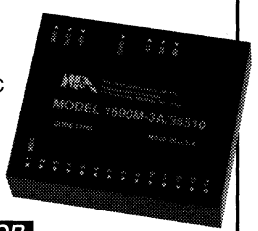
DIGITAL-TO-SYNCHRO/RESOLVER

1667 1.5 VA High Accuracy Digital-to-Synchro/Resolver Converter
16 bit resolution. Accuracy ±30 arc seconds NL; ±1 arc minute FL. Transformer isolation. Short-circuit protected output. Several frequencies, voltages and enclosure types available. Size: 3.125" x 3.625" x 1.25".

1673 1.5 VA Digital-to-Synchro/Resolver Converter
12 or 14 bit resolution. Accuracy to ±4 arc minutes. Transformer isolation. Short-circuit protected output. Several frequencies, voltages and enclosure types available. Size: 3.125" x 2.625" x 0.82".

D1673 1.5 VA Linear DC-to-Synchro/Resolver Converter
10 or 12 bit resolution. Accuracy to ±12 arc minutes. Transformer isolation. Short-circuit protected output. Several scale factors, frequencies, voltages and enclosure types available. Size: 3.125" x 3.625" x 0.82".

1690 60/400 Hz 2.0 VA Digital-to-Synchro Converter
Powered from the reference. No ±15 VDC or external transformer required. 14 bit resolution. ±4 arc minutes. Transformer isolated. 115 Vrms reference, 90 VL-L output. Size: 3.125" x 2.625" x 0.82".



▲ 1690M-3

PHASE SENSITIVE DEMODULATOR

9318 Dual Channel Phase Sensitive Demodulators
Accuracy and linearity ±.1% of full scale output. Input and reference are transformer isolated. Several frequencies, input and outputs available. Size: 3.25" x 1.90" x 0.50".

SYNCHRO/RESOLVER-TO-LINEAR DC

K678 Synchro/Resolver or Sin/Cosine-to-Linear DC Converter
Infinite resolution. Transformer isolation. Accuracy to ±6 arc minutes. Several scale factors, frequencies, voltages and enclosure types available. Output short circuit proof. Size: 3.125" x 2.625" x 0.5".

Synchro Booster Amplifiers

5173 75 VA Synchro Booster Amplifier
Infinite resolution. Accuracy ±1 arc minutes. Transformer isolation. Powered from 115 Vrms reference @ 50/400 Hz. Output 90 VL-L. KICK circuit. Will drive size 37 torque receivers (TR). Optional wraparound self test. Thermal and short circuit protected. Size: 15.50" x 4.50" x 3.50".

5586 75 VA Synchro Booster Amplifier (Replaces Electromechanical TORQSYN)
Infinite resolution. Accuracy ±1 arc minute. Transformer isolation. Powered from 115 Vrms reference @ 50/400 Hz. Output 90 VL-L. KICK circuit. Will drive passive loads such as Control Transformers (CT) and Control Differential Transmitters (CDX). Thermal and short-circuit protected. Size: 15.50" x 4.50" x 3.50"

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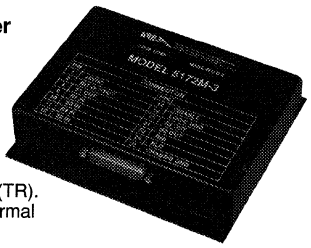
(See Volume D page D•1246 for Synchro/Resolver/LVDT/Instrumentation)

Synchro Booster Amplifiers Commercial or Military (Cont)

5172 25 VA Synchro Booster Amplifier
Infinite resolution. Accuracy ±3 arc minutes passive load, ±10 arc minutes active load. Transformer isolation. Powered from 115Vrms reference @ 50/400 Hz. Output 90 VL-L DISABLE, BITE and KICK circuits. Will drive torque receivers (TR). Optional wraparound self test. Thermal and short circuit protected.
Size: 7.25" x 5.09" x 2.55".


▲ 5172

5179 15 VA Synchro Booster Amplifier
Infinite resolution. Accuracy ±2 arc minutes. Transformer isolation. Powered from reference either 26 Vrms or 115 Vrms @ 400 Hz. Output 11.8 VL-L. Will drive passive loads such as Control Transformers (CT) and Control Differential Transmitters (CDX) Short circuit protected. Optional remote sense and wraparound self test. Size: 7.25" x 4.375" x 1.45".

5702 3 Channel 8 VA Synchro Booster Amplifier
Infinite resolution. Transformer isolation. Accuracy ±0.08° for Control Transformer (CT) loads and ±0.25° for Torque Receiver (TR) load. Channel 1 & 2 will drive CT's. Channel 3 will drive TR's. Transformer isolation. Powered from 115 Vrms reference @ 400 Hz. Output 11.8 VL-L. KICK and Built-in Test (BIT) circuits. Outputs are overload and short-circuit protected. Size: 9.85" x 6.60" x 2.80".

5564 6 VA Synchro Booster Amplifier
Infinite resolution. Accuracy ±6 arc minutes. Transformer isolation. Powered from 115 Vrms reference @ 400 Hz. Output 11.8 VL-L. KICK circuit. Will drive passive loads and one torque receiver. Short circuit protected. Size: 7.53" x 4.50" x 1.50".

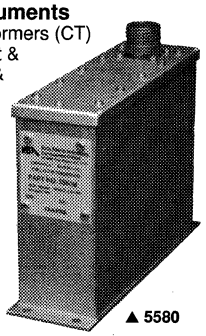
5649 9 Channel 5 VA Synchro Booster Amplifier
Infinite resolution. Transformer isolation. Accuracy ±0.25° for Control Transformer (CT) loads and ± 0.50° for Torque Receiver (TR) loads. Each channel 1-6 will drive up to 5 CT's. Each channels 7-9 will drive up to 3 size 15 TR's. Transformer isolation. Powered from 115 Vrms reference @ 400 Hz. Output 11.8 VL-L. KICK and Built-in Test (BIT) circuits. Outputs are overload and short-circuit protected. Size: 12.05" x 6.10" x 5.22".

5761 2 Channel Synchro Booster Amplifier
Infinite resolution. Accuracy ±0.25°. Transformer isolation. Powered from 26 Vrms reference @ 400 Hz. Output 11.8 VL-L. KICK circuit. Will drive passive and Torque Receiver (TR) loads. Short-circuit protected. Replaces two Litton servo repeaters P/N: 60100000-01. Size: 4.00" x 6.00" x 4.00".

ARINC 429 Modules

5181M-1PB ARINC 429 from ARINC 712. Digital ADF-to-Drive Synchro Instruments
Label 162. Will drive either Control Transformers (CT) or Torque Receivers (TR). Reference input & synchro output transformer isolated. Kick & damping circuits. Reverse polarity and short-circuit protected.
Size: 7.25" x 4.50" x 2.25".

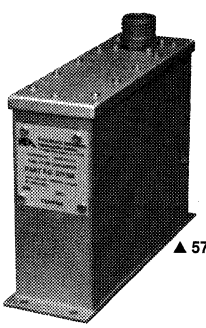
5568M DME Tuning Converter
This unit interfaces an ARINC 709 DME system with an ARINC 727 MLS and ARINC 410 or 568. Converts 2 out of 5 frequency format from ARINC 410 into ARINC 429 format.
Size 7.25" x 4.50" x 2.25".


▲ 5580

5580M Synchro Input from ARINC 570 ADF into ARINC 429 Serial Data
Label 162. Reference and signal transformer isolated. ±15 arc minutes accuracy.12 bit resolution. Loss of signal indication.
Size 7.375" x 5.109" x 2.125".

5674M ARINC 429 from ARINC 704 Digital IRU-to-Drive Synchro Instruments
Synchro output either Mag Heading (label 320) or Ture Heading (label 314). Discrete outputs. 12 bit resolution. ±30 arc minutes accuracy. Reference and synchro outputs transformer isolated. Reverse polarity and short-circuit protected. Size 9.25" x 5.62" x 2.25".

5749M ARINC 429 to Drive 3 Wheel Distance To Go Indicator
Label 001. Programmable for either high speed (100 kHz) or low speed (12.5 kHz). BCD-to-Three synchro outputs. Drives Torque Receivers (TR). Reference and synchro outputs transformer isolated. ±1° Accuracy. Loss of signal indicator. Short-circuit protected.
Size 8.00" x 6.75" x 3.24".


▲ 5749

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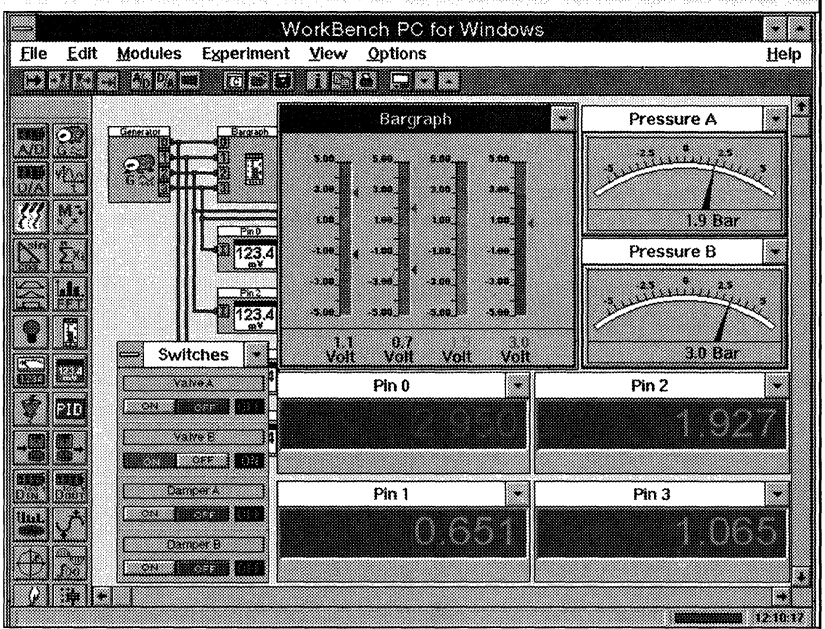
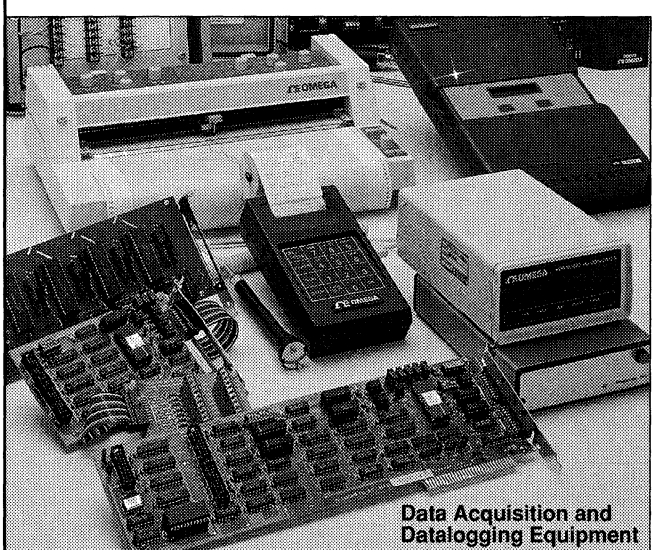


Data Acquisition and Analysis Software
Page D-6 21st Century.



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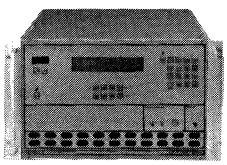

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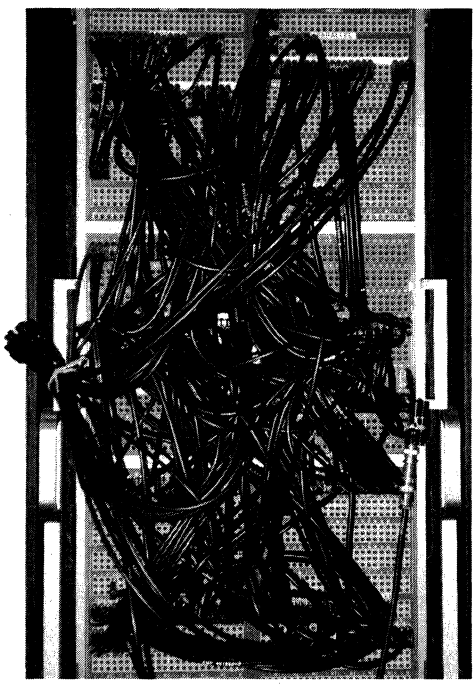

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VMA08 octal programmable amplifier. Provides eight low-noise amplifier channels in a convenient 6U VMEbus format. Programmable gain -12 dB to +72 dB. Each channel includes a 3-pole low pass filter suitable for band limiting and anti-aliasing for a sigma-delta A/D.

Auto Gain-Ranging Amplifiers

6201 automatic gain ranging AC amplifiers for acoustic signals with wide dynamic range.

Dual automatic gain ranging AC amplifier. Employs a low-noise differential input stage, band-limiting, and pre-whitening to condition wide-band, wide dynamic range AC signals. Up to 30 channels in a mainframe.

Low-level, Wide-band, AC

6104 quad low-noise AC differential preamplifier. –10 to 60 dB gain. Low-noise FET input with rolloff and filter.

Low-level, Wider-band, AC

6134 quad AC differential amplifier. –20 to 40 dB gain. 400 kHz BW.

Low-cost, Wide-band, DC

6114A quad DC post-amp. Provides additional gain after other signal conditioning modules. –9.9 to 60 dB gain.

Low-level, Low Frequency, DC

6124 quad DC preamplifier for low-Z source signals. 0 to 70 dB gain. Employs low-drift, low-noise, bi-polar input stage for measuring low-level low impedance sources.

Amplifier Options

- Calibration input, Output monitor
- Rolloff, pre-whitening
- Current sources for ICP transducers

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PRECISION FILTERS, INC.
CONDITIONERS • SWITCHES • DATA ACQUISITION • SYSTEMS

Introducing The Precision 27000 Signal Conditioning Wizard™

No other signal conditioning system gives you the power to..

Mix Transducers in a System.

The Precision 27000 makes it easy to manage a test with a mix of transducers. And unlike systems that require a dedicated rack for each type of sensor, the 27000 allows you to mix transducers for different test regimens and condition them all in a single system.

Choose strain, charge, voltage (filter amplifier), thermocouple, RTD, potentiometer, current, frequency, or other transducers. Enjoy the highest performance and flexibility for any test configuration.

Condition Signals for Immediate Data Conversion.

The Precision 27000 is data-acquisition ready with real anti-alias filters that condition signals for immediate data conversion. You get high-performance filters in each channel for 12 to 16-bit A/D resolution with cutoff frequencies from 0.1 Hz to 127.5 kHz and ± 1/2° phase match.

Manage Hundreds of Channels and a Mix of Sensors

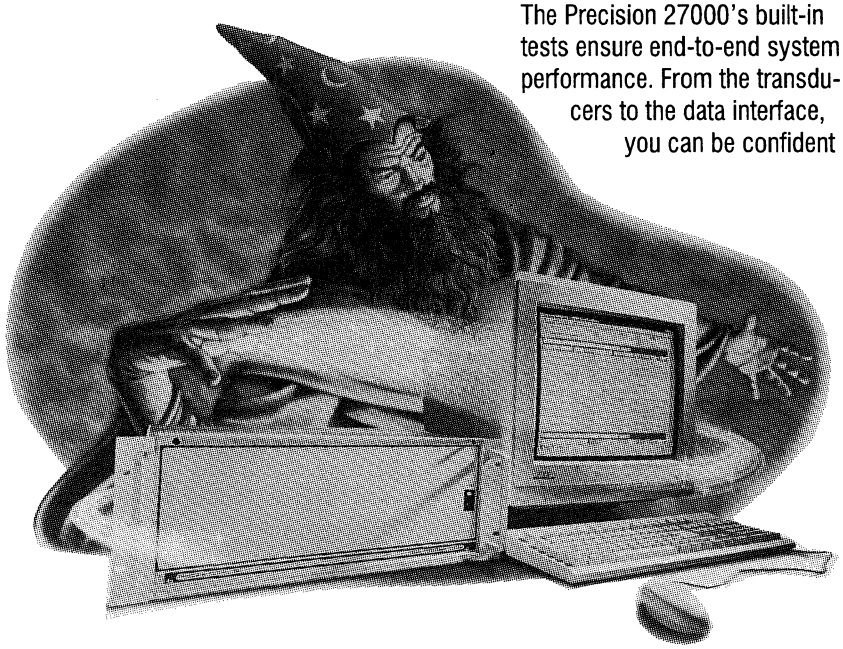
To manage so many signals, the Precision 27000 Signal Conditioning Wizard employs a management system of structured data bases, a graphical user interface (GUI) and a collection of algorithms. The Wizard's algorithms transmute tedious and complex engineering calculations into simple setup entries.

The GUI provides control panels for configuration, setup, operation and testing. And a variety of reports are available, including system status, self test results, and even cable lists.

You won't have to pore over filter plots to calculate the tradeoffs between cutoff frequency, sampling rate, and attenuation. The Wizard's algorithm does it for you, in the blink of an eye.

Assure System Integrity Before Performing Measurements.

The Precision 27000's built-in tests ensure end-to-end system performance. From the transducers to the data interface, you can be confident everything works properly before your test begins, so you get valid data. The test subsystem performs a Go/No-Go test with diagnostics prior to measurement, which reduces down time and test errors. You can generate calibration signals, measure performance, pinpoint problems, and check cabling and connections instantly. Each conditioner offers a test circuit optimized for the transducer type.



Reduce Life Cycle Costs.

The Precision 27000 offers built-in self-tests that can be performed throughout the life of the system. The Wizard's rigorous factory acceptance tests assure you that the 27000 meets your most stringent requirements for critical applications.

The tests are built-in, automatic, and fast; ready to earn a permanent place in your maintenance routine. Traceable to NIST, our built-in tests eliminate your need for off-site calibration, so you can concentrate on running your tests. That minimizes your time in the cal lab and saves you time and money over the life of the system.

Upgrade and Expand

The Wizard structured the 27000 for upgrading by employing a central controller with software to manage your databases, graphical user interface, and report generators. The Wizard is providing an ever-expanding family of Precision 27000 signal conditioning cards to meet your future requirements.

You can combine the Precision 27000 with the Precision 8600 DAServer data acquisition recording system and the Precision Programmable Patch for maximum system compatibility and savings.

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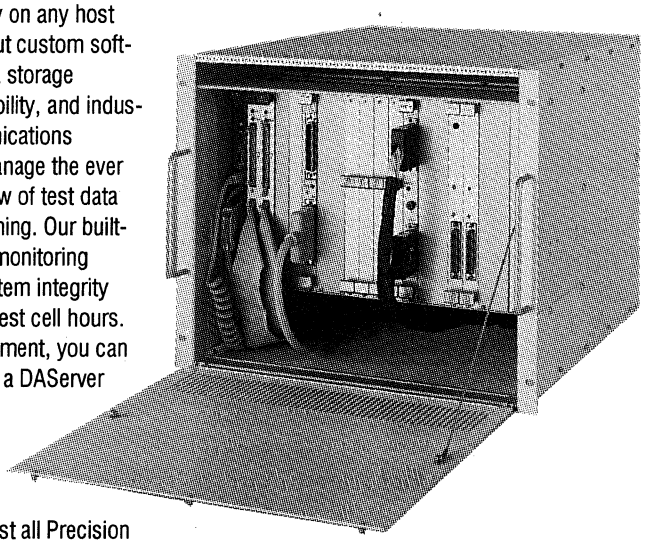
THE DAServer™ NETWORKED DATA ACQUISITION & RECORDING SYSTEM.

The Precision 8600 DAServer™ family of data acquisition and recording systems combines high performance A/D conversion and high channel density with integral large capacity data storage, full networking capability, a turn-key Graphical User Interface, and built-in self test capability.

The Precision Filters DAServer is your best choice for configuring today's advanced data acquisition systems. Our state-of-the-art A/D conversion subsystems provide you accurate, repeatable measurements. Our industry standard Graphical User Interface allows you to get up and running quickly on any host system or network, without custom software. Our high speed data storage options, network compatibility, and industry standard data communications interfaces allow you to manage the ever increasing volume and flow of test data without custom programming. Our built-in test and real time data monitoring facilities let you verify system integrity without wasting valuable test cell hours.

To preserve your investment, you can readily expand or upgrade a DAServer system as your test demands increase.

A new approach by Precision. A systems approach that can also host all Precision transducer conditioning, filtering and switching in one integrated system. All on a turnkey basis.



Your Best Choice for Handling Today's Data Acquisition Demands.

As test setups grow larger and more complex, test engineers need a better way to make more accurate and sensitive measurements and to handle the increased volume and flow of data.

They need to know that a test will run properly before valuable test cell hours are lost. And they need to get up and running quickly with assurance that all components of the test system will work together.

Precision Filters has developed the DAServer Data Acquisition and Recording System with these needs in mind. DAServer is the best choice for handling advanced data acquisition demands.

- Open networked architecture allows siting of signal conditioning, data acquisition, and real time data storage right at the test cell.
- State-of-the-art digitizers provide accurate, high resolution, repeatable data for reliable measurements.
- Integral data storage and high speed industry standard interfaces relieve the host computer/network from handling real time data.
- Graphical User Interface based on the industry standard X Window system is host platform independent.
- Built-in test and monitoring allow verification of system integrity at several levels—even while a test is running.
- Modular architecture is easily maintained, readily expandable and upgradable.

High Performance Digitizing

DAServer provides accurate 16-bit resolution digitizing from 100 kHz to several megahertz aggregate sampling rates. Many DAServer Digitizer Modules provide error correction to compensate for gain and offset errors in the signal path. And all allow the user to program every aspect of the data acquisition process.

On-Line Integral Data Storage

Precision Filters' DAServer offers a full range of high performance data storage facilities—from high speed RAM for transient tests to large capacity disk arrays and tape systems for large volumes.

Fixed and removable media are available, including optical media. You can even mix data storage options to form a test storage hierarchy.

Data Communications

While you can access test data over traditional interfaces (RS-232, SCSI, Ethernet network), the DAServer architecture also allows you to install higher speed point-to-point, bussed, and networked data transfer interfaces such as SCRAMnet, FDDI, and DEC DRxx.

Multi-Level Self Test

Full parametric factory acceptance test options verify that the system meets its operational specifications. Functional test options may be used to verify that the system is operating properly and to diagnose failures to the replaceable module level. Real time data monitoring/analysis facilities may be used to verify proper system operation while a test is running. These features serve to drastically reduce the occurrence of faulty test runs.

System Platforms

Standard platforms include 5-, 14- and 21-slot fully enclosed chassis with integral CPU/Controller and operating software.

- Ethernet with TCP/IP or DECnet, FTP, NFS
- Three async serial communication ports
- SCSI port

Graphical User Interface

DAServer provides an intuitive graphical user interface for configuring, operating and maintaining the system and attached Precision Filters instruments.

Any locally attached user, and any networked user with X Window Server capability, can access the user interface without custom software.

Refer to Section 2750 for more information about Precision Filters' Filter/Amplifier Systems

PRECISION FILTERS, INC.
CONDITIONERS • SWITCHES • DATA ACQUISITION • SYSTEMS

An Introduction to Preston Scientific and the Presys 1000 Data Conversion Systems

Analog to Digital Conversion Systems Including Digital to Analog Conversion Systems, Digital Input/Output Sub-Systems and Preston's Signal Conditioning & Instrumentation Amplifier

Here is a microprocessor-based data acquisition, simulation, and control system so flexible, so versatile, and so user friendly that it literally becomes all things to all users.

Multiple Functions

The PreSys 1000 chassis has 15 slots for thousands of possible card combinations: A/D conversion, D/A conversion, multiplexers, computer interfaces, FIFO memory expansion, diagnostics, chassis expansion logic, plus many others. And any card works in any slot!

Multiple Users

PreSys 1000 can handle up to six unique users, each with their own inputs, outputs, and internal processing. This makes the system ideal for use by individuals or teams in research and engineering applications.

Multiple Interfaces

PreSys 1000 can interface with any computer system used in the instrumentation field. Interface options include CSPI, DEC, VME, HP, DG, IEEE488, RS232, and SCSI 1/2.

If you want a data acquisition system you can configure to today's needs,with full scope for tomorrow's requirements, you want PreSys 1000. Request our informative, full-color brochure today.

Preston's PreSys 1000 Data Conversion Systems come in a wide variety of performance characteristics that feature Preston's quality-engineered construction, 13 to 16 bit resolution and high speed conversion with many other features and advantages.

ADC System

13 to 16 bit resolution featuring 1 MHz conversion rates*

ADC System

13 to 16 bit resolution featuring 500KHz conversion rates*

ADC System

13 to 16 bit resolution featuring 307KHz conversion rates*

Other System Features and Options

- Signal Conditioners...
- Amplifiers...
- Anti-aliasing Filters...
- Simultaneous Sample-and-Hold...
- Digital Inputs and Outputs...
- Digital-to-Analog Conversion...
- Computer Interfacing...
- Differential Interface...
- Optical Isolation...
- Pre-Trigger Functions...
- Expanded FIFO Memory...
- Event Counters 16 to 32 bits Programmable...
- Time Data Channel...

Also see: PreSys 2000 & 4000 Systems.
Increases system data rates from 2 to 4 times faster with same resolution and accuracy.

PRESTON

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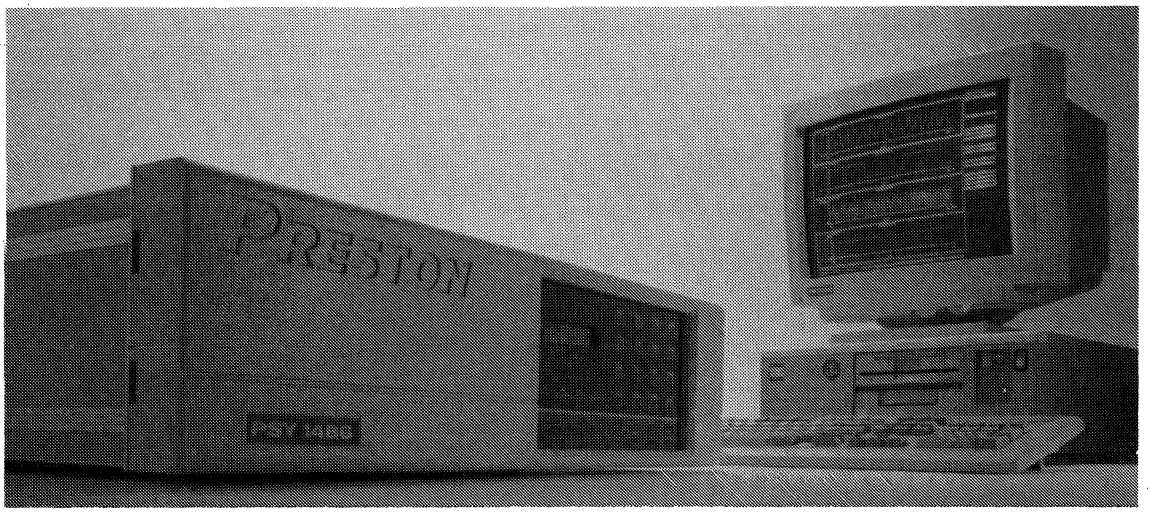
An Introduction to PRESYS 1000, 2000 and 4000 Data Conversion Systems



Here is a microprocessor-based data acquisiton, simulation and control system so flexible, so versatile and so user-friendly that it literally becomes all things to all users.

- **Multiple Functions**

  The PreSys 1000 chassis has 15 slots for thousands of card combinations: A/D & D/A conversion, analog & digital multiplexers, computer interfaces, FIFO memory expansion, diagnostics, chassis expansion logic, plus many others. Any card works in any slot!

- **Multiple Users**

  PreSys 1000 can handle up to six unique users, each with their own inputs, outputs, and internal processing. This makes the system ideal for use by individuals or teams in research and engineering applications.

- **Multiple Inputs**

  PreSys 1000 provides input signal multiplexers with up to 512 input channels per system. Choice of 7-inter-changeable A/D converters with resolution from 13 to 16 bits and channel conversions rate from 300khz to 1 mhz.

- **Multiple Interfaces**

  PreSys 1000 can interface with any computer system used in the instrumentation field. Interface options include Encore, DEC, VME, HP, DG, IEEE488 and SCSI.

PRESYS 2000 Data Acquisition System

Provides 2 or 4 parallel A/D Converters Resolution 12 to 16 Bits.

- Aggregate Conversion Rate up to 4 MHZ.
- Input channel configurations consisting of a choice of multiplexers plus other input and output options similar to PRESYS 1000.

  Some restrictions apply...each ADC must be scanning same number of channels at the same rate. There must be even number of channels selected. Channel composition for each ADC must be the same.

PRESYS 4000 Data Acquisition System

Multi-channel A/D and D/A conversion utilizing ADC (and DAC) modules, one per channel.

- Models are available with resolution and accuracy from 12 to 16 bits and conversion rates up to 1MHZ/channel.
- Composite system transfer rates up to 10MHZ is possible under limited conditions.
- Data transfer rates to computer interface at any data rate up to 5MHZ is possible using PRESYS 4000 squeeze-mode.

There is a lot more to the PRESYS 1000, 2000 & 4000 story. Obtain complete data sheet for each model and the various options from Preston Factory Sales Office. Also refer to section 1100 for Preston Amplifiers and Signal Conditioning Systems Page D•1019.

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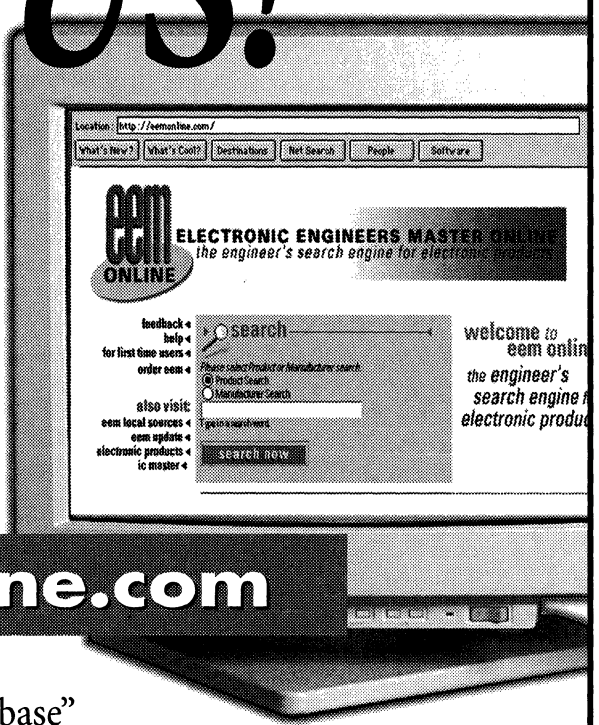

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  means... **Easy search of multiple products & companies**
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  means... **Faster search times and less time online**
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Universal Switching Corporation

Programmable Switching Systems and Modules

Product Line Applications

- RGB video or audio routing and distribution
- Uplink / Downlink switching, IF signal switching
- ATE test stations for routing test points to test equipment
- NTSC, PAL and Digital video switching
- Low noise antenna routing to HF receivers
- Airborne surveillance signal switching
- Radar X-Y-Z data, and radar video routing
- Telecommunication routing and broadcasting
- High speed '422, '232 and ECL data switching
- Switching inputs to network analyzers to UUT's
- Security video systems
- Distribution amplifiers and systems
- Instrumentation control and monitoring
- Environmental labs (shake and bake)

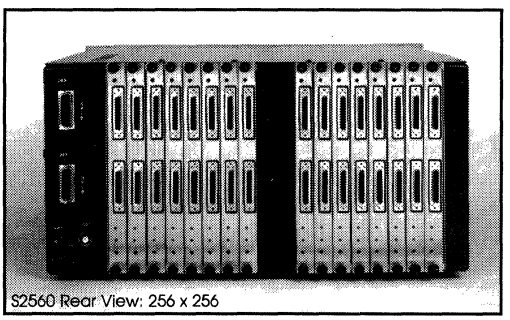
Visit Our Internet Web Site For The Latest: http://www.uswi.com

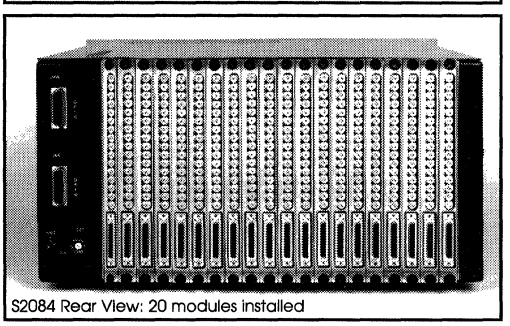
Flexible Switching Arrays

Systems covering DC to 1.3GHz
Configurations from 8 x 8, up to 512 x 512

Flexible, high performance and low cost switching arrays are available in off the shelf solutions from the following series of switching systems. They are all modular construction, thus field-modifiable by installing more or less plug-in modules into the system.

All systems are available with a combination of any two of the six remote interface types (GPIB, RS-232C, RS-422, RS-449, **USopti** fiber optic and Centronics, plus they include an embedded intelligent CPU with front panel display and intelligently backlit control keypad. LabVIEW drivers are also available upon request. Optional connector panels offer other connector types like BNC, "RJ", circular military type and many others.


S2560 Rear View: 256 x 256


S2084 Rear View: 20 modules installed

System S2560 Specifications

- Frequency range: .....DC to 6MHz (-3dB point)
- Max array size: .....256 input x 256 output, 512 x 512 with multiple units
- Min array size: .....32 input x 32 output
- Switching elements: .....Solid-state
- Signal connectors: .....High density SCSI II type (16 channels per), others optional

S2560 Features .....Low cost per crosspoint
Ultra high MTBF
Redundant Tri-Stage architecture
Over 13,000 crosspoints per vertical rack unit (RU)

System S6400 Specifications

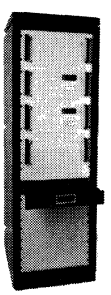
- Frequency range: .....DC to 50MHz (-3dB point)
- Max array size: .....64 input x 64 output, 128 x 128 with multiple units
- Min array size: .....8 input x 8 output
- Switching elements: .....Solid-state or relay based elements
- Signal connectors: .....BNC female, others are optional

S6400 Features .....Low cost per crosspoint
Ultra high MTBF
Redundant Tri-Stage architecture
Over 850 crosspoints per vertical rack unit (RU)

System S2084 Specifications

- Frequency range: .....DC to 1.3GHz (-3dB point)
- Configuration: .....1xN type switching and distribution amplifier system
- Max array size: .....680 x 32 (low frequency), dual 64x1 (high frequency)
- Switching elements: .....Solid-state or relay based elements
- Signal connectors: .....BNC female, SMA, SMB and multipin types

S2084 Features .....Low cost per crosspoint
Ultra high MTBF
Multiple module types in one mainframe


512 x 512 with path verification shown at left

Custom Systems

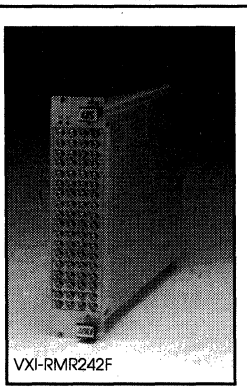
- Total system design
- Turn-key solutions using standard or modified equipment
- Special environmental tests
- Fast turn delivery
- Complete with equipment racks
- Firmware modifications to emulate other manufacturers control codes
- Special signal performance specifications or system peaking
- Special paint colors

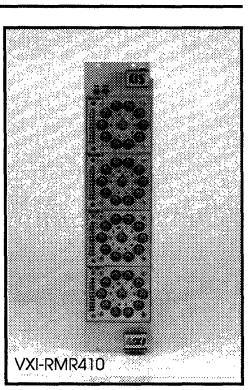
VXI-US® VXIbus Switching Modules

Register-based VXI modules for ATE

These version 1.4 VXI modules are designed for a number of switching applications including ATE, video and ECL equipment. Sizes are C1 or C2. Digital and analog.

Model	Size	Configuration
VXI-AS3216	C1	16x16 two wire analog switching array
VXI-D3216	C1	16x16 digital data switching array ('422 type)
VXI-AS4816	C1	32x16 two wire analog switching array
VXI-D4816	C1	32x16 digital data switching array ('422 type)
VXI-RRD51	C1	Two 1x4 coaxial relay sections with BNC connectors
VXI-R91	C1	1x8 coaxial relay section with BNC connectors
VXI-VRGB8	C2	8 in x 1 out RGB video selector (wideband)
VXI-RMR46	C2	Quad 1x6 relay sections, DC-18GHz, 26GHz, or 40GHz
VXI-RMR410	C2	Quad 1x10 relay sections, DC-18GHz
VXI-RMR242	C2	Twenty-four 1x2 relay sections (form C), DC-18GHz
VXI-E3216	C2	16x16 balanced digital ECL array (PECL available too)


VXI-RMR242F


VXI-RMR410

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Universal Switching Corporation

Programmable Switching Systems and Modules

USmod® Mainframe / Controllers

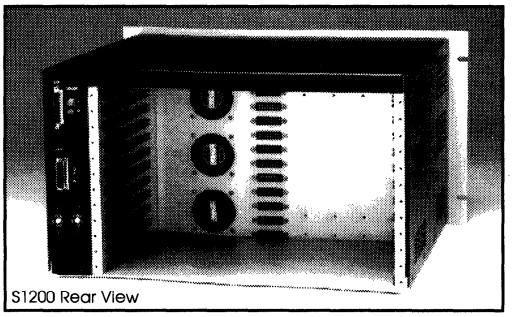
Series S200, S400, S600 and S1200 and S1600

Two, four, six, twelve and sixteen module slot positions

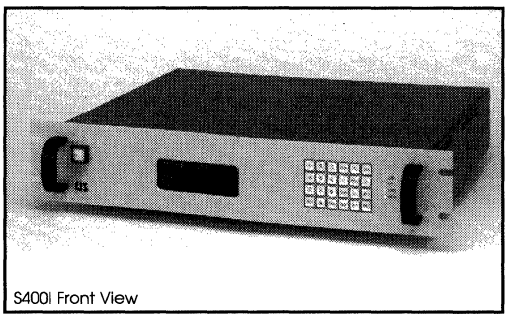
These units provide both power and control for any installed **USmod®** plug-in modules (shown below) in a compact and rugged rack mount package. Five different sizes allow you to select the ideal size for your application as well as providing for expansion in the future.

All units include power supplies and an embedded intelligent CPU. This CPU supervises all remote communication, switching module status and detection, plus power supply monitoring and error message handling. LabVIEW drivers are also available.

The S200 and S400 types have built-in remote interfaces with a choice of serial or GPIB. The S600, S1200 and S1600 types require an additional plug-in interface card (C600 Series) to add remote control. All serial interfaces include both RS-232C and RS-422A capability (except S200 type). Universal AC power requirements (85-265VAC, 47-440Hz) allow installation anywhere in the world including on board aircraft. Redundant CPU's and/or power supplies are available.



S1200 Rear View



S400I Front View

Series	Slots	Height	Depth	Display & Keypad	Built-in Interface	Interface Card Slots
S200RX	2	1.73"	14.5"	No	Serial	----
S400RX	4	3.47"	14.5"	No	Serial	----
S400IX	4	3.47"	14.5"	No	GPIB	----
S400R	4	3.47"	14.5"	Yes	Serial	----
S400I	4	3.47"	14.5"	Yes	GPIB	----
S600X	6	5.22"	14.5"	No	----	2
S600	6	5.22"	14.5"	Yes	----	2
S1200X	12	10.47"	14.5"	No	----	4
S1200	12	10.47"	14.5"	Yes	----	4
S1600X	16	12.23"	14.5"	No	----	4
S1600	16	12.23"	14.5"	Yes	----	4

USmod® Switching Modules

DC to 40GHz, 10uA to 90A

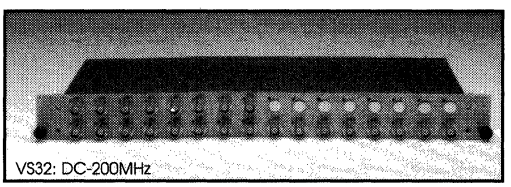
Configurations from 1 x 2, up to 48 x 48

High performance and low cost are among the key features of the **USmod®** switching modules. They are complete crosspoint switching arrays or 1xN configurations. Each module has its own characteristics and options. Both solid-state and relay based products are offered to meet most requirements. Modules are available with options for different signal connector types, impedances and built-in amplifiers (DC and AC coupled). Both blocking and non-blocking unity gain array types are available.

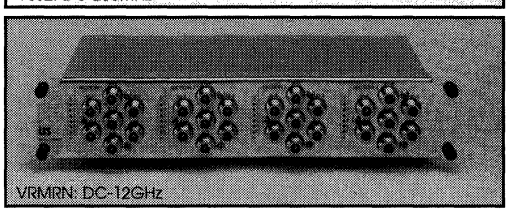
- *High reliability and ruggedness*
- *Choice of solid-state or relay based products*
- *Standard compact packaging*
- *Custom modules easily configured at the factory*
- *Low cost per crosspoint*

These modules are designed to plug into any **USmod®** compatible mainframe controller (shown above). The mainframe/controller supplies control and DC power. When installed into a mainframe/controller unit, the modules may be controlled via any industry standard remote control interface, or by the front panel controls.

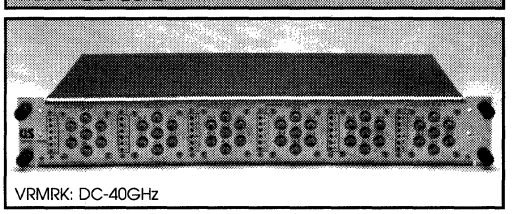
For quick identification, model numbers for solid-state modules begin with a **VS** designation, while the relay based products begin with a **VR** designation. The information shown here is in condensed form. For additional information, please call your sales engineer or the factory directly.



VS32: DC-200MHz



VRMRN: DC-12GHz



VRMRK: DC-40GHz

Series	Elements	Freq Range	Isolation(dB)	Impedance	Min Size	Max Size	Slots	Std Conn Type	Status LED's	Options *
VSP6	Solid-state	DC-400Hz	n/a	n/a	1x1	1x6	2	Terminal Lugs	Yes	10-90Amps
VSA64	Solid-state	DC-100kHz	>82 @ 10kHz	50, 75, 600, 10K	8x8	32x32	1	D-Type	No	C, A, I
VRATE32	Relay based	DC-1MHz	>70 @ 1MHz	50,75, 600	8x8	16x16	1	D-Type	No	C, A, I
VS32L	Solid-state	DC-30MHz	>50 @ 10MHz	50, 75	8x8	16x16	1 - 2	BNC	Yes	C, A, I
VS32	Solid-state	DC-200MHz	>70 @ 10MHz	50, 75	8x2	16x16	1 - 2	BNC	Yes	C, A, I
VS96	Solid-state	DC-300MHz	>75 @ 10MHz	50, 75	8x2	48x48	1 - 4	BNC	Yes	C, A, I
VRR16	Relay based	DC-1GHz	>45 @ 100MHz	50, 75	3, 1x4	1x16	1	BNC	Yes	C, A, I
VRMR	Relay based	DC-18GHz	>80 @ 4GHz	50	1, 1x2	6, 1x6	3	SMA	Yes	n/a
VRMRK	Relay based	DC-40GHz	>60 @ 18GHz	50	1, 1x3	6, 1x6	3	K-Type	Yes	n/a
VRMRN	Relay based	DC-12.4GHz	>80 @ 4GHz	50	1, 1x3	4, 1x6	4	N-Type	Yes	n/a
VSECL	Digital	1Gb/s	n/a	50 (differential)	8x8	16x16	2 or 4	SMA	No	C

*Many other modules are also available. * See full data sheet for options: C = connectors, A = amplifiers, I = impedance (in and out)*

State-of-the-Art Switching Solutions

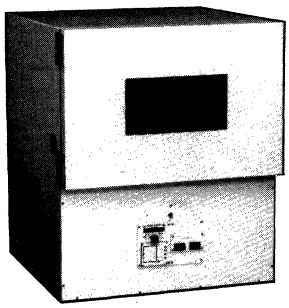
7145 Woodley Avenue ■ Van Nuys, CA 91406 USA ■ Phn (818) 785-0200 ■ Fax (818) 785-0680 ■ Email sales@uswi.com ■ Internet: http://www.uswi.com

Faster Thermal Testing

Sigma Systems Corporation

Chambers:

- ✔ Thermal cycling
- ✔ Burn In
- ✔ Cryogenically Cooled
- ✔ Mechanically Cooled
- ✔ Bench Top
- ✔ Custom

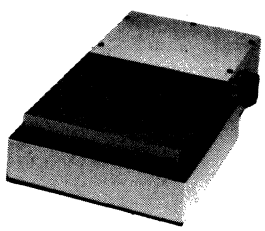


Features:

- ◆ Rugged Stainless Construction Inside & Out
- ◆ High Density Wall Insulation for Maximum Efficiency
- ◆ Precision Analog Zero Cross-over Optocouple PID Controller
- ◆ ±0.7°C Accuracy and ±0.1°C Stability
- ◆ Stagged Heat for Fast Ramps and Precise Control at Set Point
- ◆ Over Temperature Protection
- ◆ Sigma Systems Incomparable Warranty on Parts & Workmanship

Thermal Platforms:

- ✔ Thermal Cycling
- ✔ Parametric Testing
- ✔ Base Plate Heat Sink
- ✔ Flat Packaging Conditioning
- ✔ TWT Testing
- ✔ Live Load Probing



Features:

- ◆ High Grade Aluminum Platform with Custom Milled Expansion Cavity for Guaranteed Maximum Efficiency with Minimal Gradients
- ◆ Precision Analog Zero Cross-over Optocouple PID Controller
- ◆ LN_2 or LCO_2 Cooling for Rapid Ramp Rates
- ◆ Extra Flat Surface for Maximum Conductivity to UUT

Shock Chambers:

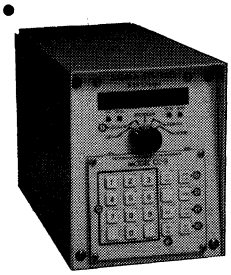
- ✔ Single Zone
- ✔ Cryogenically Cooled
- ✔ Meets Mil Spec 202, Method 107
- ✔ Bench Top or Larger
- ✔ Ramp Rates Up To 57°C/Minute
- ✔ Custom Sizes and Configurations Available

Features:

- ◆ Ultra Fast Ramp Rates, Both Hot and Cold
- ◆ Extra Thick Wall Insulation for Minimal Wall Losses and Maximum Efficiency
- ◆ No Mechanical Carriage to Break Down
- ◆ High Velocity Air Flow for Maximum Heat Transfer to or from UUT
- ◆ Sigma Systems Model CC-3 Programmable Controller

Controllers:

- ✔ Model C Provides Single Set Point Control
- ✔ Model CC-3 Programmable Controller/Interface
- ✔ Controls All Sigma Systems Products



Features:

- ◆ Lead Proportional and Lag Damping Control Strategy for Model C
- ◆ IEEE 488, RS 232 or Front Panel Input for Model CC-3
- ◆ Zero Crossover Optocoupled Circuitry for Suppressed Noise
- ◆ High Resolution Input for Greater Accuracy and Stability

Sigma Systems Corporation *3163 Adams Avenue, San Diego, CA 92116*

Sigma Systems Corporation

Faster Thermal Testing

Options:

- Door Window
- Shelves
- Cabling Apertures
- High Temperature (+300°C)
- Chart Recorders
- Dry Nitrogen Purge
- Custom Chambers are never a problem
- Cryogenic Boost on Mechanical Systems

Model	Ft^3 Capacity	Internal Dimensions	Ramp Down	Ramp Up	Cooling
M10	0.4	8.0"H x 10.0"W x 8.0"D	43°C/Min.	33°C/Min.	LN_2, LCO_2
M18	0.7	10.6"H x 10.6"W x 10.4"D	43°C/Min.	25°C/Min.	LN_2, LCO_2
M26	0.9	10.6"H x 14.5"W x 10.4"D	36°C/Min.	20°C/Min.	LN_2, LCO_2
M43	1.4	10.6"H x 19.5"W x 11.9"D	36°C/Min.	25°C/Min.	LN_2, LCO_2
M52	1.8	25.1"H x 10.5"W x 11.6"D	30°C/Min.	20°C/Min.	LN_2, LCO_2
Cycler	1.7	12.0"H x 19.5"W x 12.5"D	3°C/Min.	20°C/Min.	Mechanical
Super Cycler	2.9	14.0"H x 25.0"W x 14.5"D	5.5°C/Min.	18°C/Min.	Mechanical
M100	3.4	25.1"H x 20.3"W x 11.6"D	25°C/Min.	25°C/Min.	LN_2, LCO_2, Mechanical
M170	5.8	25.1"H x 20.3"W x 19.6"D	25°C/Min.	20°C/Min.	LN_2, LCO_2, Mechanical
M173	5.8	31.0"H x 21.0"W x 15.5"D	30°C/Min.	20°C/Min.	LN_2, LCO_2, Mechanical
M360	12.5	28.0"H x 28.0"W x 27.5"D	30°C/Min.	18°C/Min.	LN_2, LCO_2, Mechanical
M369	12.8	30.0"H x 25.0"W x 29.5"D	18°C/Min.	12.5°C/Min.	LN_2, LCO_2, Mechanical
M600	20.7	34.6"H x 35.0"W x 29.6"D	18°C/Min.	11°C/Min.	LN_2, LCO_2, Mechanical

Options:

- Platform Covers
- Dry Nitrogen Purge Assemblies
- Mechanical Refrigeration
- Threaded Inserts To Specification
- Platform Isolation

Model	Area, in^3	Plate Dimensions L x W	Ramp Rate	Heating Power	Cooling
TP48	6.1	1⅝" x 4⅝"	60-80°C/Min.	400 Watts	LN_2 Only
TP91	14.1	3¾" x 3¾"	60-80°C/Min.	600 Watts	LN_2 or LCO_2
TP294	45.6	6¾" x 6¾"	35°C/Min.	1540 Watts	LN_2 or LCO_2
TP781	121.0	11" x 11"	30°C/Min.	2700 Watts	LN_2 or LCO_2
TP944	132.0	11" x 12"	30°C/Min.	2700 Watts	LN_2 or LCO_2
TP870	135.0	6¾" x 25"	30°C/Min.	2700 Watts	LN_2 or LCO_2
TP1164	173.8	6¾" x 25¾"	30°C/Min.	2700/1540 Watts	LN_2 or LCO_2
TP2555	396.0	18" x 22"	20°C/Min.	4400 Watts	LN_2 or LCO_2

Options:

- Door Window
- Shelves
- Cabling Apertures
- High Temperature (+300°C)
- Chart Recorders
- Dry Nitrogen Purge
- Custom Configurations are never a problem

Model	Ft^3 Capacity	Internal Dimensions	Ramp Down	Ramp Up	Cooling
100S	3.4	25.1"H x 20.5"W x 11.6"D	50.0 °C/Min.	60.0 °C/Min.	LN_2
170S	5.8	25.1"H x 20.5"W x 19.6"D	42.8 °C/Min.	42.8 °C/Min.	LN_2
170SHP	5.8	25.1"H x 20.5"W x 19.6"D	57.0 °C/Min.	56.4 °C/Min.	LN_2
360S	12.5	28.0"H x 28.0"W x 27.5"D	32.0 °C/Min.	32.0 °C/Min.	LN_2

Options:

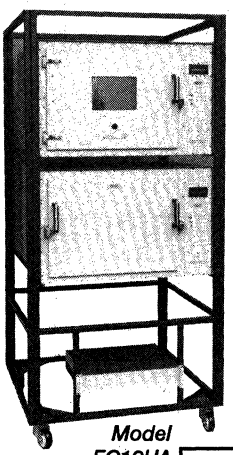
Model C:

- Digital Readout
- Voltage or Resistance Programming

Model CC-3:

- Rack Mounting
- Independent Failsafe

Model C Controller	Model CC-3 Controller
Zero Crossover, Opto-coupled Circuitry For Suppressed Noise	Zero Crossover, Opto-coupled Circuitry For Suppressed Noise
Lead Proportional, Lag Damping	Fully Adjustable PID Control

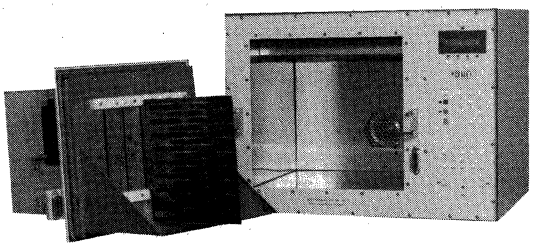


Model EC13HA

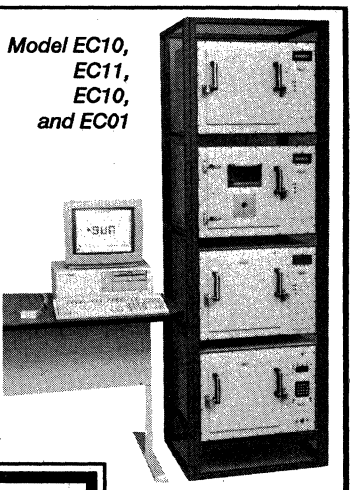
POWERFUL

enough for the most demanding automated test systems

Switching Matrix



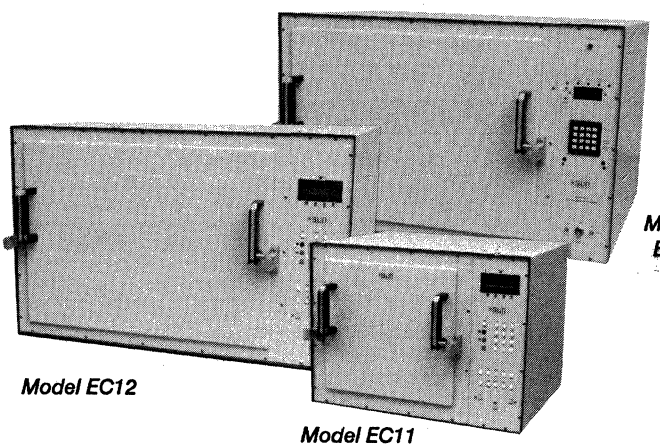
Model EC10, EC11, EC10, and EC01



QUIET

Zero voltage Switching

ENVIRONMENTAL TEST CHAMBERS



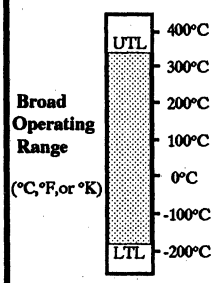
Model EC12

Model EC03

Model EC11

FAST

enough for **MIL STD 883** upto 1°C/sec



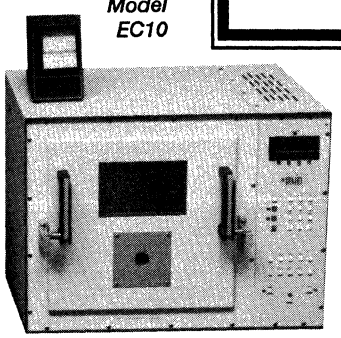
Broad Operating Range

(°C,°F,or °K)

OPTIONS:

- 3 Tank LCO_2 manifold
- Air cooled Chambers
- N_2 Gas Purge
- PC-based ATE Systems
- Carts, Racks, Fixturing
- LN_2 Auto Purge
- Switching Matrix

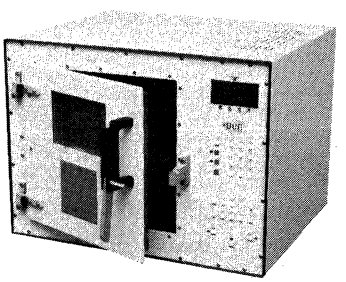
Model EC10



Features

- IEEE-488 & RS232
- Local Programming
- PID Algorithms
- 2 Year Warranty
- Engineering Support
- Competitive Pricing
- Fast Delivery
- Purchase or Rent
- Ramping
- User Probe
- Chart Outputs
- Menu Setups
- Digital User Port
- RS422
- Serial User Port
- Analog I/O

Model EC10

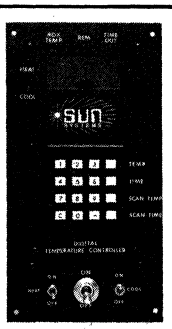


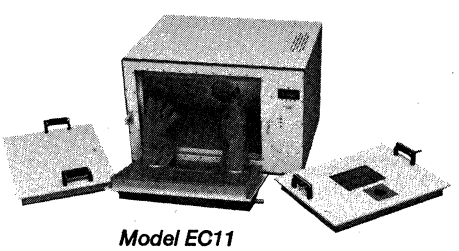
Retrofit ...

your existing temperature or temp/humidity chamber with:

IEEE-488

RS232, Programmability, and more.

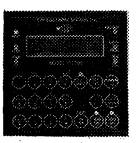




Model EC11

30 Day Free Trial

Other SUN SYSTEMS Products



1/4 DIN Controller

Sun Systems also designs and manufactures Temperature & Process Controllers and Temperature Probe Calibrators.

407 383 9400 Telephone

Sun Electronic Systems, Inc.
1900 Shepherd Drive, Titusville, Florida 32780

407 383 9412 Fax

EC Series Environmental Chambers

Model	EC0A	EC01	EC02	EC03	EC1A	EC10	EC11	EC12	EC13	EC13HA	EC16	EC16HA
List Price	$3150	$3500	$4650	$5100	$3900	$4300	$4600	$5450	$5900	$6750	$9700	$9950
Chamber Volume	0.37 ft³	0.7 ft³	2.2 ft³	3.0 ft³	0.37 ft³	0.7 ft³	0.7 ft³	2.2 ft³	3.0 ft³	3.0 ft³	6.16 ft³	6.16 ft³
Interior Dim. [Inches]	10.0 "W 8.0 "H 8.0 "D	12.0 "W 9.75"H 10.25"D	20.0"W 12.0"H 16.0"D	20.0"W 12.0"H 22.0"D	10.0"W 8.0"H 8.0"D	12.0 "W 9.75 "H 10.25 "D	12.0 "W 9.75 "H 10.25 "D	20.0 "W 12.0 "H 16.0 "D	20.0 "W 12.0 "H 22.0 "D	20.0 "W 12.0 "H 22.0 "D	22.0 "W 22.0 "H 22.0 "D	22.0 "W 22.0 "H 22.0 "D
Heat/Cool Rate of Change	30 °C/min	30 °C/min	15 °C/min	15 °C/min	30 °C/min	30 °C/min	60 °C/min	15 °C/min	15 °C/min	30 °C/min	24 °C/min	30 °C/min
Controller	MODEL TC01 (included in chamber price)				MODEL TC10 (included in chamber price)							
Temp. Setpoint Range	-73°C to +300°C in 0.1° Steps (LN_2 Option; -100°C to +300°C)				-73°C to +315°C in 0.1°C Steps (LN_2 Option: -184°C to +315°C)							
Time at Temp. Range	0.1 to 1800 minutes or Continuous (Optionally, 0.1 to 1800 hours)				1.0 sec to 99 hr 59 min 59 sec or Continuous							
Ramping Rate Control	Not controlled Locally				Locally Controlled from 0.01°C/min up to the Specified Heat/Cool Rate of Change							
Set Temps and Times	10 Programmable Set Temperatures and Times				Number of Set Temperatures and Set Times Limited Only By Available Program Memory. Typically 100+ Segments							
Temp Resolu-tion	0.1°C				0.02°C							
Temp. Loop Control	1 to 1800 Cycles of Programmable Set Temperatures and Set Times or Continuous				1 to 65,535 FOR/NEXT Loop Executions for 10 Loops, Nesting Supported							
Control Technique	PID Algorithm/Pulse Width Modulated, Programmable from Remote Interfaces				PID Algorithm / Pulse Width Modulated, Programmable from Keyboard or Remote Interfaces							
Local Operation	16 Keyboard / 4 Digit Display				29 Key Keyboard / 2 Line LCD							
Remote Operation	Built-in IEEE-488 / RS232 Interfaces				Built-in IEEE-488 / RS232 /RS422 Interfaces							
Additional I/O Capability	IEEE-488 to RS232 Transparent Mode, 2 Auxiliary Outputs, 1 Auxiliary Input				Electrically Isolated USER Temperature/Voltage Probe, 4 Channels of Analog Input and Analog Output, 16 Bit Address/8 Bit Data Parallel Port, 56 KBit Auxiliary High Speed Serial Port, IEEE-488 to RS232/RS422 Transparent Mode, 5 Auxiliary Outputs, 8 Auxiliary Inputs							
Safety Features	Open/Short Probe Detection, Adjust-able Over Temperature Thermostat, Software Upper Temperature Limit				Open/Short Probe Detection, Adjustable Over Temperature Thermostat, Software Upper and Lower Temperature Limit							

LabVIEW Drivers • Refrigerated & Expectorant Chambers • CE Approved

Visit our Website:www.sunelectronics.com E-mail:info@sunelectronics.com

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Sun Electronic Systems, Inc.
1900 Shepherd Drive, Titusville, Florida 32780

407 383 9412 Fax

CALIBRATORS, REFERENCES, STANDARDS, SOURCES

Manufacturer	Starting EEM Page No.	Model/ Series	DeviceType: Calibrator	Reference DC	Standard	Source	Parameters: Current AC	Current DC	Frequency	Phase Angle	Power	Resistance	Signal: Audio	Signal: Test	Thermal Voltage AC/DC	Voltage: AC	Voltage: AC (RMS)	Voltage: DC	Parameter Range From-To Units	Readout Features
Calibrators, Inc.	D•1196		√					√										√	100µV increments, 50µV graduations	Digital
Clarke-Hess Communication Research Corp.	D•1200	828	√				√	√								√	√	√	100µA-5A 0.1V-110V	Digital
		550			√					√									±360°, 0.001°	Digital, IEEE-488 compatible
		6000								√									0-360°, ±180°	Digital, IEEE-488 compatible
		8100	√		√	√	√	√											1Hz-100kHz .001°-360.00° 50mV-12-V	
Cytec Corp.	D•1204	All	√	√	√	√	√	√	√	√	√	√				√	√	√		Analog, digital, programmable, IEEE-488 compatible
Davis Instrument Manufacturing Company, Inc.	D•1205	Several	√	√	√	√	√	√	√	√	√	√								
General Scanning Recorder Products	D•1211																			Real-time recorders print simultaneous, multiple traces, data, and bit-mapped graphics
Global Specialties	D•1212	1332A						√										√	0-32V@5A	Digital
		1335						√										√	0-32V@3A	Digital
		1337						√										√	0-60V@2.5A	Digital
		1302B						√										√	0-32V@2A	Digital
		1504					√									√			0-150V@4A	Digital
		1505					√									√			0-260V@2A	Digital
GMW Associates	D•1213	860R, 861R	√				√	√	dc to 1KHz										40A to 10KA	Analog voltage output, 5ppm linearity, 50ppm absolute accuracy
IET Labs, Inc.	D•1218	HARS-X/-Q/-L	√		√							√							.001-10M	Digital
		HRRS	√		√							√							.01M-1100M	Digital
		PRS	√		√							√							0.01-100M RTD Simulator	Digital programmable, IEEE-488 compatible
		PRTD	√		√							√							0.001-1K RTD Simulator	Digital, programmable IEEE-488 compatible
		HATS-LR	√		√							√							1-100K	Digital, transfer std.
		HATS-Y	√		√							√							10K-100M	Digital, transfer std.
		SR	√		√							√							1-10,	Std. resistor
		KVD-600/700	√		√							√						√	Voltage divider	
		HACS	√		√														100pF-1µF	Digital, capacitance
		HACS-Z	√		√														1pF-100µF	Digital, capacitance
		PCS	√		√														100pF-100µF	Digital, capacitance, programmable, IEEE-488 compatible
		SC-900	√		√														0.02pF-110pF	Analog, prec. air cap
		SC																	100pF-10µF	Standard capacitor
		LS	√		√														1µH-100H	Digital, inductance
		PLS	√		√														1µH-100H	Digital, inductance, programmable, IEEE-488 compatible
		SL	√		√														100¨H-10H	Standard inductor
		V1-700	√	√		√												√	100µV-200V	Digital, programmable, IEEE-488 compatible
		HSVR		√														√	1V-19V,	
Keithley	D•1227	228A				√		√											100µA-10A	Digital, programmable
		248				√		√										√	0-5000VDC 0-5mA	IEEE-488 compatible
		220/224				√		√											500pA-100mA	
		236/237/238				√		√										√	100pA-1A 100µV-1100V	
		2400				√		√				√						√	5µV-210V 50pA-1A	
Krohn-Hite Corp.	D•1228	521	√					√										√	100nV-100V 10nA-100mA	
		522	√					√										√	100nV-100V 10nA-100mA	

CALIBRATORS, REFERENCES, STANDARDS, SOURCES (cont'd.)

Manufacturer	Starting EEM Page No.	Model/ Series	Device Type				Parameters												Parameter Range From-To Units	Readout Features
							Current						Signal			Voltage				
			Calibrator	Reference, DC	Standard	Source	AC	DC	Frequency	Phase Angle	Power	Resistance	Audio	Test	Thermal Voltage AC/DC	AC	AC (RMS)	DC		
Matrix Systems	D•1232																			RF/IF and Video/LF High voltage Digital Switching Matrices, Video and RF distribution amplifiers & converters
Nohau Corp.	D•1234	Micro-controller emulator		√		√													8 bit	
North Atlantic Instruments, Inc.	D•1246	540			√												√			Analog
		530			√												√		Angular position	Analog
		5200			√												√		Angular position	Analog
		213			√												√		.003-300Vms	Analog
		800/8500/ 8800			√												√		Angular position	
		5310			√												√		Angular position	Programmable
		5320			√												√		Angular position	Programmable
		2250								√							√			Digital, IEEE-488 Compatible
		VXI 5388			√												√			Programmable
		VXI 527								√							√		.003-300V	Programmable
		VXI 7836				√											√		Linear motion	Programmable
North Star Research Corporation	D•1247	PVM, PVD						√								√	√	√	up to 300kV	Voltage probes, voltage generators
Ohio Semitronics, Inc.	D•1248	PTP	√				√	√	√	√	√					√	√	√		Analog, DPM
Omega Engineering	D•1249																			
PPM Inc.	D•1250	RX	√		√							√								Digital, Programmable, IEEE-488 compatible
Programmed Test Sources	D•1251	PTSS-040-X10				√			√											
QuadTech, Inc.	D•1252	1433			√							√							10mΩ-11MΩ	
		1404			√														10, 100, 1000pF	
		1409			√														.001, .01, .1, 1 µF	
		1482			√														100µH-10H	
Ross Engineering Corp.	D•1257	VD			√											√		√	1-900KV DC-10MHz	
Valhalla Scientific	D•1264	2701C	√	√	√	√		√										√	200mV-1200V, 25mA; 120mA opt.	Digital, programmable, IEEE-488 compatible
																			1.2mV-120V 10Hz-100KHz	Digital, IEEE-488 compatible
		2703	√		√	√			√	√						√			1.2mV-120V 10Hz-100KHz	
		2705			√	√			√	√						√			1.2mV-1200V 10Hz-100KHz	
		2724A	√		√	√						√							0-11H; 5pS-120mA	Digital, IEEE-488 compatible
		2500	√				√	√											1µA-1A	
		2500EP	√				√	√											100µA-10A	Programmable; IEEE-488 compatible
		2575A	√			√	√	√											100A-1mA; .001-100	
Voltech, Inc.	D•1268	PM3000A					√	√	√	√	√	√				√	√	√	200 Apk & 2000 Vpk max.	Digital, programmable IEEE-488 compatible

INSULATION RESISTANCE TESTERS

Manufacturer	Starting EEM Page No.	Model/Series	No. of Digits	Maximum Readings					Accuracy (% Reading)	Remote Control	Type Display
				Voltage (V)		Current (A)					
				AC	DC	AC	DC	Resistance MΩ			
Avitrek Corporation	D•1194	944 Hipot/IR	4	5K	7K	35mA	35mA	100GΩ	1%	FPIB	LCD
Chatsworth Data Corp.	D•1197	400PC 400PC 400PC	4 4 4		1500 1500 1500			500ke to 5 GΩ >5 GΩ to 10 GΩ >10 GΩ to 65 GΩ	±5% ±10% ±20%		Digital Front Panel Meter
Cirris Systems Corp.	D•1198	1000Rt 1000Ht Touch 1	3 3 3		5.5 1000 1000		6.5mA 6.5mA 6.5mA	.1-5M .001-1000M .001-1000M	±4% ±4% ±4%	RS232 RS232	LCD LCD Graphical Touch Screen
Criterion Instruments LTD.	D•1203	BIRT-5000B			400-5K		350µA	1,000,000MΩ	1.5%	No	Analog
Davis Instrument Manufacturing Company, Inc.	D•1205	IRT2/ UN880125	4	0-200		0-200		0-200	±3%		Digital
Keithley	D•1227	6517	5 1/2		1000		20mA	200TΩ	.01%	IEEE-488, RS-232	VFD
QuadTech, Inc.	D•1252	1865 1864 1863	6		1000 1090 500		2mA 5mA 5mA	100TΩ 200TΩ 20TΩ	.5% 2% 2%	GPIB, PLC RS-232	LCD Analog Analog
Qualitec Technologies, Inc.	D•1254	ALL	4 1/2	5K	6K	25mA	200mA	1000	3%	√	Digital
Rod-L Electronics	D•1255	M-300, RT			500			400		√	Analog
Slaughter Div.	D•1261	205			500			1-20KMΩ	±10%		Analog

MEGOHMMETERS

Manufacturer	Starting EEM Page No.	Model/Series	No. of Digits	Maximum Readings					Accuracy (% Reading)	Remote Control	Type Display
				Voltage (V)		Current (A)					
				AC	DC	AC	DC	Resistance MΩ			
Avitrek Corporation	D•1194	944i	4	5K	7K	35mA	35mA	65,000MΩ	1.5%	GPIB	Digital-VFD
Chatsworth Data Corp.	D•1197	400PC 400PC 400PC	4 4 4		1500 1500 1500			500ke to 5 GΩ >5 GΩ to 10 GΩ >10 GΩ to 65 GΩ	±5% ±10% ±20%		Digital Front Panel Meter
Davis Instrument Manufacturing Company, Inc.	D•1205	918/5T00200	4	600	VAC			0-200	±2%		Digital
Omega Engineering	D•1249	CL 8300 Series	7	√	√	√	√	√	.01%	√	Digital
PPM, Inc.	D•1250	RIM-A	3.5		500			200,000	10		LCD
QuadTech, Inc.	D•1252	1865 1864 1863	6		1000 1090 500		2mA 5mA 5mA	100TΩ 200TΩ 20TΩ	.5% 2% 2%	GPIB, PLC RS-232	LCD Analog Analog
Qualitec Technologies, Inc.	D•1254	ALL	4 1/2	500	500	25mA	200mA	1000	3%	√	Digital
Slaughter Div.	D•1261	1727/205			50-1000V			1M-2000M	±10%	IEEE448, RS232	LCD

TEST SYSTEMS, COMPUTER CONTROLLED (ATEs)

Manufacturer	Starting EEM Page No.	Model/Series	Applications (passive/active components, EMI/RFI, power, ICs, etc.)	Modular, Stand alone	Compatibility (MS Dos, VXI, GPIB, etc.)	Programmable	Compliance/ Approvals
Chatsworth Data Corp.	D•1197	400PC	Automatic Cable and Harness Tester	Stand alone	MS Dos	√	
Cirris Systems Corp.	D•1198	CHt	Cables, Harnesses, Wired Assemblies		Windows 95, NT	√	ISO, CE
Cytec Corp.	D•1204	All	Switching Systems for ATE, Data acquisition and communications	Some	VXI, VME, GPIB, RS232, TFL, LAN		
Haefely Trench, Inc.	D•1216	PSURGE 4010 PSURGE 4 PSURGE 6 PEFT Jr. PLINE 1610 PHF 555	EMI/RFI Susceptibility EMI/RFI Susceptibility EMI/RFI Susceptibility EMI/RFI Susceptibilty EMI/RFI Susceptibility EMI/RFI Susceptibility	Stand alone Stand alone Stand alone Stand alone Stand alone Stand alone	MS Dos, Windows MS Dos, Windows MS Dos, Windows MS Dos, Windows MS Dos, Windows MS Dos, Windows	√ √ √ √ √ √	IEC 1000-4-5 IEC 1000-4-5 IEC 1000-4-5 IEC 1000-4-4 IEC 1000-4-11 IEC-3-2,3
Keithley	D•1227	7001, 7002	Component Test	Rick mount, Stand alone	MS Dos, GPIB	√	
Rod-L Electronics	D•1255	M1088		Modular	GPIB	√	
Schaffner EMC, Inc.	D•1259	6500/m100 INTEPRO 3000 NSG5000 NSG600 NSG650 6500/m1000 INTEPRO 3000 NSG 5000 NSG 1003/1005 NSG 650 Profline 1000 WIN 600 Powerstar	Power Supply ATE Power Supply ATE SAE EMC Power Line Transit Testing EMC Surge Testing Power Supply ATE Power Supply ATE Automotive transient testing (SAE) EMC Power Line transient testing EMC Surge Testing EMC Test Equipment EMC Immunity Power Supply	Modular Modular Modular Modular Stand alone Modular Modular Modular Modular Stand alone Modular Modular Modular	Windows, VXI, GPIB Windows, VXI, GPIB Windows, GPIB Windows, GPIB Windows, RS232 Windows, VXI, GPIB Windows, VXI, GPIB Windows, GPIB Windows, RS232 Windows, RS232 Windows, RS232 Windows, VXI, GPIB Windows, VXI, GPIB	√ √ √ √ √ √ √ √ √ √ √ √ √	IEC/ISO IEC/ISO IEC/ISO IEC/ISO IEC/ISO IEC/ISO IEC/ISO IEC/ISO IEC/ISO IEC/ISO IEC/ISO IEC/ISO IEC/ISO
Slaughter Div.	D•1261	1720, 1730, PC Pro	Wound Products	Stand alone	Windows 95	√	
Voltech, Inc.	D•1268	AT3600	Wound component tester	Stand alone	Windows, RS232	√	Traceable

FUNCTION GENERATORS

Manufacturer	Starting EEM Page No.	Model/Series	Frequency Range		Functions	Sweep
			From	To		
Avtech Electrosystems Limited	D•1195	AV-151	DC	1MHz	Sin, square, triple, DC, current-to-voltage, linear amplifier to ±500V	
Davis Instrument Manufacturing Company, Inc.	D•1205	3017A	0.2Hz	2MHz	Generates sine, triangle and square wave forms (0.2 to 2MHz, 7 ranges)	
Global Specialties	D•1212	2001 2002D 2003 PW2102 PW2105 PW2110 PW2120	0 0 0 0 0 0 0	100KHz 2MHz 1.6MHz 2MHz 5MHz 10MHz 20MHz	All models have 6 Digit Frequency Display, LCD Frequency Display/RS232 with Frequency Counter and AM/FM Modulation	√ √ √ √ √ √ √
Keithley	D•1227	3940	0	20MHz	Sine, square, triangle, burst, gated, arbitrary waves	AM/FM
Krohn-Hite Corp.	D•1228	1600A, 1400A 1200A, 5400C, 5920 ARB1000	0.0001Hz 0.0001Hz	10MHz 20MHz	Sine, square, triangle, pulse, burst, trig, gate, arb. Sine, square, triangle, pulse, burst, trig, gate, arb.	Linear, Log Linear, Log
National Instruments	D•1233	Virtual Bench-FG with Data acquisition board/card	2Hz	20kHz	Sine, square, triangle, ramp, & user definable waveforms	√
North Atlantic Instruments, Inc.	D•1246	5310 5330 530 5300	47Hz 47Hz 50Hz 47Hz	5KHz 10KHz 11KHz 20KHz	Synchro resolver simulator synchro resolver simulator Resolver synchro standard Resolver synchro standard	
PPM, Inc.	D•1250	DS-100	30Hz	200kHz	Accurate programmed freq. & amp.	

DIGITAL DELAY GENERATORS

Manufacturer	Starting EEM Page No.	Model/Series	Time Increments	Time Range (ns)	Trigger Rate (MHz)	Input Sensitivity (V)	Features		
							IEEE-488 Compatible	Programmable	BCD Input
PPM, Inc.	D•1250	EP-4	100µs	166 hrs		TTL			

DIGITAL MULTIMETERS, NOT HANDHELD

Manufacturer	Starting EEM Page No.	Model/Series	No. of Digits	Maximum Readings				Resistance MΩ	DC Accuracy (% Reading)	True RMS	Type of Display	Battery Operated	Plug-In	Remote Control (IEEE-488, RS-232)
				Voltage (V)		Current (A)								
				AC	DC	AC	DC							
Clarke-Hess Communication Research Corp.	D•1200	255 258 259 2330	4 4 4 5/6	1000 600 600 700	1000 600 700	7 50 7 10	7 7 10		.5% 1% 0.25% .1%	√ √ √ √	LED LED LED LED			IEEE-488 IEEE-488 IEEE-488 IEEE-488.2
Davis Instrument Manufacturing Company, Inc.	D•1205	82/FL193684	4 1/2		400mV-1000	45-200Hz		25-1,000,000	.1%	√	10.999	√		
IET Labs, Inc.	D•1218	IMF-	3 1/2	750	1000	2	2	1000	0.1	√	LED	√	√	
Keithley	D•1227	175A 197A 2000 2001 2002 2010	4 1/2 5 1/2 6 1/2 7 1/2 8 1/2 7 1/2	750 750 750 750 750 750	1000 1000 1000 1100 1100 1000	10 10 3A 2.1 2.1 3	10 10 3A 2.1 2.1 3	200M 220M 120 1GΩ 1GΩ 120M	.03% .011% .002% .0018% .0006% .0018%	√ √ √ √ √ √	Backlit LCD Backlit LCD VFD VFD VFD VFD	Option Option No	 Scanner Scanner Scanner Scanner	IEEE-488 Option IEEE-488 Option Both IEEE-488 IEEE-488 Both
Krohn-Hite Corp.	D•1228	5017 5018	7 1/2 7 1/2	700 700	1000 1000	2 2	2 2	30M 30M	4ppm 4PPM	Yes Yes	LCD LCD			Both Both
National Instruments	D•1233	Virtual Bench-DMM	4 1/2	10	10	Dep. on hard-ware	Dep. on hard-ware	Dep. on hard-ware	Dep. on hard-ware	Dep. on hard-ware				
North Atlantic Instruments, Inc.	D•1246	2250	5 1/2	500						√	LED			
Ohio Semitronics, Inc.	D•1248	AH Series					10K			√	LED		√	
Omega Engineering	D•1249	Various	to 6 1/2	√	√	√	√	√		√	Digital		√	√
QuadTech, Inc.	D•1252	7000	7					.10fF-10F .001nH-100H .0001mΩ-100MΩ	0.05%		LCD			GPIB, RS-232 PLC, Printer
Ross Engineering Corp.	D•1257	VMD2A	4 1/2	0-700	0-1000				0.01%	√	LCD	√		
Voltech, Inc.	D•1268	PM100 PM3300 PM3000A PM300	4 1/2	1KV	1KV	30A	30A		0.05%	√ √ √	Graphic	No	No	√

HANDHELD DIGITAL MULTIMETERS

Manufacturer	Starting EEM Page No.	Model/Series	No. of Digits	Maximum Readings				Resistance MΩ	DC Accuracy (% Reading)	True RMS	Type Display
				Voltage (V)		Current (A)					
				AC	DC	AC	DC				
Davis Instrument Manufacturing Company, Inc.	D•1205	33/FL192000	3 1/2			45-1000				√	
IET Labs, Inc.	D•1218	LCR-500 LOM 510A	4 4 1/2	√	√	√	√	√ 1µΩ resolution, 200Ω	√ .02%	√	LCD LCD
Omega Engineering	D•1249	HH, HHM Series	3 1/2	√	√	√	√	√	√	√	Paper
Ross Engineering Corp.	D•1257	VM- -D-	3 1/2 4 1/2	100KV 100KV	140KV 140KV				0.1% 0.1%		LCD LCD
Triplett Corporation	D•1262	9000-9030 9040 Visual Eyezor	3.5-3.75 3.75 3.75	750 750 600	1000 1000 600	10 10	10 10	20MΩ 40MΩ 4000K	0.5%+2 0.3%+5 0.25%+2	No Yes Yes	LCD LCD Heads-up

ANALOG MULTIMETERS, HANDHELD

Manufacturer	Starting EEM Page No.	Model/Series	Maximum Readings					DC Accuracy (% Reading)
			Voltage-AC	Voltage-DC	Current-AC	Current-DC	Resistance M	
Ross Engineering Corp.	D•1257	VM- -E-	100KV	140KV				2%
Triplett Corporation	D•1262	310	1200	1200	0.6	0.6	20M√	3%

ANALOG MULTIMETERS, NOT HANDHELD

Manufacturer	Starting EEM Page No.	Model/Series	Maximum Readings					DC Accuracy (% Reading)	Battery Operated	Plug-in
			Voltage-AC	Voltage-DC	Current-AC	Current-DC	Resistance M			
Jennings Technology Corp.	D•1226	J-1005	50/100K						√	
Sensitive Research Instruments	D•1260	901/904 400 Series						0.25% 0.75%		

PULSE GENERATORS

Manufacturer	Starting EEM Page No.	Model/Series	Frequency Range (Hz)		Optical Peak Power µW Pulse Amplitude (V)	Electronic	Optical
			From	To			
Avtech Electrosystems Limited	D•1195	AV Series	DC	250MHz	2V to 3000V	√	
Global Specialties	D•1212	4001	0	5MHz	.5V to 100 Amplitude	√	
Haefely Trench, Inc.	D•1216	PSURGE 4010 PSURGE 4 PSURGE 6	40 40 40	400 400 400	4.2 KV 4.2 KV 6.5KV	√ √ √	
National Instruments	D•1233	E Series PC-TIO-10	0.00596Hz 0.00153Hz	20MHz 5MHz	5V 5V		
Schaffner EMC, Inc.	D•1259	NSG1025, NSG625 NSG 650/651 NSG435 NSG435 NSG 2025/1025 NSG 605/651/2050 NSG432 NSG435		400MHz 1GHz 1GHz 400MHz 1GHz 1GHz	4400 6600 (High Energy) 16500 (ESD Testing) 25000 (ESD Testing) 8000 6600 (High Energy) 25000 (ESD Testing) 16500 (ESD Testing)	√ √ √ √ √ √ √ √	

HIPOT TESTERS (INSULATION, RESISTANCE & DIELECTRIC STRENGTH)

Manufacturer	Starting EEM Page No.	Indicators			Current Meter	Remote Control, Features	Power Source	Maximum Voltage	
		Audible	Visual Digital	Visual Analog				AC	DC
Associated Research, Inc.	D•1192	√	√		√	PLC, R5232, IEEE-488	115, 230 VAC	10,000	12,000
Avitrek Corporation	D•1194	√	√		√	Printout, Test Memory, GPIB	115/230VAC	6KV	10KV
Chatsworth Data Corp.	D•1197	√	√		√	Computer controlled	110-120 VAC	3000V	3000V
Cirris Systems Corp.	D•1198	√	√				115/230 VAC	1KV	1.5KV
Compliance West USA	D•1202					Test link & Custom options	120VAC input (240 optional)	500V	7200V
E. D. & D.	D•1208		√				120V and 240V Plugs	3000V	4250V
Jennings Technology Corp.	D•1226			√	√	Separate control	105-125V AC RMS box	70 kV Max	
QuadTech, Inc.	D•1252	√	√		√	GPIB, RS232, PLC	115/230 VAC, 47-63Hz	5kV	6kV
Qualitec Technologies, Inc.	D•1254	√	√		√	Yes	ALL	5KVAC	6KVDC
ROD-L Electronics, Inc.	D•1255	√	√	√	√	IEEE-488	AC and DC		
Ross Engineering Corp.	D•1257	√	√		√		115V AC	50KV	70KV
Schaffner EMC, Inc.	D•1259	√		√	√	√	115/230VAC	6KV	12KV
Slaughter Div.	D•1261	√	√	√	√	PC-based, IEEE-488, RS232	120VAC	5KV	5KV

MAGNETIC TEST EQUIPMENT

Manufacturer	Starting EEM Page No.	Type of Equipment	Range (Gauss)	Input Voltage (V) AC	Input Voltage (V) DC	Output Current (A) AC	Output Current (A) DC	Noise (Hz)	Accuracy (% Reading)	Readout Analog Digital	Type Display
Davis Instrument Manufacturing Company, Inc.	D•1205	IMG4D/ WS94201	100						± .1 Gauss	Digital	
F. W. Bell	D•1210	9950	3G-3MG						0.075%	Analog, IEEE-488 & RS-232	Electroluminescent
		9640	0.1G-30kG						0.3%	Analog only	Meter
		9550	3G-300kG						0.1%	Analog, IEEE-488 & RS232	Electroluminescent
		9200	20G-200kG						0.5%	Analog, RS-232	LCD
		5000	200G-30kG						1%	Analog, RS-232, (5080 only)	LCD
		4000	0.1G-2G						1%	Analog (4090 only)	LCD
GMW Associates	D•1213	Fluxgate (1-Axis)	2G & 20G						0.1%	Digital/analog	LCD
		Fluxgate (3-Axis)	1G & 10G						0.1%	Analog, dc to 3KHz	
		Hall (1-Axis)	300G-30KG						0.03% & 0.01%	Digital/analog,	RS232, IEEE-488
		Hall (3-Axis)	200G-20KG						2%	Digital, RS232	LCD
		Hall (1,2,3 Axis)	20KG						0.1%-0.01%	Analog, DC to 10KHz	
		NMR (high precision)	to 136KG						5ppm	Digital, RS232 & IEEE-488	LED
Lake Shore Cryotronics, Inc.	D•1229	480Gaussmeter	300mG 300kG						±0.10%	Digital 5 3/4	Vacuum Flourescent Display
		450Gaussmeter	300mG 300kG						±0.10%	Digital 5 3/4	Vacuum Flourescent
		420Gaussmeter	300mG 300kG						±0.45%	Digital 3 3/4	LCD
		410Gaussmeter	200G, 2kG 20kG						±2%	Digital 3 1/2	LCD
		Fluxmeters Hall Probes	300G 300kG								Over 40 standard probes available
		Vibrating Sample Magnetomer	0-12 Tesla						2% of reading ±0.2% of Full Scale		
		Magnetic Power Supplies					=125ADC				

MAGNETIC TEST EQUIPMENT (cont'd.)

Manufacturer	Starting EEM Page No.	Type of Equipment	Range (Gauss)	Input Voltage (V) AC	Input Voltage (V) DC	Output Current (A) AC	Output Current (A) DC	Noise (Hz)	Accuracy (% Reading)	Readout Analog/ Digital	Type Display
Lake Shore Cryotronics, Inc.	D•1229	Lab. Electro-magnets Hall Effect Meas. System AC Suscepto-meter/DC Magnetometer									
Magnetic Instrumentation, Inc.	D•1230	Gauss & Fluxmeter	to 100kG	115/230			±1V		0.50%	Digital	Digital
Magnos	D•1231	Field Monitor	20 KG						.25%	Analog/Digital	LCD optional
Schaffner EMC, Inc.	D•1259	NSR8010 NSR8030 NSR8051 NSR9000	9kHz-30MHz 30MHz-1GHz 20Hz-3GHz 9kHz-1GHz							Digital/graphical Digital/graphical Digital Digital/graphical	LCD/CRT LCD/CRT LCD CRT
Walker Scientific	D•1269	Gaussmeters Fluxmeters Magnetometers Field Monitors Reference Magnets Hysteresisgraphs Regulated power Supplies Electromagnet Systems Solenoids Helmholtz Coils Magnet Chargers Conditioners Ion-Optics/ Beam Electro-magnets									

PASSIVE LOADS

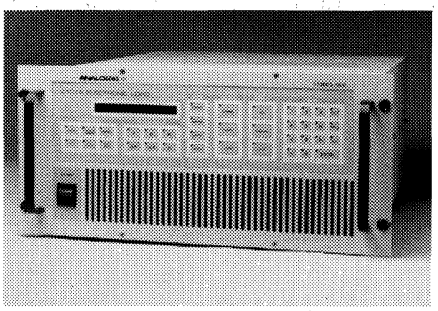
Manufacturer	Starting EEM Page No.	Model/Series	Power Range	Voltage Range	Meters	Load Type	Non-Inductive	QVP
American Reliance	D•1187	PEL	60,150, 300, 600, 1.2K, 2.5K, 5K, 7.5K, 10K, 100K Watts		Yes	DC	Yes	8 Channels, local control and remote programming
Analogic Corp.	D•1186	2101/2000 2103/2000	250W/Channel 250W/Channel	4-150 Voc 4-150 Voc	Internal Panel Meter	DC DC	Yes Yes	4/8 Channels Dynamic Capability 8 Channels only
Dynaload	D•1206	RBL FET RBL 488 FET MCL 488 DLVP DLP DLM	800W, 2000W, 4000W 800W, 2000W, 4000W 350W-3500W 1500W, 2500W, 3000W 1000W 100W	1-600 0-10V 0-10V 0-10V	Yes Yes Yes Yes Yes Yes	DC DC DC DC DC DC		Multi-range programming Local programming, 10 programmable presets 10 Channels Remote constant current programming Remote constant current programming Remote constant current programming
Empro Manufacturing Company	D•1209	Meter Shunts						
Hyberlab Corp.	D•1217	PL-Series	0-80KW	0-1KV	Yes	DC/AC	Yes	Yes
Ross Engineering	D•1257	HV	to 60KV	to 300KV	Yes	Resistive	Yes	

Analogic's Series 2000

Superior Cost-Effective Power Test Solutions

Model 2101A Dynamic Electronic Load

The Series 2000 is a modular standalone electronic load offering superior measurement speeds and true dynamic simulation of power supply loads. The unit has 8 independent and floating load channels which may be paralleled in any combination to yield up to 2000W. Each independent load channel can handle 250W, with a maximum operating voltage of 150V. Each load channel offers the following capabilities: constant current, constant resistance, programmable high/low current settings, selectable slew rates and internal 12-bit measurement of voltage and current to eliminate the need for external DVMs and shunts.



Specifications

OPERATING CONDITIONS
(ANY SINGLE CHANNEL)

Maximum Operating Current
50A/channel @ 5V

Maximum Operating Voltage
150V

Minimum Operating Voltage
4.0V @ 50A

Maximum Power Continuous
250W

Dynamic
500W @ 50% Duty Cycle

GENERAL

Power Required
500W @ 115/230V, 47 - 64 Hz

Physical Dimensions
8.72 in/222 mm (H), 19.00 in/483 mm (W), 20.60 in/523 mm (D)

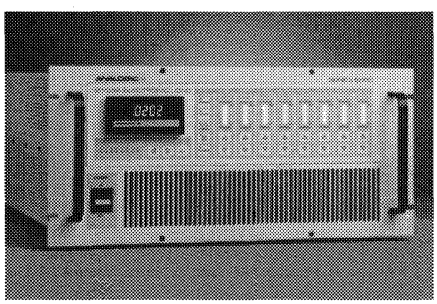
Weight
45 lbs/20 kg

Features

- ❑ Front Panel Operation
- ❑ Dynamic Mode
- ❑ IEEE-488 Interface
- ❑ Data Acquisition System
- ❑ True 4-wire Sensing

Applications

- ❑ Power Supply Testing
- ❑ Battery Testing
- ❑ Relay Testing
- ❑ Burn-in Reliability Testing
- ❑ Programmable DC Resistor
- ❑ Constant Current Limiter



Model 2103A Static Electronic Load

The Model 2103A Electronic Load is a flexible cost effective solution for many power test applications. The 2103A contains a sophisticated control and measuring system which may be monitored via a 4 1/2 digit front panel display or reported over the GPIB with the standard IEEE-488 interface. An ideal solution for high volume burn-in applications, the 2103A can be operated in constant current or constant resistance modes.

The 2103A is available with 8 channels which may be operated independently or in parallel allowing the user to sink up to 2000W in one compact instrument. Channels can sink 250W continuously, with the unique capability of handling up to 150 VDC.

Features

- ❑ Direct Read Out of Voltage or Current by Front Panel Meter or via IEEE-488
- ❑ True 4-Wire Sensing

Applications

- ❑ Power Supply Testing
- ❑ Battery Testing
- ❑ Relay Testing
- ❑ Burn-in Reliability Testing
- ❑ Programmable DC Resistor
- ❑ Constant Current Limiter

Specifications

PARAMETERS

Maximum Operating Current
50 amps per channel at 5.0 VDC

Continuous Operating Power
250 watts per channel

Maximum Operating Power
500 watts per channel, 50% Duty Cycle

Minimum Operating Voltage
4.0 VDC at 50 amps, 500 mVDC at 5.0 amps

GENERAL

Power Required
500 watts max., 115 VAC - 60 Hz

Physical Dimensions
8.75" (222 mm) H x 19.0" (483 mm) W x 20.62" (523 mm) D

Weight
45 lbs (20 kg)

For more information contact *Customer Service:*
Analogic Corportion, 8 Centennial Drive, Peabody, MA 01960
1-800-237-2200, Fax: (978) 532-8913, email: csd@analogic.com

ANALOGIC®
The World Resource for Precision Signal Technology

Programmable Electronic Loads
PEL Series (60, 150, 300, 600, 1.2K, 2.5K, 5K, 7.5K, 10K, 100K Watts)

The PEL Series of Programmable Electronic Loads deliver precision loads with state-of-the-art features for your static or dynamic applications. They are engineered for high performance, but will not compromise your budget. The PEL Series features 99 points programming through a keypad. They operate in four constant modes; current, voltage, resistance and power. They are driven by dual internal micro-controllers with advanced firmware that enhances test and measurement functions. For PC based test applications, the PEL Series include standard RS232 and IEEE 488.2 SCPI interfaces. Other features include; improved EMI and EMC immunity and a "C" operand function for battery designers that require a dynamic utility. In addition, a master PEL has the capability to control 8 channels. Amrel's PEL Series are reliable, proven performers, tested with over 50K hours MTBF.

Key Features

- 99 Points Real-time voltage, current, power recording capability with programmable timer setup.
- 99 Points voltage, current, and power self-programming capability from front panel keypad.
- "C" operand function
- Local control and remote programming for pulse amplitude, pulse width, pulse shape, pulse rate, and pulse cycle.
- External analog programming
- Dual-mode transient generator
- Dual internal micro controllers
- CV/CC/CR/CP programming capabilities
- IEEE 488.2 SCPI programming capability
- RS232 programming capability
- RS232 printing capability (optional)
- 256 step programmable slew rate capability
- OV, OC, OP and OT protections
- 12 bit programming/readback resolution (14 bit optional)
- Expandable system
- Master unit has capability to control 8 channels
- Available in either air cool or water cool design
- **CUSTOM UNITS AVAILABLE**

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Programmable Electronic Loads
PEL Series

PEL MODELS Incl.. RS-232 & IEEE-488	PEL 60	PEL 150-1	PEL 150-2	PEL 150-3	PEL 300-1	PEL 300-2
INPUT RANGES						
Voltage	60 VOLTS	60 VOLTS	60 VOLTS	120 VOLTS	60 VOLTS	60 VOLTS
Current	10 AMPS	30 AMPS	60 AMPS	30 AMPS	60 AMPS	120 AMPS
Rated Power	60 WATTS	150 WATTS	150 WATTS	150 WATTS	300 WATTS	300 WATTS
CONSTANT VOLTAGE MODE						
Range	0-60 Volts	0-60 Volts	0-60 Volts	0-120 Volts	0-60 Volts	0-60 Volts
Resolution	0.017 Volts	0.017 Volts	0.017 Volts	0.034 Volts	0.017 Volts	0.017 Volts
Accuracy	0.01%+0.050 Volts	0.01%+0.050 Volts	0.01%+0.050 Volts	0.01%+0.170 Volts	0.01%+0.050 Volts	0.01%+0.050 Volts
CV Transient Level						
Program Range	0-60 Volts	0-60 Volts	0-60 Volts	0-120 Volts	0-60 Volts	0-60 Volts
Prog. Resolution	0.017 Volts	0.017 Volts	0.017 Volts	0.034 Volts	0.017 Volts	0.017 Volts
Program Accuracy	0.1%+0.050 Volts	0.1%+0.050 Volts	0.1%+0.050 Volts	0.01%+0.170 Volts	0.1%+0.050 Volts	0.1%+0.050 Volts
CV Readback Spec.						
Resolution	0.017 Volts	0.017 Volts	0.017 Volts	0.034 Volts	0.017 Volts	0.017 Volts
Accuracy	0.2%+0.050 Volts	0.2%+0.050 Volts	0.2%+0.050 Volts	0.01%+0.170 Volts	0.2%+0.050 Volts	0.2%+0.050 Volts
CONSTANT CURRENT MODE						
Range	Low = 0-1 Amps Hi = 0-10 Amps	Low = 0-3 Amps Hi = 0-30 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-3 Amps Hi = 0-30 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-12 Amps Hi = 0-120 Amps
Resolution	Low = .3 mA Hi = 3 mA	Low = 1 mA Hi = 10 mA	Low = 2 mA Hi = 20 mA	Low = 1 mA Hi = 10 mA	Low = 2 mA Hi = 20 mA	Low = 4 mA Hi = 40 mA
Accuracy	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+5mA Hi = 0.1%+50mA	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+5mA Hi = 0.1%+50mA	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+20mA Hi = 0.1%+140mA
CC Transient Level						
Program Range	Low = 0-1 Amps Hi = 0-10 Amps	Low = 0-3 Amps Hi = 0-30 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-3 Amps Hi = 0-30 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-12 Amps Hi = 0-120 Amps
Prog. Resolution	Low = .3 mA Hi = 3 mA	Low = 1 mA Hi = 10 mA	Low = 2 mA Hi = 20 mA	Low = 1 mA Hi = 10 mA	Low = 2 mA Hi = 20 mA	Low = 4 mA Hi = 40 mA
Program Accuracy	Low = 0.1%+2mA Hi = 0.1%+20mA	Low = 0.1%+5mA Hi = 0.1%+40mA	Low = 0.1%+10mA HI = 0.1%+70mA	Low = 0.1%+5mA HI = 0.1%+40mA	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+20mA Hi = 0.1%+140mA
CC Readback Spec.						
Resolution	Low = .4 mA/C Hi = 4 mA/C	Low = 4 mA/C Hi = 10 mA/C	Low = 2 mA/C Hi = 20 mA/C	Low = 4 mA/C Hi = 10 mA/C	Low = 2 mA/C HI = 20 mA/C	Low = 4 mA Hi = 40 mA
Accuracy	Low = 0.2%+4 mA Hi = 0.2%+20 mA	Low = 0.2%+2mA Hi = 0.2%+20mA	Low = 0.2%+10 mA Hi = 0.2%+70 mA	Low = 0.2%+2mA Hi = 0.2%+20mA	Low = 0.2%+10 mA Hi = 0.2%+70 mA	Low = 0.2%+20mA Hi = 0.2%+140mA
CONSTANT RESISTANCE MODE						
Range	Low = 0.05-6 Ohm Med = 6-60 Ohm Hi = 60-20,000 Ohm	Low = 0.05-2 Ohm Med = 2-20 Ohm Hi = 20-20,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-10,000 Ohm	Low = 0.05-4 Ohm Med = 4-40 Ohm Hi = 40-20,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-10,000 Ohm	Low = 0.01-0.5 Ohm Med = 0.5-5 Ohm Hi = 5-1,000 Ohm
Accuracy S = 1/ohm	Low = 1%+10.0 mOhm Med = 1%+0.25 mS Hi = 1%+0.025 mS	Low = 1%+2.5 mOhm Med = 1%+1 mS Hi = 1%+0.1 mS	Low = 1%+1.0 mOhm Med = 1%+1mS Hi = 1%+0.1mS	Low = 1%+0.5 mOhm Med = 1%+0.3 mS Hi = 1%+0.03 mS	Low = 1%+1.0 mOhm Med = 1%+1mS Hi = 1%+0.1mS	Low = 1%+0.7 mOhm Med = 1%+2.5 mS Hi = 1%+0.25 mS
CR Transient Spec.						
Maximum Input	Low = 0.05-6 Ohm Med = 6-60 Ohm Hi = 60-20,000 Ohm	Low = 0.05-2 Ohm Med = 2-20 Ohm Hi = 20-20,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-20,000 Ohm	Low = 0.05-4 Ohm Med = 4-40 Ohm Hi = 40-20,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-20,000 Ohm	Low = 0.01-0.5 Ohm Med = 0.5-5 Ohm Hi = 5-1,000 Ohm
Program Accuracy	Low = 1%+10 mOhm Med = 1%+0.25 mS Hi = 1%+0.025 mS	Low = 1%+2.5 mOhm Med = 1%+1.0 mS Hi = 1%+0.1 mS	Low = 1%+2.5 mOhm Med = 1%+1mS Hi = 1%+0.1mS	Low = 1%+0.5 mOhm Med = 1%+0.3 mS Hi = 1%+0.03 mS	Low = 1%+2.5 mOhm Med = 1%+1mS Hi = 1%+0.1mS	Low = 1%+0.7 mOhm Med = 1%+2.5 mS Hi = 1%+0.25 mS
CONSTANT POWER MODE						
Maximum Input	Low = 0.5-6 Watts Hi = 3-60 Watts	Low = 1-15 Watts Hi = 3-150 Watts	Low = 1-30 Watts Hi = 6-300 Watts	Low = 1-15 Watts Hi = 3-150 Watts	Low = 1-30 Watts Hi = 6-300 Watts	Low = 1-30 Watts Hi = 6-300 Watts
Prog. Resolution	Low = 0.002 Watts Hi = 0.02 Watts	Low = 0.005 Watts Hi = 0.05 Watts	Low = 0.01 Watts Hi = 0.1 Watts	Low = 0.005 Watts Hi = 0.05 Watts	Low = 0.01 Watts Hi = 0.1 Watts	Low = 0.01 Watts Hi = 0.1 Watts
Program Accuracy	Low = 1%+0.01 Watt Hi = 1%+0.1 Watt	Low = 1%+0.05 Watt Hi = 1%+0.5 Watt	Low = 1%+0.1 Watt Hi = 1%+1 Watt	Low = 1%+0.05 Watt Hi = 1%+0.5 Watt	Low = 1%+0.1 Watt Hi = 1%+1 Watt	Low = 1%+0.1 Watt Hi = 1%+1 Watt
CP Transient Level						
Program Range	Low = 0.5-6 Watts Hi = 3-60 Watts	Low = 1-15 Watts Hi = 3-150 Watts	Low = 1-30 Watts Hi = 3-300 Watts	Low = 1-15 Watts Hi = 3-150 Watts	Low = 1-30 Watts Hi = 3-300 Watts	Low = 1-30 Watts Hi = 3-300 Watts
Prog. Resolution	Low = 0.002 Watts Hi = 0.02 Watts	Low = 0.005 Watts Hi = 0.05 Watts	Low = 0.01 Watts Hi = 0.1 Watts	Low = 0.005 Watts Hi = 0.05 Watts	Low = 0.01 Watts Hi = 0.1 Watts	Low = 0.01 Watts Hi = 0.1 Watts
Program Accuracy	Low = 1%+0.01 Watt Hi = 1%+0.1 Watt	Low = 1%+0.05 Watt Hi = 1%+0.5 Watt	Low = 1%+0.1 Watt Hi = 1%+1 Watt	Low = 1%+0.05 Watt Hi = 1%+0.5 Watt	Low = 1%+0.1 Watt Hi = 1%+1 Watt	Low = 1%+0.1 Watt Hi = 1%+1 Watt
GENERAL SPECIFICATIONS						
Operating Voltage	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac
Physical Size (WxDxH)	4.25"x22.5"x7"	8.5"x22.5"x7"	8.5"x22.5"x7"	8.5"x22.5"x7"	8.5"x22.5"x7"	8.5"x22.5"x7"

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Programmable Electronic Loads
PEL Series

PEL 300-3	PEL 300-4	PEL 600-1	PEL 600-2	PEL 600-3	PEL 1.2K-1	PEL 1.2K-2
INPUT RANGES						
120 VOLTS	600 VOLTS	600 VOLTS	300 VOLTS	120 VOLTS	600 VOLTS	300 VOLTS
60 AMPS	60 AMPS	60 AMPS	120 AMPS	120 AMPS	120 AMPS	300 AMPS
300 WATTS	300 WATTS	600 WATTS	600 WATTS	600 WATTS	1.2K WATTS	1.2K WATTS
CONSTANT VOLTAGE MODE						
0-120 Volts	0-600 Volts	0-600 Volts	0-300 Volts	0-120 Volts	0-600 Volts	0-300 Volts
0.034 Volts	0.100 Volts	0.170 Volts	0.170 Volts	0.034 Volts	0.170 Volts	0.170 Volts
0.01%+0.170 Volts	0.01%+0.300 Volts	0.01%+0.500 Volts	0.01%+0.250 Volts	0.01%+0.170 Volts	0.01%+0.500 Volts	0.01%+0.250 Volts
0-120 Volts	0-600 Volts	0-600 Volts	0-300 Volts	0-120 Volts	0-600 Volts	0-300 Volts
0.034 Volts	0.170 Volts	0.170 Volts	0.090 Volts	0.034 Volts	0.170 Volts	0.090 Volts
0.01%+0.170 Volts	0.01%+0.500 Volts	0.01%+0.500 Volts	0.01%+0.250 Volts	0.01%+0.170 Volts	0.01%+0.500 Volts	0.01%+0.250 Volts
0.034 Volts	0.170 Volts	0.170 Volts	0.090 Volts	0.034 Volts	0.170 Volts	0.090 Volts
0.02%+0.170 Volts	0.2%+0.500 Volts	0.2%+0.500 Volts	0.2%+0.250 Volts	0.01%+0.170 Volts	0.2%+0.500 Volts	0.2%+0.250 Volts
CONSTANT CURRENT MODE						
Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-12 Amps Hi = 0-120 Amps	Low = 0-12 Amps Hi = 0-120 Amps	Low = 0-12 Amps Hi = 0-120 Amps	Low = 0-30 Amps Hi = 0-300 Amps
Low = 2 mA Hi = 20 mA	Low = 2 mA Hi = 20 mA	Low = 2 mA Hi = 20 mA	Low = 4 mA Hi = 40 mA	Low = 4 mA Hi = 40 mA	Low = 4 mA Hi = 40 mA	Low = 10 mA Hi = 100 mA
Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+20mA Hi = 0.1%+140mA	Low = 0.1%+20mA Hi = 0.1%+140mA	Low = 0.1%+20mA Hi = 0.1%+140mA	Low = 0.1%+50mA Hi = 0.1%+500mA
Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-12 Amps Hi = 0-120 Amps	Low = 0-12 Amps Hi = 0-120 Amps	Low = 0-12 Amps Hi = 0-120 Amps	Low = 0-30 Amps Hi = 0-300 Amps
Low = 2 mA Hi = 20 mA	Low = 2 mA Hi = 20 mA	Low = 2 mA Hi = 20 mA	Low = 4 mA Hi = 40 mA	Low = 4 mA Hi = 40 mA	Low = 4 mA Hi = 40 mA	Low = 10 mA Hi = 100 mA
Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+20mA Hi = 0.1%+140mA	Low = 0.1%+20mA Hi = 0.1%+140mA	Low = 0.1%+20mA Hi = 0.1%+140mA	Low = 0.1%+50mA Hi = 0.1%+500mA
Low = 2 mA/C Hi = 20 mA/C	Low = 2 mA/C Hi = 20 mA/C	Low = 2 mA/C Hi = 20 mA/C	Low = 4 mA Hi = 40 mA	Low = 4 mA Hi = 40 mA	Low = 4 mA Hi = 40 mA	Low = 8 mA Hi = 80 mA
Low = 0.2%+10 mA Hi = 0.2%+70 mA	Low = 0.2%+10 mA Hi = 0.2%+70 mA	Low = 0.2%+10 mA Hi = 0.2%+70 mA	Low = 0.2%+20mA Hi = 0.2%+140mA	Low = 0.2%+20mA Hi = 0.2%+140mA	Low = 0.2%+20mA Hi = 0.2%+140mA	Low = 0.2%+40mA Hi = 0.2%+300mA
CONSTANT RESISTANCE MODE						
Low = 0.05-2 Ohm Med = 2-20 Ohm Hi = 20-20,000 Ohm	Low = 0.05-10 Ohm Med = 10-100 Ohm Hi = 100-20,000 Ohm	Low = 0.1-10 Ohm Med = 10-100 Ohm Hi = 100-20,000 Ohm	Low = 0.05-2 Ohm Med = 2-20 Ohm Hi = 20-20,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-10,000 Ohm	Low = 0.1-5.0 Ohm Med = 5.0-50 Ohm Hi = 50-20,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-10,000 Ohm
Low = 1%+2.5 mOhm Med = 1%+1 mS Hi = 1%+0.1 mS	Low = 1%+10mOhm Med = 1%+0.1 mS Hi = 1%+0.01 mS	Low = 1%+10 mOhm Med = 1%+0.1 mS Hi = 1%+0.01 mS	Low = 1%+2.5 mOhm Med = 1%+1 mS Hi = 1%+0.1 mS	Low = 1%+1.0 mOhm Med = 1%+1 mS Hi = 1%+0.1 mS	Low = 1%+ 7 mOhm Med = 1%+0.25 mS Hi = 1%+0.025 mS	Low = 1%+1.0 mOhm Med = 1%+1 mS Hi = 1%+0.1 mS
Low = 0.05-2 Ohm Med = 2-20 Ohm Hi = 10-20,000 Ohm	Low = 0.05-10 Ohm Med = 10-100 Ohm Hi = 100-20,000 Ohm	Low = 0.1-10 Ohm Med = 10-100 Ohm Hi = 100-20,000 Ohm	Low = 0.05-2 Ohm Med = 2-20 Ohm Hi = 20-20,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-20,000 Ohm	Low = 0.1-5.0 Ohm Med = 5.0-50 Ohm Hi = 50-20,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-20,000 Ohm
Low = 1%+2.5 mOhm Med = 1%+1mS Hi = 1%+0.1mS	Low = 1%+10 mOhm Med = 1%+0.1 mS Hi = 1%+0.01 mS	Low = 1%+10 mOhm Med = 1%+0.1 mS Hi = 1%+0.01 mS	Low = 1%+2.5 mOhm Med = 1%+1.0 mS Hi = 1%+0.1 mS	Low = 1%+2.5 mOhm Med = 1%+1.0 mS Hi = 1%+0.1 mS	Low = 1%+ 7 mOhm Med = 1%+0.25 mS Hi = 1%+0.025 mS	Low = 1%+2.5 mOhm Med = 1%+1.0 mS Hi = 1%+0.1 mS
CONSTANT POWER MODE						
Low = 1-30 Watts Hi = 6-300 Watts	Low = 1-30 Watts Hi = 6-300 Watts	Low = 2-60 Watts Hi = 6-600 Watts	Low = 2-60 Watts Hi = 6-600 Watts	Low = 2-60 Watts Hi = 6-600 Watts	Low = 6-120 Watts Hi = 20-1,200 Watts	Low = 6-120 Watts Hi = 20-1,200 Watts
Low = 0.01 Watts Hi = 0.1 Watts	Low = 0.01 Watts Hi = 0.1 Watts	Low = 0.02 Watts Hi = 0.2 Watts	Low = 0.02 Watts Hi = 0.2 Watts	Low = 0.02 Watts Hi = 0.2 Watts	Low = 0.04 Watts Hi = 0.4 Watts	Low = 0.04 Watts Hi = 0.4 Watts
Low = 1%+0.1 Watt Hi = 1%+1 Watt	Low = 1%+0.1 Watt Hi = 1%+1 Watt	Low = 1%+0.2 Watt Hi = 1%+2 Watt	Low = 1%+0.2 Watt Hi = 1%+2 Watt	Low = 1%+0.2 Watt Hi = 1%+2 Watt	Low = 1%+0.4 Watt Hi = 1%+4 Watt	Low = 1%+0.4 Watt Hi = 1%+4 Watt
Low = 1-30 Watts Hi = 3-300 Watts	Low = 1-30 Watts Hi = 3-300 Watts	Low = 2-60 Watts Hi = 6-600 Watts	Low = 2-60 Watts Hi = 6-600 Watts	Low = 2-60 Watts Hi = 6-600 Watts	Low = 6-120 Watts Hi = 20-1,200 Watts	Low = 6-120 Watts Hi = 20-1,200 Watts
Low = 0.01 Watts Hi = 0.1 Watts	Low = 0.01 Watts Hi = 0.1 Watts	Low = 0.02 Watts Hi = 0.2 Watts	Low = 0.02 Watts Hi = 0.2 Watts	Low = 0.02 Watts Hi = 0.2 Watts	Low = 0.04 Watts Hi = 0.4 Watts	Low = 0.04 Watts Hi = 0.4 Watts
Low = 1%+0.1 Watt Hi = 1%+1 Watt	Low = 1%+0.1 Watt Hi = 1%+1 Watt	Low = 1%+0.2 Watt Hi = 1%+2 Watt	Low = 1%+0.2 Watt Hi = 1%+2 Watt	Low = 1%+0.2 Watt Hi = 1%+2 Watt	Low = 1%+0.4 Watt Hi = 1%+4 Watt	Low = 1%+0.4 Watt Hi = 1%+4 Watt
GENERAL SPECIFICATIONS						
115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac
8.5"x22.5"x7"	8.5"x22.5"x7"	12.75"x22.5"x7"	12.75"x22.5"x7"	12.75"x22.5"x7"	19"x22.5"x7"	19"x22.5"x7"

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Programmable Electronic Loads
PEL Series

PEL MODELS Incl.. RS-232 & IEEE-488	PEL 1.2K-3	PEL 2.5K-1	PEL 2.5K-2	PEL 2.5K-3	PEL 5K-1	PEL 5K-2
INPUT RANGES						
Voltage	120 VOLTS	600 VOLTS	600 VOLTS	60 VOLTS	600 VOLTS	600 VOLTS
Current	240 AMPS	300 AMPS	60 AMPS	300 AMPS	600 AMP	120 AMPS
Rated Power	1.2K WATTS	2.5K WATTS	2.5K WATTS	2.5K WATTS	5K WATTS	5K WATTS
CONSTANT VOLTAGE MODE						
Range	0-120 Volts	0-600 Volts	0-600 Volts	0-60 Volts	0-600 Volts	0-600 Volts
Resolution	0.034 Volts	0.170 Volts	0.170 Volts	0.017 Volts	0.170 Volts	0.170 Volts
Accuracy	0.01%+0.170 Volts	0.01%+0.500 Volts	0.01%+0.500 Volts	0.01%+0.050 Volts	0.01%+0.500 Volts	0.01%+0.500 Volts
CV Transient Level						
Program Range	0-120 Volts	0-600 Volts	0-600 Volts	0-60 Volts	0-600 Volts	0-600 Volts
Prog. Resolution	0.034 Volts	0.170 Volts	0.170 Volts	0.017 Volts	0.170 Volts	0.170 Volts
Program Accuracy	0.01%+0.170 Volts	0.01%+0.500 Volts	0.01%+0.500 Volts	0.1%+0.050 Volts	0.01%+0.500 Volts	0.01%+0.500 Volts
CV Readback Spec.						
Resolution	0.034 Volts	0.170 Volts	0.170 Volts	0.017 Volts	0.170 Volts	0.170 Volts
Accuracy	0.01%+0.170 Volts	0.2%+0.500 Volts	0.2%+0.500 Volts	0.2%+0.050 Volts	0.2%+0.500 Volts	0.2%+0.500 Volts
CONSTANT CURRENT MODE						
Range	Low = 0-24 Amps Hi = 0-240 Amps	Low = 0-30 Amps Hi = 0-300 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-30 Amps Hi = 0-300 Amps	Low = 0-60 Amps Hi = 0-600 Amps	Low = 0-12 Amps Hi = 0-120 Amps
Resolution	Low = 8 mA Hi = 80 mA	Low = 10 mA Hi = 100 mA	Low = 2 mA Hi = 20 mA	Low = 10 mA Hi = 100 mA	Low = 20 mA Hi = 200 mA	Low = 4 mA Hi = 40 mA
Accuracy	Low = 0.1%+40mA Hi = 0.1%+300mA	Low = 0.1%+50mA Hi = 0.1%+500mA	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+50mA Hi = 0.1%+500mA	Low = 0.1%+100mA Hi = 0.1%+1000mA	Low = 0.1%+20mA Hi = 0.1%+140mA
CC Transient Level						
Program Range	Low = 0-24 Amps Hi = 0-240 Amps	Low = 0-30 Amps Hi = 0-300 Amps	Low = 0-6 Amps Hi = 0-60 Amps	Low = 0-30 Amps Hi = 0-300 Amps	Low = 0-60 Amps Hi = 0-600 Amps	Low = 0-12 Amps Hi = 0-120 Amps
Prog. Resolution	Low = 8 mA Hi = 80 mA	Low = 10 mA Hi = 100 mA	Low = 2 mA Hi = 20 mA	Low = 10 mA Hi = 100 mA	Low = 20 mA Hi = 200 mA	Low = 4 mA Hi = 40 mA
Program Accuracy	Low = 0.1%+40mA Hi = 0.1%+300mA	Low = 0.1%+50mA Hi = 0.1%+500mA	Low = 0.1%+10mA Hi = 0.1%+70mA	Low = 0.1%+50mA Hi = 0.1%+500mA	Low = 0.1%+100mA Hi = 0.1%+1000mA	Low = 0.1%+20mA Hi = 0.1%+140mA
CC Readback Spec.						
Resolution	Low = 8 mA Hi = 80 mA	Low = 8 mA Hi = 80 mA	Low = 2 mA Hi = 20 mA	Low = 8 mA Hi = 80 mA	Low = 20 mA Hi = 200 mA	Low = 4 mA Hi = 40 mA
Accuracy	Low = 0.2%+40mA Hi = 0.2%+300mA	Low = 0.2%+40mA Hi = 0.2%+300mA	Low = 0.2%+10mA Hi = 0.2%+70mA	Low = 0.2%+40mA Hi = 0.2%+300mA	Low = 0.2%+100mA Hi = 0.2%+1000mA	Low = 0.2%+20mA Hi = 0.2%+140mA
CONSTANT RESISTANCE MODE						
Range	Low = 0.01-0.5 Ohm Med = 0.5-5 Ohm Hi = 5-1,000 Ohm	Low = 0.05-2 Ohm Med = 2-20 Ohm Hi = 20-20,000 Ohm	Low = 0.05-10 Ohm Med = 10-100 Ohm Hi = 100-20,000 Ohm	Low = 0.005-0.2 Ohm Med = 0.2-2 Ohm Hi = 2-2,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-10,000 Ohm	Low = 0.05-5.0 Ohm Med = 5.0-50 Ohm Hi = 50-20,000 Ohm
Accuracy S = 1/ohm	Low = 1%+0.7 mOhm Med = 1%+2.5 mS Hi = 1%+0.25 mS	Low = 1%+2.5 mOhm Med = 1%+1 mS Hi = 1%+0.1 mS	Low = 1%+10 mOhm Med = 1%+0.1 mS Hi = 1%+0.01 mS	Low = 1%+0.25 mOhm Med = 1%+10 mS Hi = 1%+1 mS	Low = 1%+1.0 mOhm Med = 1%+1 mS Hi = 1%+0.1 mS	Low = 1%+7 mOhm Med = 1%+0.25 mS Hi = 1%+0.025 mS
CR Transient Spec.						
Maximum Input	Low = 0.01-0.5 Ohm Med = 0.5-5 Ohm Hi = 5-1,000 Ohm	Low = 0.05-2 Ohm Med = 2-20 Ohm Hi = 10-20,000 Ohm	Low = 0.05-10 Ohm Med = 10-100 Ohm Hi = 100-20,000 Ohm	Low = 0.005-0.2 Ohm Med = 0.2-2 Ohm Hi = 2-2,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-20,000 Ohm	Low = 0.05-5.0 Ohm Med = 5.0-50 Ohm Hi = 50-20,000 Ohm
Program Accuracy	Low = 1%+0.7 mOhm Med = 1%+2.5 mS Hi = 1%+0.25 mS	Low = 1%+2.5 mOhm Med = 1%+1mS Hi = 1%+0.1mS	Low = 1%+10 mOhm Med = 1%+0.1 mS Hi = 1%+0.01 mS	Low = 1%+0.25 mOhm Med = 1%+10 mS Hi = 1%+1 mS	Low = 1%+2.5 mOhm Med = 1%+1.0 mS Hi = 1%+0.1 mS	Low = 1%+7 mOhm Med = 1%+0.25 mS Hi = 1%+0.025 mS
CONSTANT POWER MODE						
Maximum Input	Low = 6-120 Watts Hi = 20-1,200 Watts	Low = 3-250 Watts Hi = 100-2,500 Watts	Low = 3-250 Watts Hi = 100-2,500 Watts	Low = 3-250 Watts Hi = 100-2,500 Watts	Low = 5-500 Watts Hi = 200-5,000 Watts	Low = 5-500 Watts Hi = 200-5,000 Watts
Prog. Resolution	Low = 0.04 Watts Hi = 0.4 Watts	Low = 0.1 Watts Hi = 1 Watts	Low = 0.1 Watts Hi = 1 Watts	Low = 0.1 Watts Hi = 1 Watts	Low = 0.2 Watts Hi = 2 Watts	Low = 0.2 Watts Hi = 2 Watts
Program Accuracy	Low = 1%+0.4 Watt Hi = 1%+4 Watt	Low = 1%+0.5 Watt Hi = 1%+5 Watt	Low = 1%+0.5 Watt Hi = 1%+5 Watt	Low = 1%+0.5 Watt Hi = 1%+5 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt
CP Transient Level						
Program Range	Low = 6-120 Watts Hi = 20-1,200 Watts	Low = 3-250 Watts Hi = 100-2,500 Watts	Low = 3-250 Watts Hi = 100-2,500 Watts	Low = 3-250 Watts Hi = 100-2,500 Watts	Low = 5-500 Watts Hi = 200-5,000 Watts	Low = 5-500 Watts Hi = 200-5,000 Watts
Prog. Resolution	Low = 0.04 Watts Hi = 0.4 Watts	Low = 0.1 Watts Hi = 1 Watts	Low = 0.1 Watts Hi = 1 Watts	Low = 0.1 Watts Hi = 1 Watts	Low = 0.2 Watts Hi = 2 Watts	Low = 0.2 Watts Hi = 2 Watts
Program Accuracy	Low = 1%+0.4 Watt Hi = 1%+4 Watt	Low = 1%+0.5 Watt Hi = 1%+5 Watt	Low = 1%+0.5 Watt Hi = 1%+5 Watt	Low = 1%+0.5 Watt Hi = 1%+5 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt
GENERAL SPECIFICATIONS						
Operating Voltage	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac
Physical Size (WxDxH)	19"x22.5"x7"	19"x22.5"x7"	19"x22.5"x7"	19"x22.5"x7"	19"x26"x7"	19"x26"x7"

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Programmable Electronic Loads
PEL Series

PEL 5K-3	PEL 7.5K-1 or PEL 10K-1	PEL 7.5K-2	PEL 7.5K-1 or PEL 10K-3	PEL 10K-1 PEL 10K-3 POWER ONLY	PEL 10K-2	PLB 100K-1
INPUT RANGES						
60 VOLTS	600 VOLTS	600 VOLTS	60 VOLTS		600 VOLTS	400 VOLTS
600 AMPS	600 AMP	180 AMPS	1200 AMPS		240 AMP	500 AMP
5K WATTS	7.5K or 10K WATTS	7.5K WATTS	7.5K or 10K WATTS		10K WATTS	100K WATTS
CONSTANT VOLTAGE MODE						
0-60 Volts	0-600 Volts	0-600 Volts	0-60 Volts		0-600 Volts	50-400 Volts
0.017 Volts	0.170 Volts	0.170 Volts	0.017 Volts		0.170 Volts	0.1 Volts
0.01%+0.050 Volts	0.01%+0.500 Volts	0.01%+0.500 Volts	0.01%+0.050 Volts		0.01%+0.500 Volts	0.1%+0.50 Volts
0-60 Volts	0-600 Volts	0-600 Volts	0-60 Volts		0-600 Volts	50-400 Volts
0.017 Volts	0.170 Volts	0.170 Volts	0.017 Volts		0.170 Volts	0.1 Volts
0.1%+0.050 Volts	0.01%+0.500 Volts	0.01%+0.500 Volts	0.1%+0.050 Volts		0.01%+0.500 Volts	0.1%+1.0 Volts
0.017 Volts	0.170 Volts	0.170 Volts	0.017 Volts		0.170 Volts	0.017 Volts
0.2%+0.050 Volts	0.2%+0.500 Volts	0.2%+0.500 Volts	0.2%+0.050 Volts		0.2%+0.500 Volts	0.2%+0.050 Volts
CONSTANT CURRENT MODE						
Low = 0-60 Amps Hi = 0-600 Amps	Low = 0-60 Amps Hi = 0-600 Amps	Low = 0-18 Amps Hi = 0-180 Amps	Low = 0-120 Amps Hi = 0-1200 Amps		Low = 0-24 Amps Hi = 0-240 Amps	Low = 0-50 Amps Hi = 0-500 Amps
Low = 20 mA Hi = 200 mA	Low = 20 mA Hi = 200 mA	Low = 5 mA Hi = 50 mA	Low = 30 mA Hi = 300 mA		Low = 6 mA Hi = 60 mA	Low = 15 mA Hi = 150 mA
Low = 0.1%+100mA Hi = 0.1%+1000mA	Low = 0.1%+100mA Hi = 0.1%+1000mA	Low = 0.1%+25mA Hi = 0.1%+250mA	Low = 0.1%+400mA Hi = 0.1%+2000mA		Low = 0.1%+30mA Hi = 0.1%+300mA	Low = 0.1%+200mA Hi = 0.1%+750mA
Low = 0-60 Amps Hi = 0-600 Amps	Low = 0-60 Amps Hi = 0-600 Amps	Low = 0-18 Amps Hi = 0-180 Amps	Low = 0-120 Amps Hi = 0-1200 Amps		Low = 0-24 Amps Hi = 0-240 Amps	Low = 0-50 Amps Hi = 0-500 Amps
Low = 20 mA Hi = 200 mA	Low = 20 mA Hi = 200 mA	Low = 5 mA Hi = 50 mA	Low = 30 mA Hi = 300 mA		Low = 6 mA Hi = 60 mA	Low = 15 mA Hi = 150 mA
Low = 0.1%+100mA Hi = 0.1%+1000mA	Low = 0.1%+100mA Hi = 0.1%+1000mA	Low = 0.1%+25mA Hi = 0.1%+250mA	Low = 0.1%+400mA Hi = 0.1%+2000mA		Low = 0.1%+30mA Hi = 0.1%+300mA	Low = 0.1%+200mA Hi = 0.1%+750mA
Low = 20 mA Hi = 200 mA	Low = 20 mA Hi = 200 mA	Low = 5 mA Hi = 50 mA	Low = 40 mA Hi = 400 mA		Low = 7 mA Hi = 70 mA	Low = 20 mA Hi = 200 mA
Low = 0.2%+100mA Hi = 0.2%+1000mA	Low = 0.2%+100mA Hi = 0.2%+1000mA	Low = 0.2%+25mA Hi = 0.2%+250mA	Low = 0.2%+400mA Hi = 0.2%+2000mA		Low = 0.2%+40mA Hi = 0.2%+400mA	Low = 0.2%+200mA Hi = 0.2%+750mA
CONSTANT RESISTANCE MODE						
Low = 0.003-0.1 Ohm Med = 0.1-1 Ohm Hi = 1-1,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-10,000 Ohm	Low = 0.05-3.33 Ohm Med = 3.33-33.3 Ohm Hi = 33.3-10,000 Ohm	Low = 0.005-0.05 Ohm Med = 0.05-0.5 Ohm Hi =0.5-500 Ohm		Low = 0.05-2.5 Ohm Med = 2.5-25 Ohm Hi = 25-10,000 Ohm	Low = 0.03-0.7 Ohm Med = 0.7-8 Ohm Hi = 8-1,000 Ohm
Low = 1%+0.1 mOhm Med = 1%+10 mS Hi = 1%+1.0 mS	Low = 1%+1.0 mOhm Med = 1%+1 mS Hi = 1%+0.1 mS	Low = 1%+5 mOhm Med = 1%+0.5 mS Hi = 1%+0.05 mS	Low = 1%+0.07 mOhm Med = 1%+25 mS Hi = 1%+2.5 mS		Low = 1%+4.0 mOhm Med = 1%+0.5 mS Hi = 1%+0.05 mS	Low = 1%+0.8 mOhm Med = 1%+1.5 mS Hi = 1%+0.15 mS
Low = 0.003-0.1 Ohm Med = 0.1-1 Ohm Hi = 1-1,000 Ohm	Low = 0.03-1 Ohm Med = 1-10 Ohm Hi = 10-20,000 Ohm	Low = 0.05-3.33 Ohm Med = 3.33-33.3 Ohm Hi = 33.3-10,000 Ohm	Low = 0.005-0.05 Ohm Med = 0.05-0.5 Ohm Hi = 0.5-500 Ohm		Low = 0.05-2.5 Ohm Med = 2.5-25 Ohm Hi = 25-10,000 Ohm	Low = 0.03-0.7 Ohm Med = 0.7-8 Ohm Hi = 8-1,000 Ohm
Low = 1%+0.1 mOhm Med = 1%+10 mS Low = 1%+0.1 mOhm	Low = 1%+2.5 mOhm Med = 1%+1.0 mS Hi = 1%+0.1 mS	Low = 1%+5 mOhm Med = 1%+0.5 mS Hi = 1%+0.05 mS	Low = 1%+0.07 mOhm Med = 1%+25 mS Hi = 1%+2.5 mS		Low = 1%+4.0 mOhm Med = 1%+0.5 mS Hi = 1%+0.05 mS	Low = 1%+0.8 mOhm Med = 1%+1.5 mS Hi = 1%+0.15 mS
CONSTANT POWER MODE						
Low = 5-500 Watts Hi = 200-5,000 Watts	Low = 7.5-750 Watts Hi = 200-7500 Watts	Low = 7.5-750 Watts Hi = 200-7500 Watts	Low = 7.5-750 Watts Hi = 200-7500 Watts	Low = 10-1000 Watts Hi = 200-10,000 Watts	Low = 10-1000 Watts Hi = 200-10,000 Watts	Low = 100-10,000 Watts Hi = 100-100,000 Watts
Low = 0.2 Watts Hi = 2 Watts	Low = 0.2 Watts Hi = 2 Watts	Low = 0.2 Watts Hi = 2 Watts	Low = 0.2 Watts Hi = 2 Watts	Low = 0.25 Watts Hi = 2.5 Watts	Low = 0.25 Watts Hi = 2.5 Watts	Low = 3 Watts Hi = 30 Watts
Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1.2 Watt Hi = 1%+12 Watt	Low = 1%+1.2 Watt Hi = 1%+12 Watt	Low = 1%+20 Watt Hi = 1%+200 Watt
Low = 5-500 Watts Hi = 200-5,000 Watts	Low = 7.5-750 Watts Hi = 200-7500 Watts	Low = 7.5-750 Watts Hi = 200-7500 Watts	Low = 7.5-750 Watts Hi = 200-7500 Watts	Low = 10-1000 Watts Hi = 200-10,000 Watts	Low = 10-1000 Watts Hi = 200-10,000 Watts	Low = 100-10,000 Watts Hi = 100-100,000 Watts
Low = 0.2 Watts Hi = 2 Watts	Low = 0.2 Watts Hi = 2 Watts	Low = 0.2 Watts Hi = 2 Watts	Low = 0.2 Watts Hi = 2 Watts	Low = 0.25 Watts Hi = 2.5 Watts	Low = 0.25 Watts Hi = 2.5 Watts	Low = 3 Watts Hi = 30 Watts
Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1 Watt Hi = 1%+10 Watt	Low = 1%+1.2 Watt Hi = 1%+12 Watt	Low = 1%+1.2 Watt Hi = 1%+12 Watt	Low = 1%+20 Watt Hi = 1%+200 Watt
GENERAL SPECIFICATIONS						
115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac	115Vac/230Vac
19"x26"x7"	19"x26"x14"	19"x26"x14"	19"x26"x14"	19"x26"x21"	19"x26"x21"	22"x40"x82"

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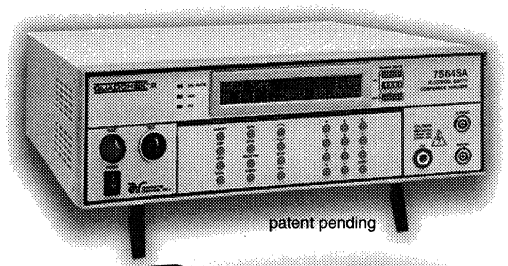
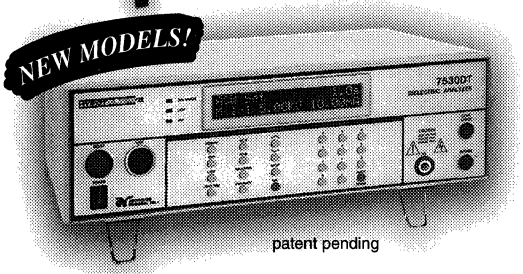
Fully-Automated Instruments

QUADCHEK® II
4-in-1 Multi-Function Safety Analyzer includes AC/DC Hipot, Insulation Resistance, Ground Bond tester and optional built-in scanner in a single instrument. Complete with IEEE-488 (GPIB) or RS232 interface.

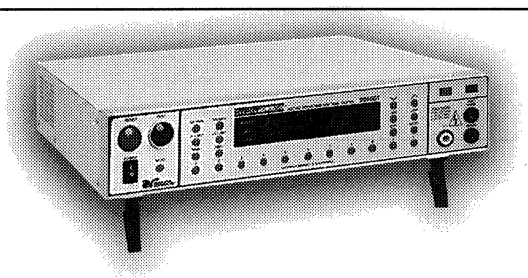


HYPOTULTRA® II
Multi-Function Dielectric Analyzers include AC/DC Hipot, Insulation Resistance tester and optional built-in scanner in a single instrument. Complete with IEEE-488 (GPIB), RS232 or printer interface.



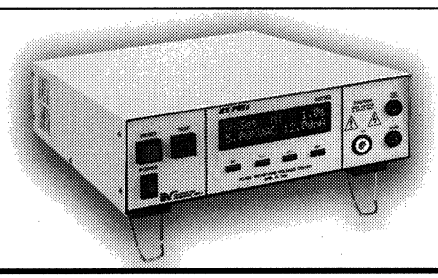
Semi-Automated Instruments

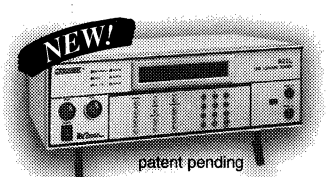
HYPOTPLUS® II
The first fully Microprocessor Controlled Dielectric Withstand testers. Both models include enhanced PLC control and advanced failure detection systems.



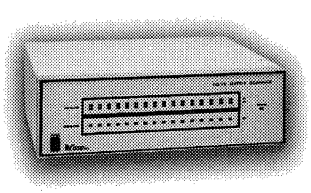
Basic Instruments

HYPOT® II
Dielectric Withstand testers with simple PLC control for production line safety agency compliance testing.

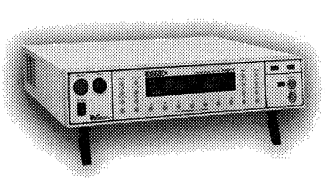




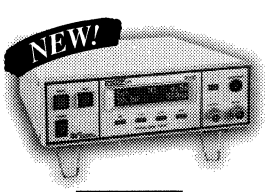
LINECHEK
Models 510L, 520L
(Fully-Automated Instruments)
Current Leakage testers available in two models. The 510L stand-alone system or the 520L system with a switching matrix interface which allows the instrument to be interconnected with other AR safety testers to form a complete safety testing system.



SWITCHING MATRIX
Models HS-8A, HS-16
The HS-8A is an 8 port scanner and the HS-16 is a 16 port scanner. Both models are high-voltage and high current matrix scanners for multi-point or multi-product testing. (For use with QUADCHEK® II or HypotULTRA® II).



HYAMP® II
Model 5030DT
(Semi-Automated Instrument)
30 Amp Ground Bond tester that works as a stand-alone system or can be interconnected to the HypotPLUS® II to form a semi-automatic test system.



HYAMP® JR.
Model 3030DT
(Basic Instrument)
30 Amp Ground Bond tester that works as a stand-alone system or can be interconnected to the Hypot® II to form a complete test system.

	No Load Trip Setting	Meter Memory	Frequency Selection	Line/Load Regulation	Dwell Timer	Lockout Feature	Selectable Input	CE Approved	TÜV Listed	Ramp Timer	Lo-Limit Setting	Storage of Setups	Digital Arc Detection	Rack Mount	Alarm Volume Control	Advanced Remote	Real Current (Option)	10V Analog (Option)	Continuity Test	Autoware	Built-in RS232 / Printer	Built-in GPIB / RS232	Scanner Interface	Charge-LO / Ramp-HI
Model 7564SA	5kV AC, 6kV DC, 30 Amp Ground Bond & IR Test																							
Model 7550DT	5kV AC, 6kV DC & IR Test																							
Model 7530DT	5kV AC, 6kV DC & IR Test																							
Model 7512DT	12kV DC @ 3.5mA																							
Model 7510DT	10kV AC @ 10mA																							
Model 7500DT	5kV AC @ 500VA, 6kV DC & IR Test																							
Model 5560DT	5kV AC, 6kV DC																							
Model 5500DT	5kV AC																							
Model 3570D	5kV AC, 6kV DC & IR Test																							
Model 3565D	5kV AC, 6kV DC																							
Model 3505D	5kV AC																							
Model 3500D	5kV AC																							

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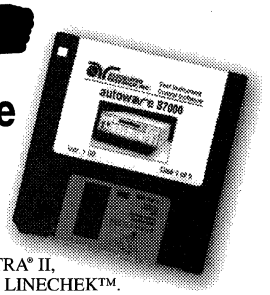

Designed to fully automate the testing process of HypotULTRA® II, QUADCHEK® II and LINECHEK™. Autoware can export data into any Windows software program such as Excel, Word or Access and includes a Windows 3.xx and 95 installation program. Autoware also features bar coding inputs and basic statistical analysis graphs.

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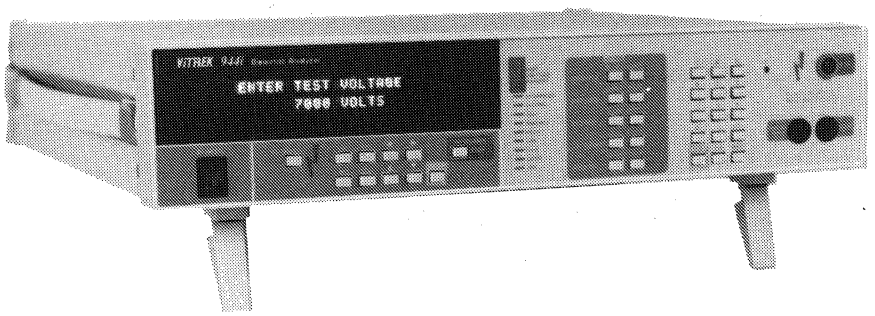
GPIB Hipot & Ground Testers, High Voltage Scanners

944i AC/DC Hipot plus IR and continuity all in 1 automated Tester



- Up to 5KVAC/7KVDC
- IR to 65 Gig-ohms
- Earth Continuity to 1mΩ
- Holds 100 Test Routines
- Continuous Safety Sensing
- Selectable Arc Detection
- Digital/Bar Graph Display
- 1 nano-amp Sensing
- 35 milli-amp Sourcing

944 Performance Specifications

AC Dielectric Mode - AC Voltage

Range	Current	Accuracy
100 to 500 VAC	20 mA	0.3% of output + 7.5V
500 to 5000 VAC	35 mA	0.3% of output + 25V

AC Current Sensing (AC Leakage)

Range	Resolution	Accuracy
500nA	1nA	1.0% of reading + 5nA
12.00μA	10nA	0.5% of reading + 15nA
2.00mA	10μA	0.3% of reading + 10μA
40.0mA	100μA	0.3% of reading + 200μA

DC Current Sensing (DC Leakage)

Range	Resolution	Accuracy
1800nA	1nA	0.4% of reading + 2nA
20.00μA	10nA	0.2% of reading + 10nA
2.00mA	10μA	0.2% of reading + 10μA
40.0mA	100μA	0.2% of reading + 100μA

High Resistance Mode

Resistance Range	Minimum Resistance	Test Voltage
2.6GΩ	50 KΩ	100 VDC
13GΩ	250 KΩ	500 VDC
26GΩ	500 KΩ	1000 VDC
65GΩ	1.25 MΩ	2500 VDC

Accuracy: 1.5% of reading for minimum resistance value linearity decreasing to 5% of reading for full scale.

DC Dielectric Mode - DC Voltage Output

Range	Current	Accuracy
100 to 500 VDC	20 mA	0.2% of output + 5V
500 to 5000 VDC	35 mA	0.2% of output + 15V
5000 to 7000 VDC	5mA	0.2% of output + 25V

Output above 5000 VDC requires option DC-7.

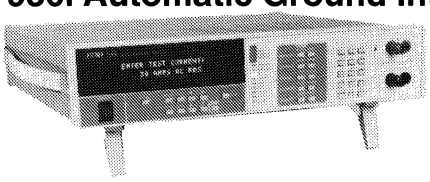
Low Resistance Mode

Full Scale: 8.5 ohms maximum including lead resistance.
Resolution: 1 milli-ohm
Test Current: 100 mA
Lead Compensation: Automatic offset circuit "nulls" out two wire lead resistance.
Accuracy: 0.3% of reading + 30mΩ

General

Arc Detection Sensitivity: User selectable 3 micro-seconds to 30 microseconds.
High Voltage Indicator: Lightning bolt illuminated by independent output voltage monitor. Audible alarm.
Safety Lead Sensing: Output automatically shuts down if V Lo or chassis terminal is disconnected.
Voltage Resolution: 1 volt AC or DC.
Slew Rate: 10 Volts/second to 5000 volts/second.
Limits: Test automatically aborts stored minimum or maximum limit.

930i Automatic Ground Integrity Analyzer



- Selectable Current 3-30A
- Stand alone or with 944i
- Auto Lead Compensation
- Holds 20 Test Routines
- Digital Limits/Timer

930 Performance Specifications

Alternating Current Output

Range: 3 to 30 amperes RMS, programmable
Resolution: 1 amp
Output Frequency: Sinewave synthesis, 50 Hz to 400 Hz
Compliance Voltage: 3 volts RMS
Regulation: ± 0.25% no load to full load

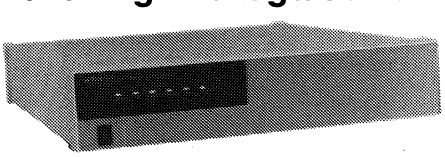
Resistance Measurement

Resistance Limit: Digitally displayed, user programmable
Maximum Resistance: 1 Ω at 3 amps linearly decreasing to 100mΩ @ 30A
Resistance Resolution: 1 μΩ
Measurement Accuracy: ± 1.0% of reading ± 0.5 of range

General

Memory: Non-volatile storage of up to 20 test routines
Test time: Digital count down timer, programmable 1 to 99 seconds
Terminal Configuration: True four-wire or two wire
Isolation: Output isolated to 500MΩ for dielectric testing
Remote Interface: VICL serial communications ports for control via PC or 944i
Display: 40 character dot matrix vacuum florescent display
Indicators: L.E.D. status indicators
Alarm: Audible and visual alarms provide pass/fail indication
Limits: Test is automatically aborted when programmed max value is exceeded
Diagnostics: Built-in self diagnostics test ROM, RAM and output system.

948i High Voltage/Current Switch Matrix



- Up to 5KV or 30 Amps
- Up to 48 Channels
- GPIB or RS232
- Compact Size 3.5″ Height

948 Performance Specifications

Switch Card Specification

High Voltage Type: Form A (1 pole, 1 throw, normally open) 8 per card
Maximum Input Voltage: 7 KVDC, 5KVAC RMS 50-60 Hz
Maximum Switching Voltage: 1 KV DC or RMS AC
Maximum Current: 3A DC or RMS AC
Maximum Switching Power: 50 Watts

High Current Type: Form A (1 pole, 1 throw, normally open) 8 per card
Maximum Input Voltage: 1500 V RMS
Maximum Switching Voltage: 277 VAC, 30VDC
Maximum Current: 30A DC or RMS AC
Maximum Switching Power: 500 Watts

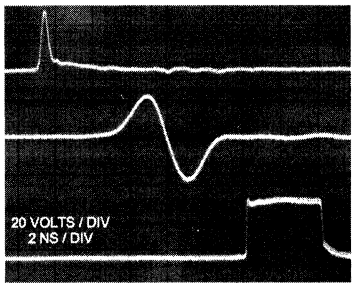
General

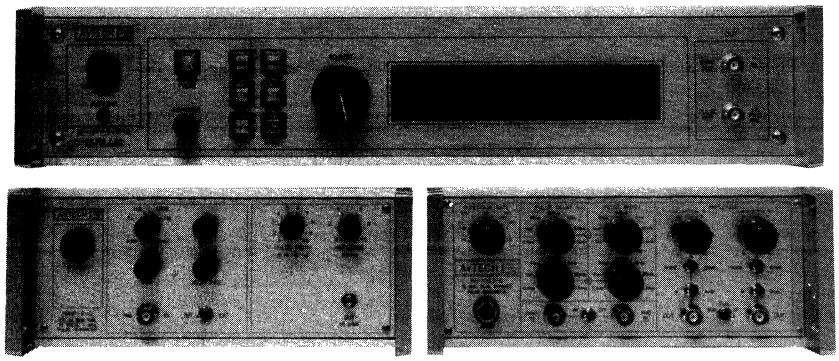
Memory: Non-volatile storage of up to 99 switching patterns
Input Reversal: Option "PRM" available on 2 X models
Remote Interface: GPIB standard, RS232 optional
Indicators: LED status indicators for Test, Standby, Active, Talk, Listen, Address
Diagnostics: Built-in self diagnostics test ROM, RAM and output system
Operating Temperature: 0°C to 50°C
Humidity: 80% RH 0°C to 40°C
Power: 115/230 VAC ±10% 100VA max
Dimensions: 89mm H x 432mm W x 485mm D (3.5" H x 17" W x 19" D)
Weight: 12 Kg (27 lb.) Net/16 Kg (36 lb.) shipping

VITREK **Vitrek Corporation**
9955 Mesa Rim Road, San Diego, CA 92121
FOR MORE INFORMATION CALL: ***(619) 558-4530 or Fax: (619) 558-9688***

HIGH-SPEED AND GENERAL-PURPOSE ~ STANDARD AND CUSTOM

PULSE GENERATORS ~ LASER DIODE DRIVERS ~ ACCESSORIES





GENERAL-PURPOSE PULSE GENERATORS (visit www.avtechpulse.com for complete data sheets)

MODEL*	V_{OUT}	PRF	PW	RISE TIME	DC OFFSET	JITTER	DELAY	GPIB, RS232 CONTROL	PRICE (US)
AV-1000-C	± 10 V, TTL, ECL	1 kHz-50 MHz	10 ns-1 ms	5 ns-1ms	0 to ± 10 V	± 15 ps	45 ns-1 ms	NA	2990
AV-1002-C	± 10 V, TTL, ECL	1 Hz-10 MHz	50 ns-0.5 sec	5 ns	0 to ± 10 V	± 50 ps	25 ns-0.1 sec	NA	2190
AV-1011-C	± 100 V	100 Hz-1.0 MHz	100 ns-1 ms	10 ns	NA	≤ 0.1%	0 -1 ms	NA	4715
AV-1011-B*	± 100 V	1.0 Hz-1.0 MHz	100 ns-1 ms	10 ns	NA	≤ 0.1%	0 -1 ms	yes, included	6442
AV-1011B1-B*	± 100 V	1.0 Hz-100 kHz	100 ns-1 ms	2 ns	NA	≤ 0.1%	0 -1 ms	yes, included	7940
AV-1015-C	± 50 V	10 Hz-10 MHz	20 ns-10 ms	10 ns	NA	≤ 0.01%	0 -10 ms	NA	4715
AV-1015-B*	± 50 V	1.0 Hz-10 MHz	20 ns-10 ms	10 ns	NA	≤ 0.03%	0 -10 ms	yes, included	6442
AV-1020-C	± 10 V, TTL, ECL	1 Hz-10 MHz	50 ns-0.5 sec	10 ns	0 to ± 10 V	± 50 ps	35 ns-0.5 sec	NA	1990
AV-1021-B*	± 10 V, TTL, ECL	1 Hz-10 MHz	50 ns-0.5 sec	10 ns	0 to ± 10 V	± 50 ps	35 ns-0.5 sec	yes, included	4715
AV-1022-C	± 5V	1 Hz-10 MHz	50 ns-0.5 sec	10 ns	NA	± 50 ps	35 ns-0.5 sec	NA	1498
AV-1023-C	± 10 V (Dual channel)	1 Hz-10 MHz	50 ns-0.5 sec	10 ns	0 to ± 10 V	± 50 ps	35 ns-0.5 sec	NA	2990

HIGH-SPEED PULSE GENERATORS (over 100 Models)

MODEL*	t_R (ns)	V_{OUT} (V)	PW (ns)	PRF (MHz)	U.S. PRICE
AVP-2S	0.04	2	0.2-4.0	0-1	2700
AVP-AV-1	0.1	10	0.2-4.0	0-1	1529
AVP-AV-HV3-C	0.15	40	0.4-2.0	0-1	3284
AV-1030-C	0.2	±5	5ns - 1ms	0-10	3498
AVM-2	0.1	15	0.2-2.0	0-25	2246
AVMM-2-C	0.3-2.0	5	0.5-10	0-25	4015
AVMP-2-C	0.1	10	5-100	0-1	3575
AVPP-1-C	0.1	10	0.2-100	0-1	5150
AVN-3-C	0.15	15	0.2-1.0	50-250	4207
AVNN-1-C	0.1	5	1-30	25-250	3983
AVMR-2-C-TRF	0.3-3.0	20	20-200	0-10	4066
AVI-V	0.3	50	2-100	0-20 kHz	1216
AVI-V-HV3-C	0.2	100	5-100	0-5 kHz	3988
AVL-3A-C	0.5	300	5-100	0-5 kHz	4290

HIGH-POWER PULSE GENERATORS (over 50 models)

MODEL*	t_R (ns)	V_{OUT} (V)	PW	PRF (kHz)	U.S. PRICE
AVR-D2-C	1.0	30	0.2-20 us	0-5	4802
AV-1010-C	15	100	50 ns-10 ms	0-1000	4715
AVR-E3-W	0.5	100	0.1 us-5.0 us	0-5	2834
AVR-E4	0.4	100	1.0-5.0 ns	0-100	3261
AVR-A-1-S1-C	2	200	50-1000 ns	0-100	4043
AVR-1-PW-C	10	200	0.1-5.0 us	0-1	2718
AVRF-2-C	2	200	0.1-100 us	0-1	4980
AVR-3-C	10	200	0.1-100 us	0-10	3728
AVR-G3-C	50	250	1 us-10 ms	0-5	6009
AVL-2-C	2	350	5-100 ns	0-5	3519
AVR-4-C	20	400	0.1-100 us	0-10	4770
AVR-7B-C	50	700	0.1-100 us	0-10	6274
AVR-8B-C	150	1500	0.3-30 us	0-1	8948
AVRH-2-C	60	2000	0.2-2.5 us	0-1	6484

HIGH-SPEED LASER DIODE DRIVERS (see Cat. No. 10 for more models)

MODEL*	I_{OUT} (mA)	t_R (ns)	PW (ns)	PRF (MHz)	U.S. PRICE
AVO-9A-C	200	0.2	0.4-4.0	0-1	3250
AVO-9B-C	200	0.2	5-100	0-1	4142
AVO-9E	400	0.3	20-200	0-5	2606
AVO-9F-C	100	0.2	3-30	25-250	4550
AVO-9G-C	1000	0.5	20-200	0-50 kHz	4331
AVO-6A1-C	1000	1	100-5000	0-0.01	4608
AV-155C-C	2000	50	0.1-10 us	0-1.0	2620
AV-156C-C	2000	200	1-1000 us	0-10 kHz	2798
AVO-2W	10 Amp	2.0	2-50	0-20 kHz	1871
AVO-3A	70 Amp	1	2	0-20 kHz	2029

HIGH-POWER LASER DIODE DRIVERS (over 30 models)

MODEL*	I_{OUT} (A)	t_R (ns)	PW	PRF (kHz)	U.S. PRICE
AVO-5-C	28	3	5-100 ns	5	4078
AVO-5B-C	48	10	25-500 ns	1	4078
AVO-1	100	8	25 ns	1	1323
AVO-7A-C	40	100	0.5-200 us	1	4478
AVO-6C-C	5	10	0.1-5 us	1	4031
AV-156A-B*	5	3 us	10us - 10ms	10	5118
AVOZ-A2-C	100	20	0.03-2 us	2	3988
AVO-8B-C	100	1 us	1 us-1 ms	1	4400
AVO-8C-C	200	1 us	1 us-1 ms	1	4730
AVO-8D-C	500	2 us	5 us-10 ms	1	5555

IMPULSE GENERATORS (over 40 models)

MODEL*	V_{OUT} (V)	PW (ns)	PRF (MHz)	PRICE (US)
AVH-S-1	0-10	0.130	0-1.0	1952
AVH-M1	30	1.0	0-1.0	459
AVMH-3-C	0-50	0.6	0-25	3577
AVH-HV1	0-100	1.0	0-0.1	2098
AVG-1	0-250	4.0	0-0.02	1735
AVG-4A	0-650	4.0	0-0.01	2321

MONOCYCLE GENERATORS (40 models)

MODEL	V_{OUT} (V)	f_0 (MHz)	PRICE (US)
AVD	20	400-1500	1000
AVA	20	200-400	1000
AVC	35	20-200	1088
AVB1-3	50	400-900	2300
AVB2-TA-C	400	25-50	4925
AVB3-TB-C	750	75-100	6143

PULSE AND CW AMPLIFIERS (over 40 models)

MODEL	GAIN	BW (MHz)	t_R (ns)	V_{OUT} (max)	PRICE (US)
AV-131	40 dB	1-500	1.0	1	418
AV-134	10 dB	1-2000	0.3	1	418
AV-141C	20 dB	DC-600	1.0	3	470
AV-141F	20 dB	DC-75	4	5	681
AV-143B	x 5.0	DC-10	50	20	891
AV-144B1	x 4	DC-100	2	20	628

FUNCTION GENERATORS

- ±10V, 10MHz models
- ±200V and ±500V models
- Sine, square, triangle, DC
- Useable as linear amplifiers

DELAY GENERATORS

- analog and digital models
- one or two channels
- manual or GPIB controlled models
- low jitter and insertion delays

FREQUENCY DIVIDERS

- 10 & 100 MHz Dividers
- Division factors to 999
- TTL inputs (or sine)
- adjustable pulse width out

ACCESSORIES & OPTIONS

LOW IMPEDANCE LINES
- 1, 2, 3, 6 & 12 Ohms

BIAS INSERTION UNITS
- PW from 0.2 ns to 100 us

SCOPE PROBES
- 5 GHz bandwidth
- 100 ps rise time

ATTENUATORS, SPLITTERS & COMBINERS
- Inverting & non-inverting
- 100 ps rise times

TRANSFORMERS
- Rise times as low as 60 ps
- Inverting and matching

LASER BIAS INSERTION UNITS

- Frequencies to 1500 MHz
- Peak currents from 100 mA to 48 Amp
- Socket mounting of laser diode
- DC bias and current monitor

TRANSIMPEDANCE AMPLIFIERS

- Transimpedances of 500Ω, 1, 2, 5kΩ
- 30, 150, 600 & 1200 MHz
- socket mounting of photodiode
- For PIN or APD diodes

SAMPLE & HOLD

- Gate widths variable from 0.2-4 ns or 4-20 ns
- one-shot or repetitive
- Sampling rates to 1 MHz

-B units include GPIB IEEE 488.2, RS-232 computer-control! Available on many models.

Over 400 models for device testing, time of flight, optical communications, laser, radar, airbag, SAW, ultrasonic, ATE, nuclear and other OEM and lab applications are listed in our free 113 page catalog. Many models are available with GPIB IEEE 488.2 & RS-232 control! Avtech has defined the state-of-the-art for ultra-fast waveform technology since 1975. See our product information on the World Wide Web, or call with your special requirements.

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- Laboratory accuracy of ±0.015% of FSR at +25°C, traceable to the National Bureau of Standards
- 4 1/2 Digit LCD display
- 100 µV increments
- Two output voltage ranges:
  Decimal: ±1.2V dc, ±12V dc
  Hexadecimal: ±1V dc, ±10V dc
- Up to 20 mA source or sink current capability
- Rated accuracy down to 6.5V battery level using rechargeable 7.2V battery or conventional 9V battery
- Right and left binary shift for hexadecimal calibration of A/D or D/A converters
- Convenient, easy-to-use membrane keyboard with audible feedback
- Finger-touch cursor control with automatic voltage increment or decrement
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- Automatic current limiting and low battery indication
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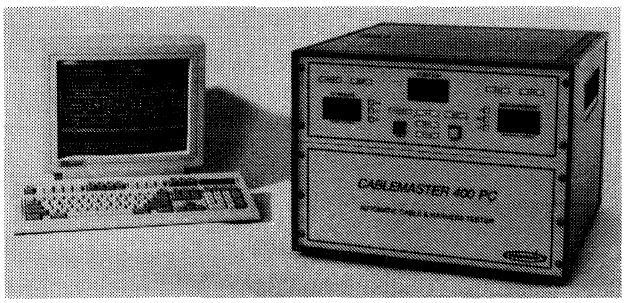
CABLEMASTER DIVISION
(818) 341-9200

AUTOMATIC CABLE HARNESS AND CONNECTOR TESTERS

CABLEMASTER MODEL 400 PC



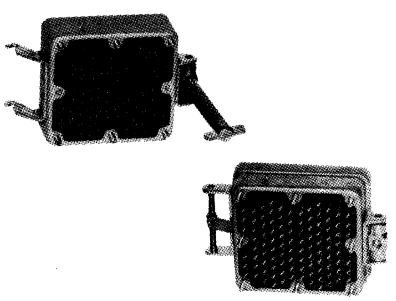
Cablemaster model 400 PC by Chatsworth Data Corporation - a fully automated computer based cable/harness analyzer designed to meet the requirements of UL, VDE, CSA, BS, FCC and MIL-SPEC's including MIL-STD-202.

HIGH VOLTAGE TESTING
- Dielectric strength (HIPOT) to 3000 vac or vdc.
- Insulation resistance (MEG) from 1 meg to 10 gigaohms, tested at 20 vdc to 1500 vdc.
- Simultaneous application HIPOT/MEG test voltage to one point against all others tied together.
- 500 volts-per-second ramp circuit.
- 10 msec arc detection circuitry.
- Rapid high voltage shutdown in less than 10 msec.
- Visual indication of test status including the presence of high voltage.
- Adjustable dwell time from 1 sec to 180 sec.

LOW VOLTAGE TESTING
- 2 wire resistance 0.5 ohms to 200 ohms.
- Test current adjustable for 0.5 amps to 3.0 amps.
- 4 wire resistance using volt/ammeter method (optional).
- 4 wire voltmeter range is 10 mv to 20 volts (optional).
- Constant current source provides 0.1 amp to 3.0 amps.

PERFORMANCE FEATURES
- COST EFFECTIVE.
  The Model 400 PC uses switching modules to handle both high voltage and current at a lower cost-per-point than any reed relay switching matrix system. Dielectric strength, insulation resistance and continuity tests are performed using the same adapter cable.
- MULTIPLE CIRCUITS.
  Complex branch circuitry, referred to as "multiple circuits," are automatically sensed and tested without additional programming and without the use of patch panels or jumper plugs. Using this unique Cablemaster feature simplifies multiple and simple circuit checking, permits them to be mixed in any sequence, and reduces adapter cable manufacturing costs. Multiple circuits are tested against all other points and all other multiple circuits simultaneously, satisfying the requirements of aerospace vehicle and guided missile cable specifications.
- EASE OF OPERATION.
  Simplified operating procedures permit the cablemaster to be operated by non-technical personnel. Controls are executed via computer keyboard on a user friendly menu.
- PERMANENT TEST RECORD
  A computer print-out can be generated for either all points tested or faults only. The test results (stimulus voltage/current, discrete measured value and test decision) are automatically stored to computer hard disk and can be retrieved for future analysis.
- COMPLIES WITH MILITARY SPECIFICATIONS.
  MIL STD 202 and other military specifications are met by applying Meg and Hipot test voltage simultaneously "to one point against all other points tied together" for the entire specified dwell times. See footnotes.
- TEST CREATION.
  Tests are created by following a simple menu-driven Test Format generator–no computer programming is required by the operator. Test Formats may be password protected to avoid unauthorized alterations.
- FAIL SAFE FEATURES.
  Upon Detection of a Hipot failure, test voltage is rapidly (less than 10 ms) shut down to protect the item under test. Tester circuitry, external computer, and printer are protected from high voltage spikes by a proprietary isolation device.
- EXPANDABLE.
  The base units has 400 points (200 continuity circuits) and is expandable to 1600 points (rack mounted).
- RISE TIME.
  A rise time control is available to ramp test voltage up at 500 volts per second.

HIGH VOLTAGE CONNECTORS WITH QUICK DISCONNECT

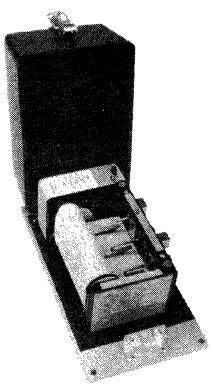


High voltage, high current connector with hinge action mating; comes in 50 pin and 100 pin configurations. Will accommodate 50 or 100 No. 16 wires, and is nominally rated at 2000 volts at RMS 60 Hz at sea level. Available with various types of contacts.

IMPACT-O-GRAPH DIVISION
(818) 341-3000

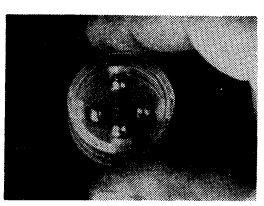
IMPACT INDICATORS, ACCELEROMETERS AND RECORDERS

IMPACT-O-GRAPH RECORDER



Impact-O-Graph recorders are available in sensitivities of 2g to 300g full scale deflectioh. Recording period of various models is from (1) one minute to (6) six months. Independent styli record time, direction and magnitude of impacts in (3) three separate axes. Lightweight and compact. Self-contained – no outside power necessary. Used to monitor shipping and handling abuse and to design packaging.

IMPACT INDICATOR



Resettable and non-resettable impact indicators (accelerometers) are used to monitor impacts accurately from all directions to give a visual indication that a specific "g" level has been exceeded. Used to monitor shipping and handling abuse. Available up to 300g.

CHATSWORTH DATA CORPORATION

DEPT. EM, 20710 LASSEN STREET/CHATSWORTH, CALIFORNIA 91311/(818) 341-9200
CABLEMASTER DIVISION (818) 341-9200/IMPACT-O-GRAPH DIVISION (818) 341-3000
FAX: (818) 341-3002

Cable/Harness Testing

Continuity / Resistance / Hipot / SCSI / Twisted Pair / Installed Cables

Signature: Cable/Harness Testers

Cirris Systems Signature™ cable/harness quality assurance systems are easy to use, rugged, and affordable. The systems feature self-programming, non-volatile memory, and the industry's widest choice of interchangeable adapters. Systems offer both audible and visual information to verify quality, and to direct guided assembly work.

Cirris' commitment to overnight service, customer support, and immediate availability is unmatched. All equipment carries a full 1-year warranty.

CH+ 1500VDC, 1000VAC PC-Based, Expandable
Tests Assemblies with Resistors, Diodes, and Capacitors

Specifications:

Capacity:	256 to 5376 points in 256-point increments
Test Levels:	8-1500VDC, 100-1000VAC
Sensitivity:	Conductance: normal: .1 to 100KΩ 4-wire: .001 to 10Ω
Leakage:	5M to 1000MΩ
Size (inches):	7" x 10" x 18" (rack mountable)

TOUCH 1 1000VDC Hipot, Expandable
Tests Assemblies with Resistors, Diodes, and Capacitors

Specifications:

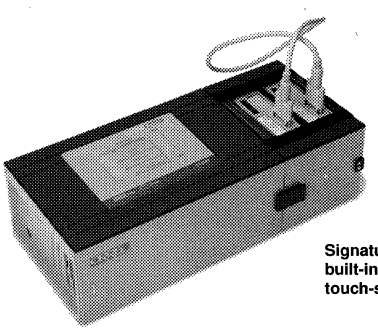
Controller:	Built-in 486 PC with 1 floppy and 1 hard disk drive. Serial, parallel, keyboard and monitor ports standard. Ethernet port optional.
Capacity:	128 to 512 points in 128-point increments
Test Rate:	128 points/.25 second (typical)
Test Levels:	5-1000VDC
Sensitivity:	Conductance: normal: .1 to 1MΩ 4-wire: .001 to 10Ω
Leakage:	5M to 1000MΩ
Size (inches):	14" x 9" x 6"

1000H+ 1000VDC Hipot, Tests Assemblies with Resistors, Diodes, and Capacitors, Expandable

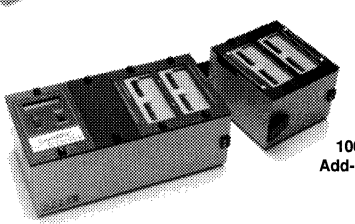
Specifications:

Capacity:	128 to 512 points with expansion boxes
Test Rate:	128 points per second
Test Levels:	5-1000VDC
Sensitivity:	Conductance: normal: .1 to 100KΩ 4-wire: .001 to 10Ω
Leakage:	5M to 1000MΩ
Size (inches):	5" x 6.5" x 13"

The new 1500VDC, 1000VAC Signature CH+ Wiring Analyzer Base Unit (bottom) shown with a single CH+ Test Point Scanner module (top). System includes Windows™-based software to run on your 386/486 PC compatible.



Signature Touch 1 with built-in 486 PC & graphical touch-screen control.



1000H+

1000H+ Add-on Box

Specifications subject to change without notice. Windows is a trademark of Microsoft Corporation.

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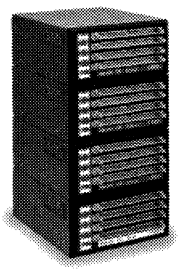
Continuity / Resistance / Hipot / SCSI / Twisted Pair / Installed Cables

easy-wire CR Guided harness assembly and testing

Specifications:

Capacity:	256 to 65,024 points in 256-point increments
Test Rate:	256 points < 1 second
Test Levels:	10VDC @ < 6mA
Sensitivity:	.1 to 1MΩ
Size (inches):	5.4" x 6.6" x 2.6"

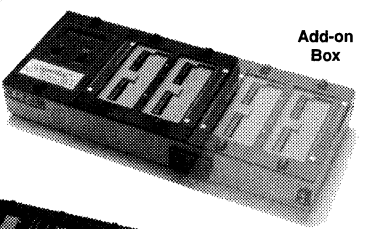


easy-wire CR

1000R+ Resistance/Continuity Testing, Expandable, Tests Assemblies with Resistors & Diodes

Specifications:

Capacity:	128 to 512 points with expansion boxes
Test Rate:	128 points per second
Test Levels:	5VDC @ 3mA
Sensitivity:	.1 to 5MΩ
Size (inches):	2" x 6.7" x 10.5"

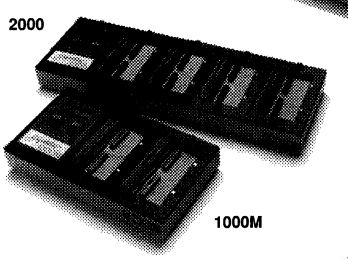


1000R+ Add-on Box

1000M/2000 Priced from $995

Specifications:

Capacity:	128 (1000M) / 256 (2000) points
Test Rate:	.2 seconds (128 points)
Test Levels:	5VDC @ 1mA
Sensitivity:	shorts < 1KΩ, opens > 1.5KΩ
Size (inches):	2" x 7" x 12" / 2" x 7" x 19"



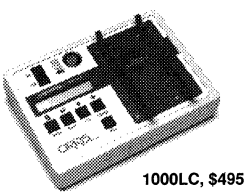
2000

1000M

1000LC Low Cost, Battery-Powered Continuity Testing

Specifications:

Capacity:	128 points (no adapter support)
Test Rate:	.5 seconds typical
Test Levels:	9 volts (current limited to 2mA)
Sensitivity:	Connections < 4KΩ, opens > 4KΩ
Size (inches):	8.5" x 5.5" x 2.2"



1000LC, $495

500 Portable Testing of Installed Cables, Twisted Pair Testing

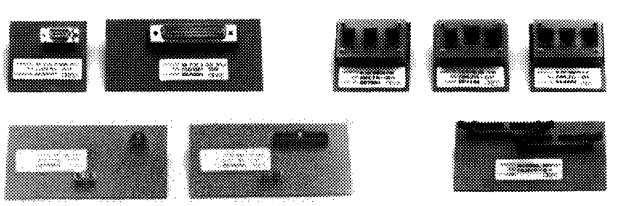
Specifications:

Capacity:	64 points per unit (2 units can be paired together for a total of 128 points—required for installed cable testing)
Test Rate:	.5 seconds (longer as cable length increases)
Test Levels:	9 volts (current limited to 2mA)
Sensitivity:	Connections < 4KΩ, opens > 4KΩ
Size (inches):	8.5" x 5.5" x 2.2"

The new Signature 500 offers remote testing of installed cables with a unit connected at each end of the cable. Single units offer 64-point continuity testing and twisted-pair testing in a light-weight, easy-to-use design.

The Most Complete Line of Connector Adapters Available

Cirris offers immediate availability of the most common connectors in the industry, now including SCSI, Wide SCSI, and USB connectors. As the market leader, Cirris is always first with adapters you need for the newest connectors on the market.



Specifications subject to change without notice.

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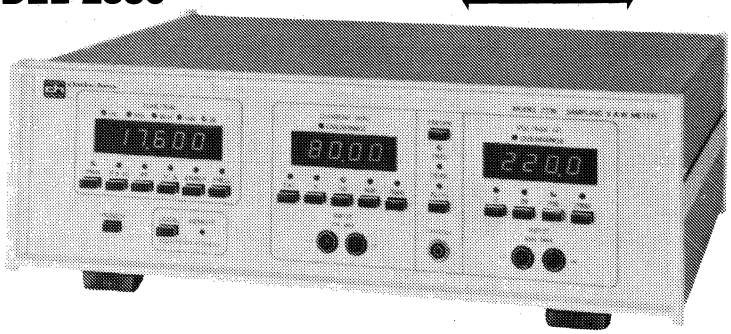
VOLT-AMPERE-WATTMETERS

MODEL 2330

IEEE-488



SAMPLING V-A-W METER

- Isolated Inputs
- Current to 10 Amperes
- Voltages to 600 Volts
- DC to 400 kHz
- Less than 0.2% Uncertainty (All PF to 200kHz)
- Less than 0.4% Uncertainty (All PF to 400kHz)

Model 2330 Sampling V-A-W Meter measures Current, Voltage, Power, Power Factor, Energy and Frequency. Displays Current, Voltage and one other of the measured parameters. Either true RMS or PEAK Current and Voltage. AUTO-RANGING or MANUAL operation. Current Ranges of 5mA, 50mA, 500mA, and 5A. Voltage Ranges of 2V, 20V, 200V, 2000V (usable to 600V). 100% over range capability. IEEE-488 Interface standard. $3,595

Model 255/256 V-A-W Meter measures Current and Voltage from DC to 300kHz and Power from DC to 100kHz with 0.6% accuracy for all power factors. Single Display. Current Ranges of 5mA, 50mA, 500mA, and 5A. Voltage Ranges of 20V, 200V, and 1000V (100V for the Model 256). $1,800

Model 258 V-A-W Meter measures Current, Voltage and Power from 50Hz to over 1MHz with better than 1% accuracy for all power factors. Typical Current Ranges of 50mA, 250mA, 500mA, and 2.5A. Current transformer input. Voltage ranges of 20V, 100V, 200V. 100% over range capability. $2,735

TRANSCONDUCTANCE AMPLIFIER

HIGHLY ACCURATE • 100 AMPERES AT 100 kHz • 7 VOLT COMPLIANCE

MODEL 8100

IEEE-488

- 200μA to 100A in six ranges
- 100% over range capability
- 50ppm short term stability
- 0.04% dc and 0.10% AC accuracy
- Accuracy independent of load
- Distortion below -60dB
- Complete Front Panel Calibration
- IEEE-488.2 Interface standard
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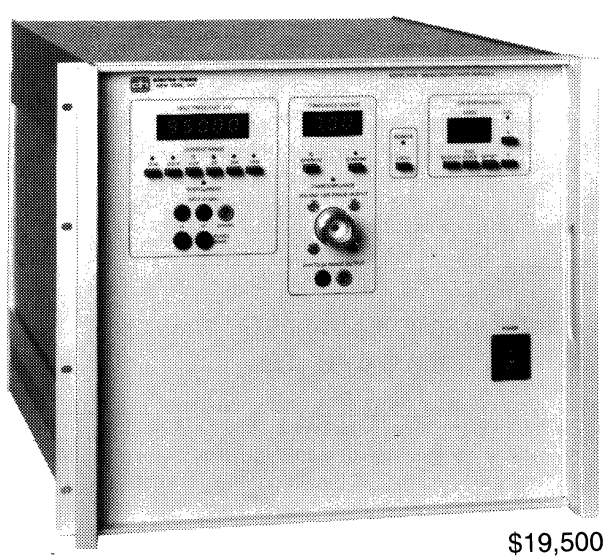

$19,500

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DIGITAL PHASE STANDARD

IEEE-488

$12,500

MODEL 5500

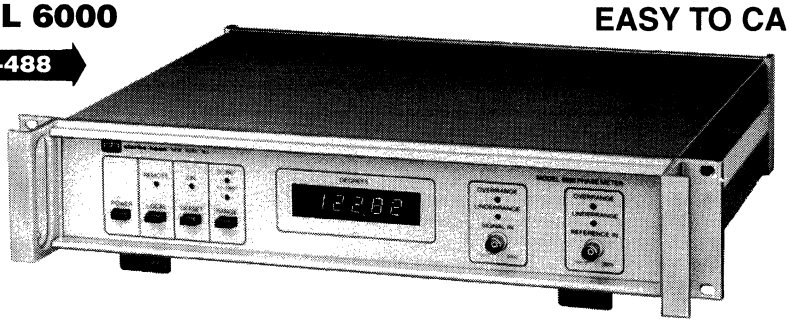
- High Phase Resolution of 1m°
- Outputs from 50mV to 120V RMS
- Frequency Range 1Hz to 100kHz (200kHz option)
- High Phase Accuracy of 5m°
- Amplitude Accuracy of 0.1% Typically
- Frequency Accuracy of 25ppm Typically
- Low Distortion Sinewaves Typically below -80dB
- Phase Accuracy Maintained with Voltage Ratios up to 2400:1
- All Parameters Stable with Time and Temperature

The **MODEL 5050**, 5A phase controlled transconductance amplifier is used to increase the current output of the Variable Channel of the Model 5500 while maintaining the phase accuracy. This configuration functions as a phantom power generator of greater than 600W for wattmeter calibration.

PHASE METER

MODEL 6000

IEEE-488



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- 20m° Typical Accuracy
- Waveshape Independent
- 10mV to 350V Input Voltages
- 10,000:1 Input Ratios
- 5 Hz to 500 kHz
- Analog Output

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Model 828 AC/DC V-A Source is a light-weight truely portable device capable of calibrating analog and digital panel meters in the lab, on the production line or in field installations. Low cost, compact and highly accurate. Voltage Ranges of 1V, 10V, 100V, and 1000V. Current Ranges of 1mA, 10mA, 100mA, 1A, and 10A (5A max.). Resolution 0.1% of Range, Accuracy: DC voltage ±0.1%, AC voltage ±0.15%, AC/DC current ±0.2%. **$3,495**

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HIPOT TESTERS

HT-2000 HT-2800 HT-3000

DIELECTRIC WITHSTAND (HIPOT) PRODUCTION LINE TESTER

AC voltage to 2000 volt 20mA, DC voltage to 2800 volts 5mA or, AC to 20mA/DC to 5mA both up to 2800 volts.

- *Logic controlled, one button test. LED's indicate test progress. Upon failure, buzzer sounds and testing is terminated.*
- *Output voltage, leakage current limit, voltage ramp-up time, and test duration controls are controlled from the rear panel. Ground continuity test is defeatable for testing of two-wire products.*
- *NEMA 5-15R output receptacle for easy testing of finished products.*
- *Automatic voltage rampdown circuit eliminates residual voltage.*
- *Operation instructions provided on the rear panel.*
- *High efficiency design results in low power consumption.*
- *Performs to safety agency requirements for production line testing.*
- *Ergonomically designed for safety, speed, and efficiency.*
- *Calibration resistor mounted on rear panel.*
- *One year calibration cycle.*
- *Test leads included.*
- *Economical, compact and durable.*
- *TEST-LINK - Compatible.*
- *30 day trial - 1 year warranty.*

HT-5000

HIGH VOLTAGE DIELECTRIC WITHSTAND (HIPOT) AC/DC TESTER

AC voltage to 5000 volts 10mA.
DC voltage to 7200 volts 10mA

- *Logic controlled, one button test. LED's indicate test progress. Upon failure, buzzer sounds and testing is terminated.*
- *Output voltage, leakage current limit, voltage ramp-up time, and test duration are controlled from the rear panel.*
- *Ground continuity test is defeatable for testing of two-wire products.*
- *Automatic voltage rampdown circuit eliminates residual voltage.*
- *Operation instructions provided on the rear panel.*
- *High efficiency design, low power consumption.*
- *Performs to safety agency requirements for production line testing.*
- *Ergonomically designed for safety, speed, and efficiency.*
- *Calibration resistor mounted on rear panel.*
- *One year calibration cycle.*
- *Economical, durable and compact.*
- *Test leads included.*
- *30 day trial - 1 year warranty.*

GF-25A

HIGH CURRENT GROUND CONTINUITY TESTER

- *DC output - constant current delivers 25 amps to any ground circuit with resistance of 0 to 0.1 ohms.*
- *Logic controlled, one button test. Lights indicate test results. Upon failure, buzzer sounds and testing is terminated.*
- *V-irtual™ voltage sense circuit compensates for lead resistance.*
- *Operation instructions provided on the rear panel.*
- *High efficiency design, low power consumption.*
- *Performs to safety agency requirements for production line testing.*
- *Ergonomically designed for safety, speed, and efficiency.*
- *Calibration resistor mounted on rear panel.*
- *One year calibration cycle.*
- *Economical, durable and compact.*
- *Test leads included.*
- *TEST-LINK - Compatible.*
- *30 day trial - 1 year warranty.*

TEST-LINK™

THE TEST-LINK™ OPTION INTERCONNECTS THE HT (HIPOT) WITH THE GF (HIGH CURRENT TESTER)

The ultimate choice for both ground continuity and hipot testing. The TEST-LINK™ option combines the GF with the HT to perform both tests as one simple operation. Logic level circuits and interconnecting cables unite the two testers. A 60-second setup! Once the GF and the HT are interconnected, simply plug the product into the HT's high voltage receptacle located on the front panel and press the blue "TEST" button. First, the high current ground continuity (GF) test will be performed. In the event of failure, a buzzer will sound and all subsequent tests will terminate. If the product passes the ground continuity test, the dielectric withstand test will then be performed. All test results will be indicated by the appropriate green (pass) or red (fail) lights.

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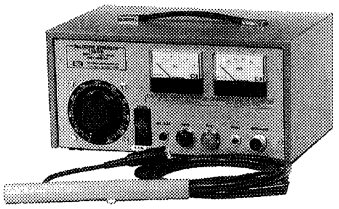

- Adjustable output potentials to 75,000 volts
- Automatic cut-out wide range of trip current
- Continuously indicating high-voltage voltmeter
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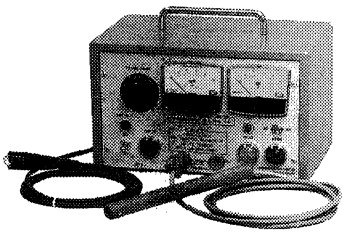
- Optional milliameter
- Indicator lamps
- Safety device for incorrectly wired outlet
- Heavy-duty retractable prod (to 5 kV)



FOR TESTING TO MEET U.L. AND CSA SPECIFICATIONS

MODEL NO. WITH MILLIAMMETER	MODEL NO. WITHOUT MILLIAMMETER	OUTPUT VOLTAGE	TRIP CURRENT
AV-25VA-5V	AV-25V-5V	0-2.5 kV AC	2-5 mA
AV-25VA-10V	AV-25V-10V	0-2.5 kV AC	2-10 mA
AVC-25VA	AVC-25V	0-2.5 kV AC	95 mA
AV50VA-5V	AV-50V-5V	0-5 kV AC	2-5 mA
AV-50VA-10V	AV-50V-10V	0-5 kV AC	2-10 mA
AVC-50VA	AVC-50V	0-5 kV AC	2-95 mA
AV-100VA-5V	AV-100V-5V	0-10 kV AC	2-5 mA
AV-100VA-10V	AV-100V-10V	0-10 kV AC	2-10 mA
AV-150VA-5V	AV-150V-5V	0-15 kV AC	2-5 mA
DV25VA-5VE		0-2.5 kV DC	0.1-5 mA
DV25VA-5V	DV-25V-5V	0-2.5 kV DC	2-5 mA
DV-50VA-5V	DV-50V-5V	0-5 kV DC	2-5 mA
DV-50VA-10V	DV-50V-10V	0-5 kV DC	2-10 mA
DV-100VA-10V	DV-100V-10V	0-10 kV DC	2-10 mA
DV-150VA-5V	DV-150V-5V	0-15 kV DC	2-5 mA
AV/DV-25VA-5V	AV/DV-25V-5V	0-2.5 kV AC/DC	2-5 mA
AV/DV-25VA-10V	AV/DV-25V-10V	0-2.5 kV AC/DC	2-10 mA
AV/DV-50VA-10V	AV/DV-50V-10V	0-5 kV AC/DC	2-10 mA
AV/DV-50VA-95/10V		0-5 kV AC/DC	2-95 mA AC/2-10 mA DC
AV-30VA-400V		0-3 kV AC	95-400 mA
AV-30VA-500V		0-3 kV AC	95-500 mA
AV-50VA-1000V		0-5 kV AC	100-1000 mA
AV-60VA-1000V-V3		0-6 kV AC	100-1000 mA
AV-100VA-500V		0-10 kV AC	100-500 mA
AV-150VA-750V		0-15 kV AC	100-750 mA
AV-350VA-10V		0-35 kV AC	2-10 mA
AV-350-50V		0-35 kV AC	10-50 mA
DV-300VA-5V		0-30 kV DC	2-5 mA
DV-750-5		0-75 kV DC	2-5 mA

Other voltages and currents on special order up to 100 kV, up to 20 kVA.
Also available: manual and automatic testers to test high voltage, continuity and insulation resistance or current leakage to meet U.L., CSA, or European specifications.

INSULATION RESISTANCE TESTERS

CONDENSED SPECIFICATIONS

MODEL NO.	TEST VOLTAGE	RESISTANCE RANGE	POWER SOURCE
BIRT-1000C	0-1000 V well regulated	2-2,000,000 MΩ	battery and ac line
BIRT-5000B	400-5000 V well regulated	1-1,000,000 MΩ	battery and ac line
BIRT-5000C	400-5000 V well regulated	100-100,000,000 MΩ	battery and ac line
BIRT-7500B	500-7500 V well regulated	1-1,000,000 MΩ	battery and ac line
BIRT-10000B	800-10000 V well regulated	1-1,000,000 MΩ	battery and ac line
IR-250	250 V regulated	0-250 MΩ	ac line
IR-500	500 V regulated	0-500 MΩ	ac line
IR-1000	1000 V regulated	0-1000 MΩ	ac line
IR-500-100K	500 V regulated	1-100,000 MΩ	ac line

Higher-voltage testers or other special units can be designed to meet your particular specifications.

For more information, please contact:

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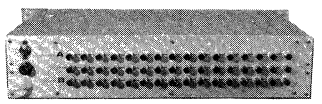
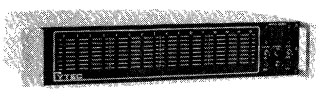
Standard 19 inch rack mounting units expandable in Matrices, Multiplexers or Individual Relay configurations with LED Display of the selected relays.

BENCHTOP

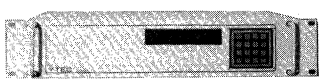
These are small, low cost, 1.7" high units with up to 128 relays in Matrix, Multiplex or Individual Relay configurations or 48x48 Solid State Matrices.



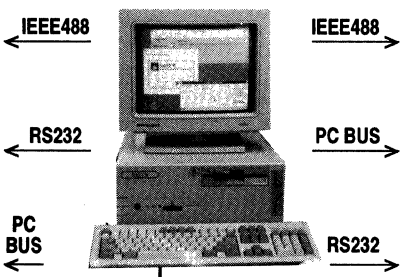
COAXIAL SWITCHES

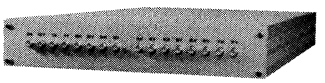


MATRICES



MULTIPLEXERS





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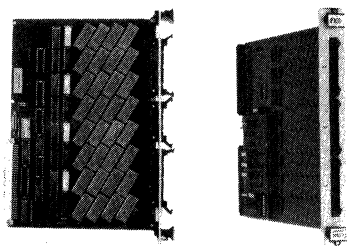
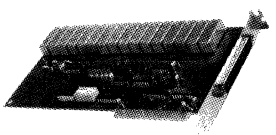
MATRIX

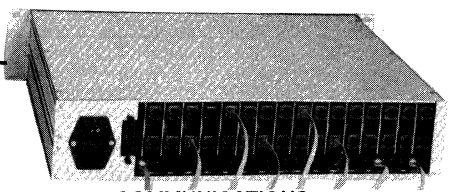
MULTIPLEX

VXI & VME BUS MODULES





LAN-INTERFACE



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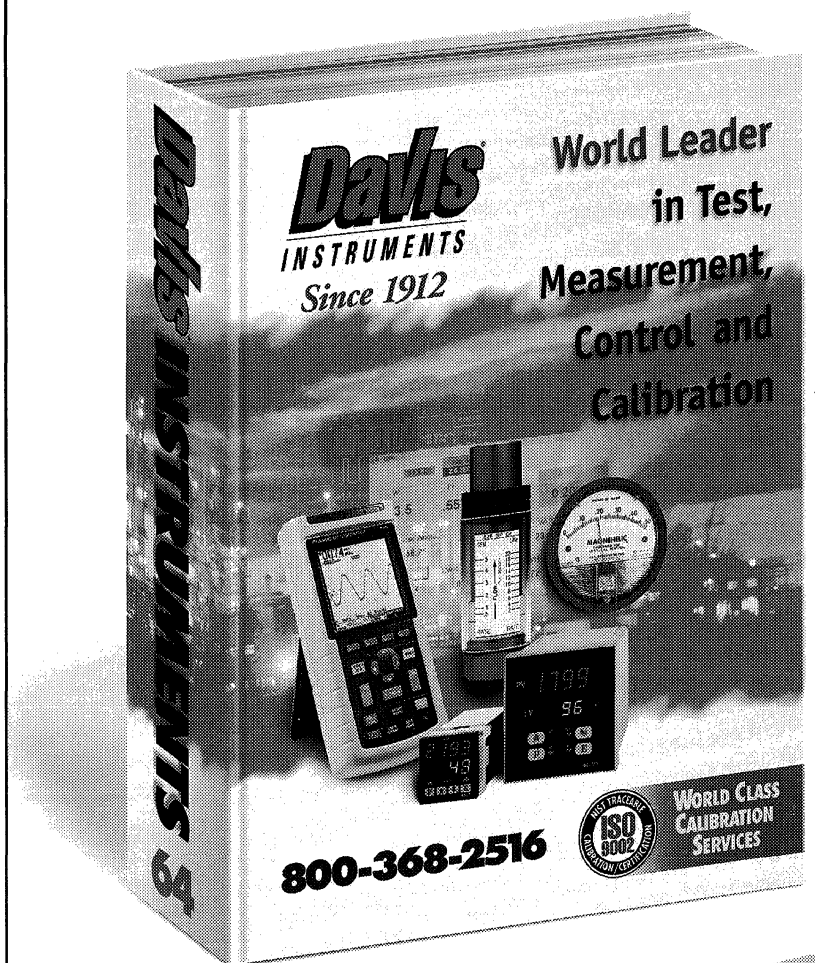

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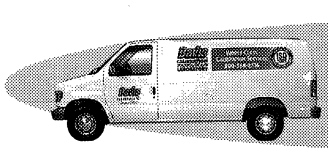

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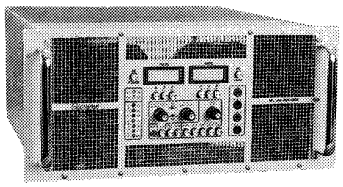
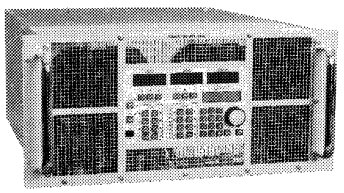


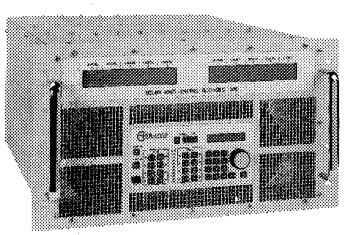
Local control and remote programming includes current, resistance, voltage, power, pulse amplitude, pulse width, pulse shape and pulse frequency with operation from 0 to 600 amps and compliance from a fraction of 1 volt to 600 volts. Master/Slave paralleling easily expands system capability. Multi-range programming and instrumentation provides unequaled accuracy and resolution.

NEWER RBL488 FET Loads rated at 800W, 2000W, 4000W



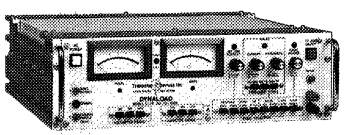
Simplified computer programming of the RBL series is via an IEEE-488 or an optional RS232 interface. Local programming is by a front panel keyboard. 10 programmable "presets" change load programs rapidly for automated testing of multiple applications.

NEWEST MCL488 MULTI-CHANNEL FET Loads (Available May '98)



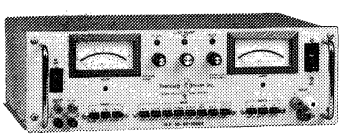
The MCL488 Multi-Channel load provides up to 10 independent load channels programmed via a single IEEE-488 bus or a front panel keyboard. Each load channel is rated at 350 watts. Channels may be paralleled for higher power loading up to 3500 watts with automatic correction of instrumentation. Load channels may be added in the field without special tools.

DLVP Loads rated at 1500W, 2500W, 3000W



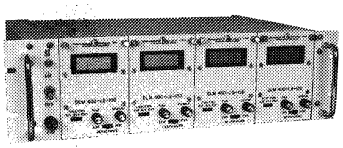
The DLVP Series is popular for laboratory and automotive testing with current, resistance, voltage, pulse rate and duty cycle operation. Analog front panel controls simplify operation. Remote constant current programming of 0-10 volts is included.

DLP Load rated at 1000W Compact Design for Bench-Top Applications



Current, resistance, voltage and pulse operation makes the DLP an economical choice for engineering and design verification. The pulse rate is variable with a 50% duty cycle. Analog front panel controls simplify operation. Remote constant current programming of 0-10 volts is included.

DLM Loads rated at 100W Modules Low Cost Multi-Channel Load



Low cost 100 watt load modules fit four across in a 19" sub-rack for high volume testing or burn-in. Operation includes constant current and constant resistance. Remote constant current programming of 0-10 volts is included. Modules can be used in parallel. Analog front panel controls simplify operation.

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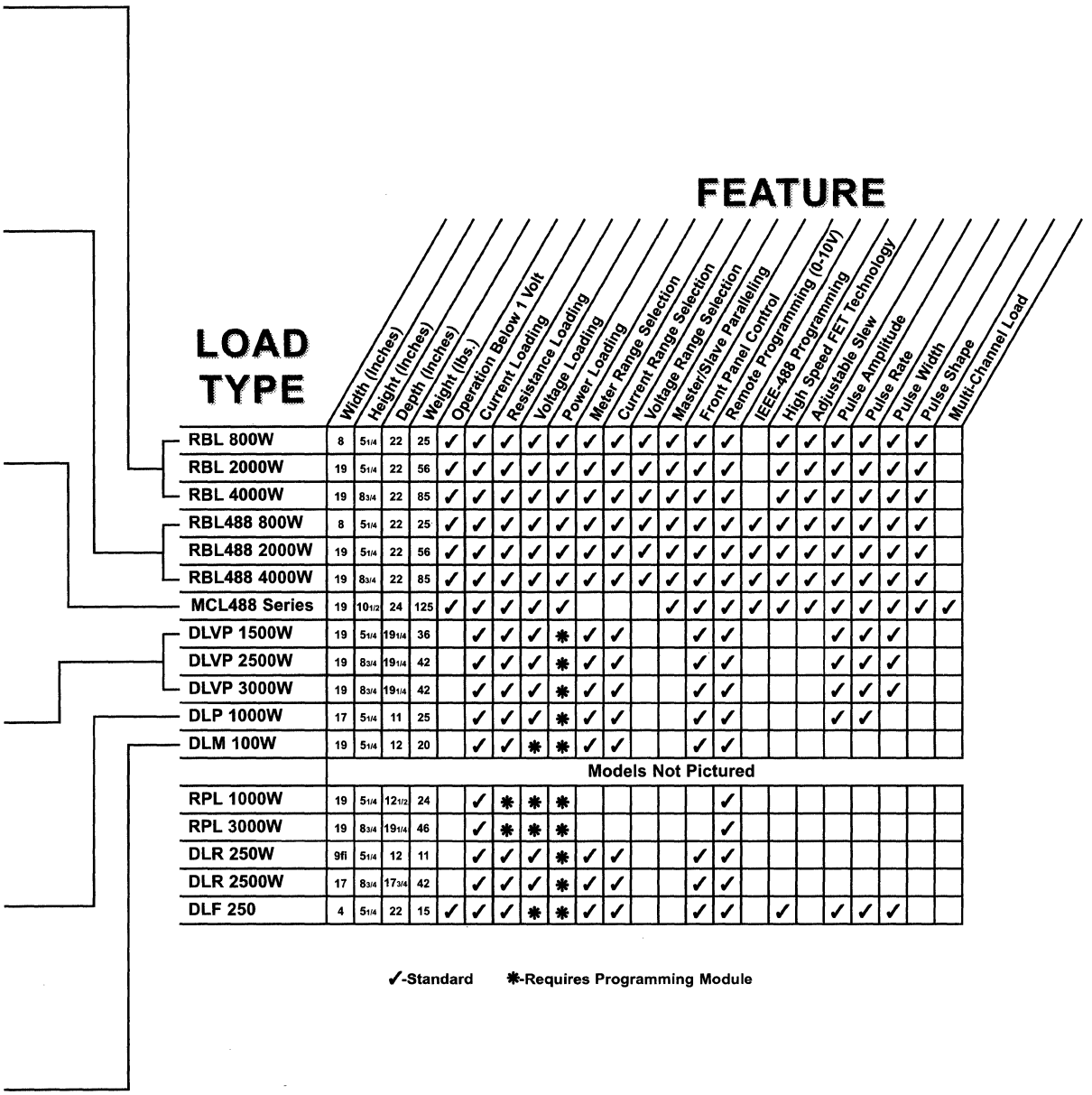
Website: www.dynaload.com

PRODUCT OVERVIEW



LOAD TYPE	Width (inches)	Height (inches)	Depth (inches)	Weight (lbs.)	Operation Below 1 Volt	Current Loading	Resistance Loading	Voltage Loading	Power Loading	Meter Range Selection	Current Range Selection	Voltage Range Selection	Master/Slave Paralleling	Front Panel Control	Remote Programming (0-10V)	IEEE-488 Programming	High Speed FET Technology	Adjustable Slew	Pulse Amplitude	Pulse Rate	Pulse Width	Pulse Shape	Multi-Channel Load
RBL 800W	8	5 1/4	22	25	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		
RBL 2000W	19	5 1/4	22	56	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		
RBL 4000W	19	8 3/4	22	85	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		
RBL488 800W	8	5 1/4	22	25	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
RBL488 2000W	19	5 1/4	22	56	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
RBL488 4000W	19	8 3/4	22	85	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
MCL488 Series	19	10 1/2	24	125	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DLVP 1500W	19	5 1/4	19 1/4	36		✓	✓	✓	*	✓	✓			✓	✓				✓	✓	✓		
DLVP 2500W	19	8 3/4	19 1/4	42		✓	✓	✓	*	✓	✓			✓	✓				✓	✓	✓		
DLVP 3000W	19	8 3/4	19 1/4	42		✓	✓	✓	*	✓	✓			✓	✓				✓	✓	✓		
DLP 1000W	17	5 1/4	11	25		✓	✓	✓	*	✓	✓			✓	✓				✓	✓			
DLM 100W	19	5 1/4	12	20		✓	✓	*	*	✓	✓			✓	✓								
Models Not Pictured																							
RPL 1000W	19	5 1/4	12 1/2	24		✓	*	*	*						✓								
RPL 3000W	19	8 3/4	19 1/4	46		✓	*	*	*						✓								
DLR 250W	9fi	5 1/4	12	11		✓	✓	✓	*	✓	✓			✓	✓								
DLR 2500W	17	8 3/4	17 3/4	42		✓	✓	✓	*	✓	✓			✓	✓								
DLF 250	4	5 1/4	22	15	✓	✓	✓	*	*	✓	✓			✓	✓		✓		✓	✓	✓		

✓-Standard *-Requires Programming Module

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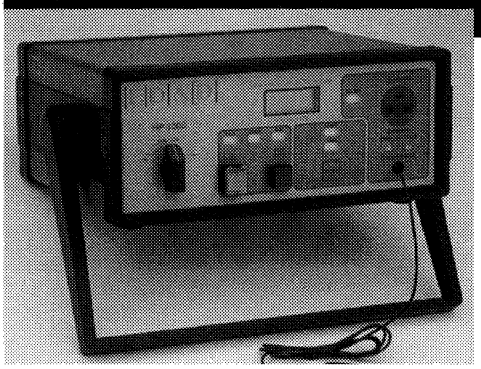
New Millennium Series Testing Equipment

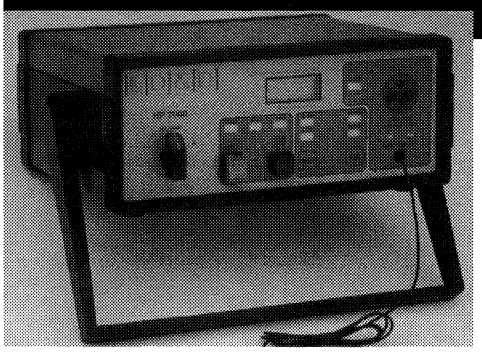


Model HP 1000 AC Hipot Tester

Introducing the world's fastest, easiest, and most affordable automatic AC Dielectric Withstand (Hipot) tester ever built, not to mention, the most reliable and repeatable. Simply put, the new Millennium Series HP1000 testers from ED&D make all others obsolete. The only such tester available produced by experts in Product Safety!

OUTSTANDING FEATURES

- Safety Protected Start Switch - Protects user from shock
- 1 Button Testing - No setup required, just plug right in
- Auto Test Time - No need to set a timer or clock watch
- Easy to identify PASS/FAIL - anyone can operate
- Special Feature: Ground Sense
- 0-3000 VAC True RMS
- Custom "Universal" receptacle accepts both 120V and 240V plugs (US / Canadian configuration)

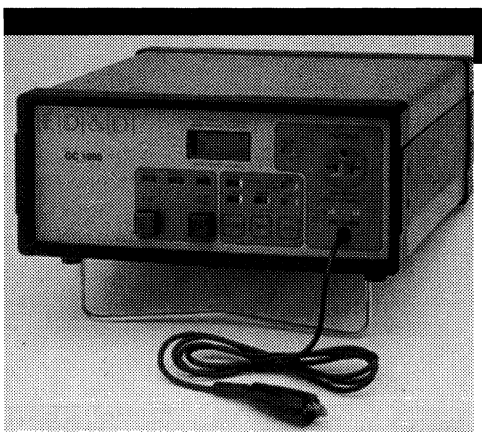


Model HP 2000 AC/DC Hipot Tester

Introducing the world's fastest, easiest, and most affordable automatic AC/DC Dielectric Withstand (Hipot) tester ever built, not to mention, the most reliable and repeatable. Simply put, the new Millennium Series HP2000 testers from ED&D make all others obsolete. The only such tester available produced by experts in Product Safety!

OUTSTANDING FEATURES

- Safety Protected Start Switch - Protects user from shock
- 1 Button Testing - No setup required, just plug right in
- Auto Test Time - No need to set a timer or clock watch
- Easy to identify PASS/FAIL - anyone can operate
- Special Feature: Ground Sense
- 0-3000 VAC True RMS
- 0-4250 VDC
- Custom "Universal" receptacle accepts both 120V and 240V plugs (US / Canadian configuration)



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OUTSTANDING FEATURES

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- Conveniently located custom front panel AC receptacle accepts 120 & 240
- Test methodology meets UL, CSA, TUV, VDE and IEC Standards
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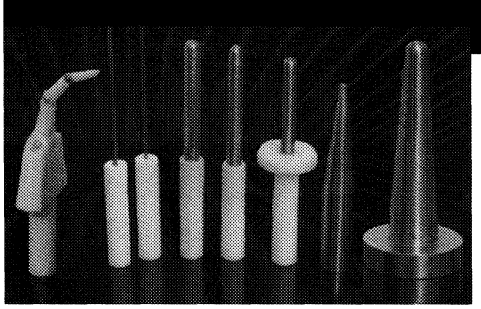
- Select Test Current: 25 or 30 Amps
- Select Test Time: 1 or 60 seconds
- Display holds data after test - Great for record keeping
- Special Feature: Zero feature allows you to "zero out" the impedance of the EUT for extremely accurate results

Equipment for Testing Access to Hazardous Parts



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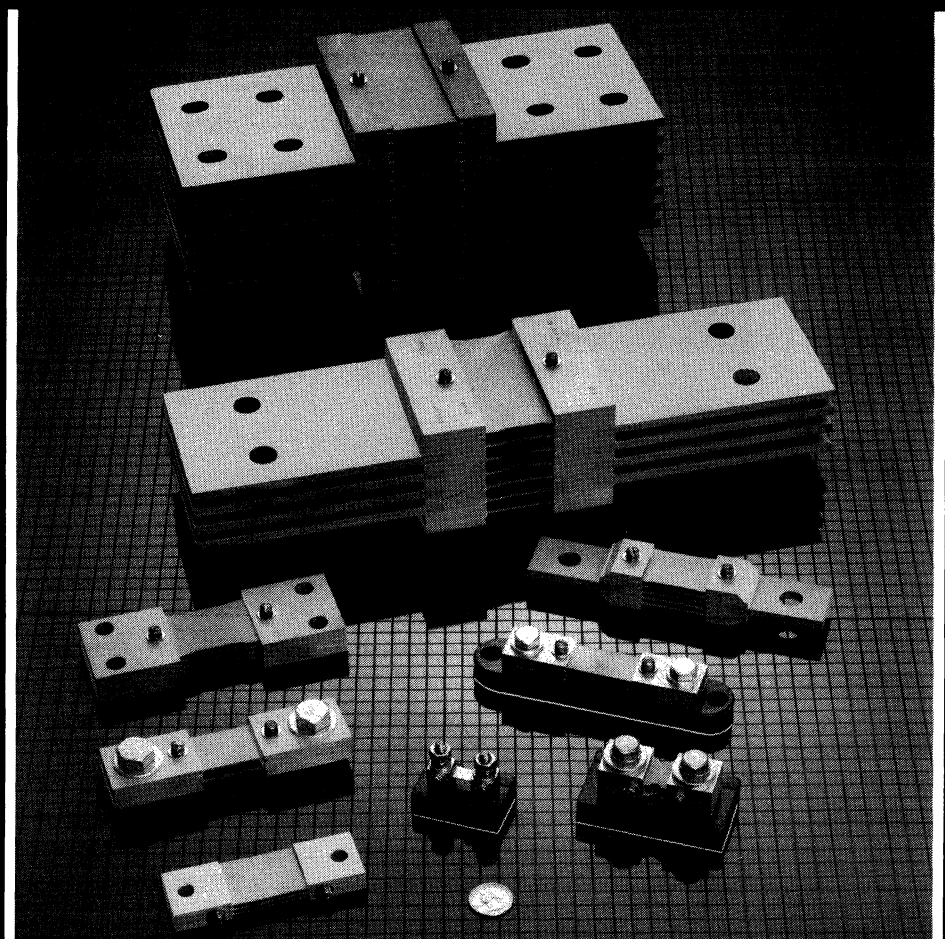

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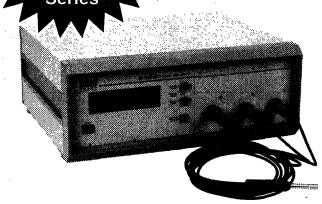
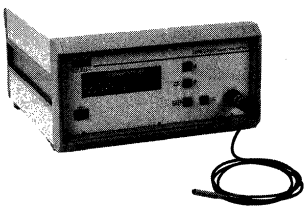


Model **9950**

Outstanding performance, widest frequency range on the market, measurement accuracy 0.075% from 10mG to 300kG. Flexibility from a single to three channel measurement.



Model **9550**

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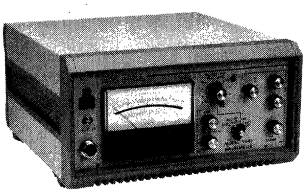
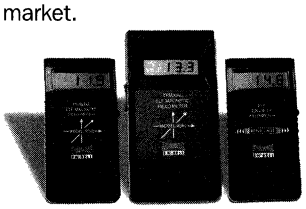


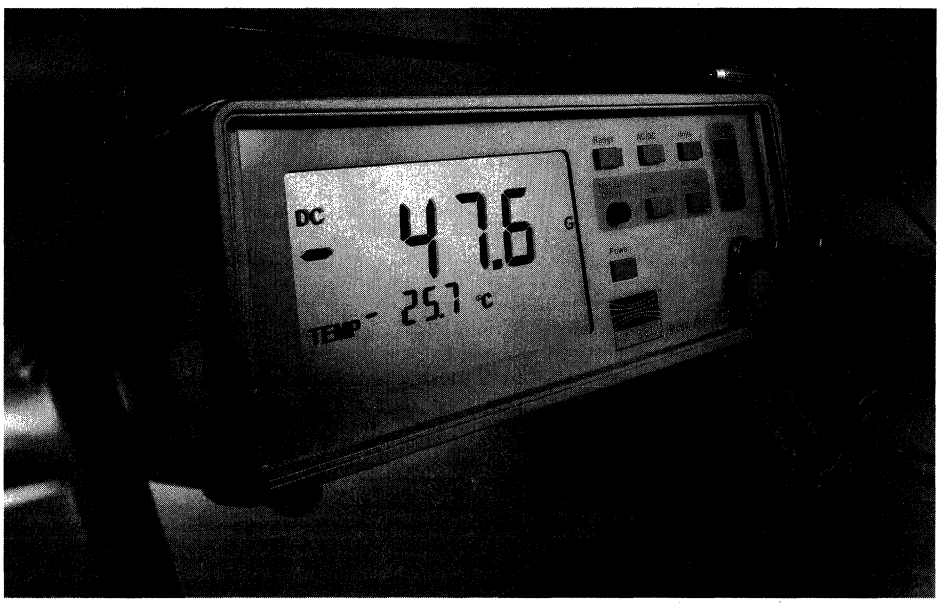
Model **9640**

Accurate measurement from 0.1G to 30kG. Range expansion feature provides minute change in field measurement with an accuracy unparalleled in the market.



Series **4000**

Lightweight, completely self contained. The 4000 Series offers a single axis and 3-axis model for EMF measurements.



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Model **6010**

The Model 6010 performs Magnetic field measurements from zero to 300 kG (30 T) over 6 ranges with a resolution of 1 mG (0.1 μT) using an appropriate probe. The Model 6010 measures both DC & True RMS AC magnetic fields, at frequencies up to 20 kHz, with a basic DC accuracy of 0.25%. The Model 6010 provides readings in Gauss, Tesla & Ampere/Meters. To facilitate temperature measurement and compensation we are introducing the new 6000 Series Hall-effect probe that features F.W. Bell's Dynamic Probe Correction technology and temperature measurement capability.

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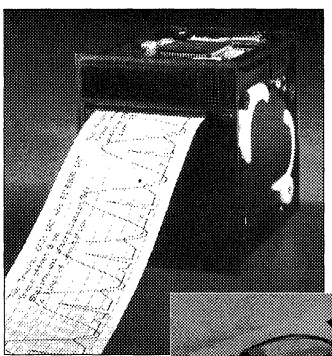
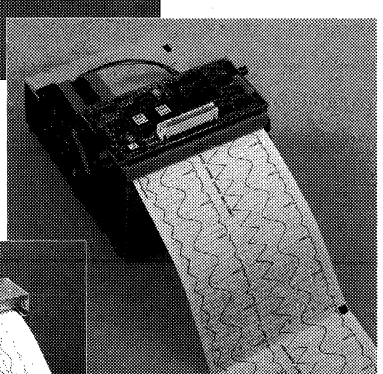
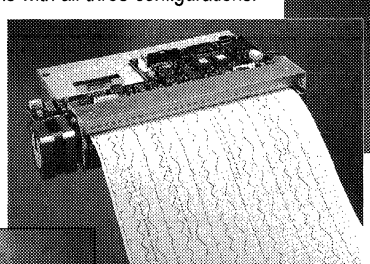


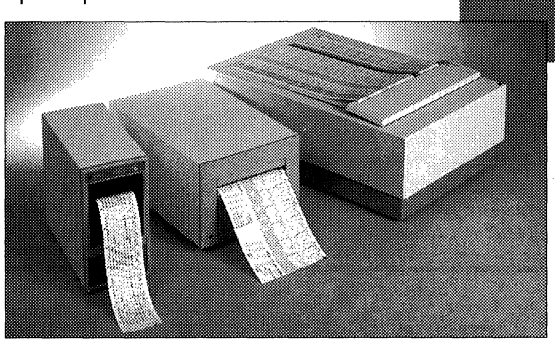
General Scanning's **AR-42** is small and versatile, with high resolution and low power demand. The AR-42 features easy-loading and prints 3 traces and 8 lines of annotation at speeds from 1mm/sec to 50mm/sec. Offering advanced hardware/software features to eliminate barriers to instrument design.



The **OMNI-100** modular recorder offers over 30 possible configurations and is available in three basic mechanical styles: print engine, panel-mount, and flat-bed recorder. The OMNI-100 motor prints at speeds from 1mm/hr to 100mm/sec and can be mounted in up to 14 different positions with all three configurations.

The **OMNI-200** offers a low-cost solution to your 200 mm printing needs. The OMNI-200 prints at speeds from 1mm/hr to 50mm/sec. Available in a low profile 50-sheet configuration or a1000-sheet configuration, the OMNI-200 prints up to 16 traces and 16 lines of annotation.





General Scanning's line of **Satellite** recorders offers a free-standing printing solution for easy, convenient use. Using the same high-performance print engines found in our medical print applications, Satellites are used to retrofit instruments that are already designed or built or when design time and/or facilities are limited. Each Satellite recorder is furnished with all the necessary approvals.

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- Burst Mode (20 MHz version)
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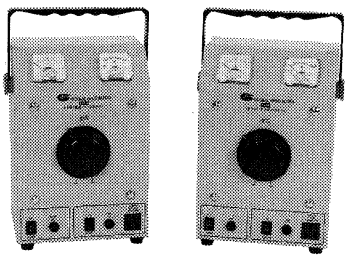
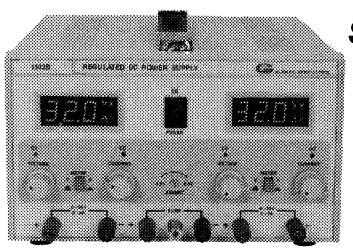
Variable AC Line Sources

1510 • 1515



- Wide operating frequency range 47-450 Hz
- High continuous current outputs:
  Model 1510: 0-10 Amps
  Model 1515: 0-15 Amps
- Continuously variable outputs of 0 to130VAC on both models
- Built-in analog voltmeter and ammeter with 2% full scale accuracy
- Power on/off switch and special ouput on/off voltage load switch
- Separate input & output fuses for double protection
- Rugged design yet portable with unique adjustable handle

Model 1510 ..... ***P/N 105-1510***
Model 1515 ..... ***P/N 105-1515***



Single & Triple Output DC Power Supplies

1302B • 1332A
1335 • 1337

TRIPLE OUTPUT SUPPLY:
- **Model 1302B:** Triple output, two 0-32V @ 2A and one 5VDC (variable from 4.5VDC to 5.5VDC) @ 5A
- Isolated, independent supplies
- Series and parallel operation

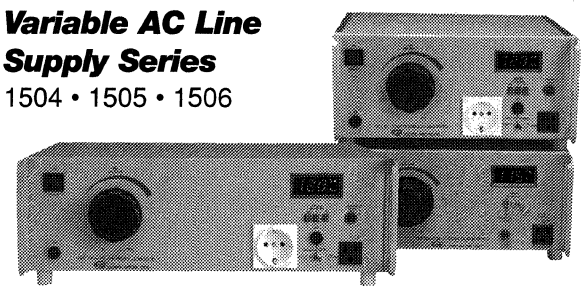
SINGLE OUTPUT SUPPLIES:
- Continuously variable with coarse and fine controls
- **Model 1332A:** 0-32V@0-5A; **Model 1335:** 0-32V@0-3A; **Model 1337:** 0-60V@0-2.5A

ALL:
- Short circuit protected
- Two digital readouts -monitor current or voltage
- Constant voltage or constant current mode with LED indicators
- Heavy duty transformer isolated design

Model 1302B ..... ***P/N 105-1307***
Model 1332A ..... ***P/N 105-1333***
Model 1335 ..... ***P/N 105-1335***
Model 1337 ..... ***P/N 105-1337***

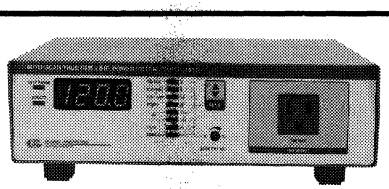
Variable AC Line Supply Series

1504 • 1505 • 1506



- Model 1504 single range: 0-150VAC@4A
- Model 1505 dual range: 0-130VAC@4A, 0-260VAC@2A
- Model 1506: 240V input, dual range output same as 1505
- Triple isolated continuously variable AC output
- Power line leakage and current measurement facilities
- 3 digit DPM for high accuracy
- Capacitive coupling less than 0.005pF
- Galvanic leakage less than 10µA
- 120dB attenuation for common mode noise

Model 1504 ..... ***P/N 105-1504***
Model 1505 ..... ***P/N 105-1505***
Model 1506 ..... ***P/N 105-1506***



Autoscan True RMS Power Line Analyzer

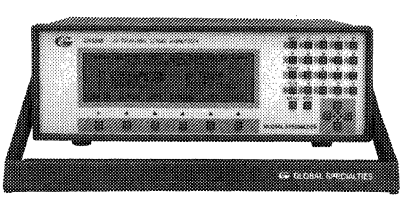
1521

- 32 Data channels from DC up to 25 MHz
- RS-232 standard interface
- 100MHz maximum acquisition speed
- 5 nanosecond glitch capture
- 4-step multilevel trigger sequencing with delay & restart
- Multiple clocks for complex synchronous capture
- Variety of disassemblers available for many popular microprocessors
- Non-volatile data and set-up memories
- 120VAC@60Hz or 220VAC@50Hz operation

Model GA 320S ..... ***P/N 105-0320***

Logic Analyzer

GA 320S



- True RMS measurements of voltage, current, power, volt-amps, power factor and line frequency
- Data Logging via RS232 interface to PC
- 7 segment display and overrange LED
- Unique user settable scan mode enables continuous monitoring of all parameters sequentially
- Selection switch allows monitoring of each parameter separately
- Reads current up to 10 Amps and wattage up to 1300 watts
- Unique power factor measurement facility

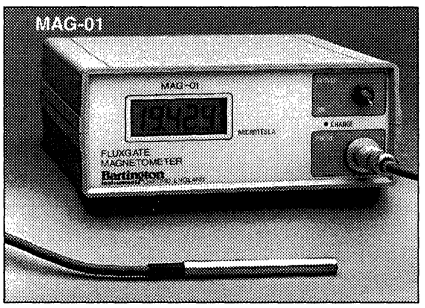
Model 1521 ..... ***P/N 105-1521***

Precision Magnetic Field Measurement

INSTRUMENTATION FOR YOUR APPLICATION

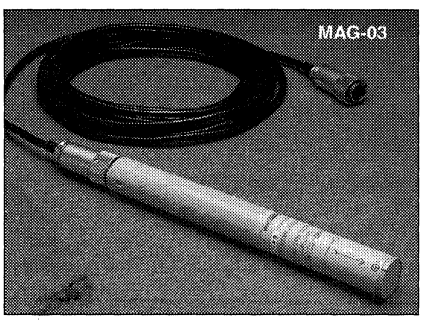
GMW offers the broadest range of magnetic field measurement instrumentation available. This allows us to provide the technical experience and support to better meet your measurement requirement. Here is an outline of the types of measurement solutions we offer.

High Sensitivity for Low Fields



The Bartington MAG-01 and MAG-01H are portable, lightweight, fluxgate instruments powered from an internal rechargeable battery or from the AC line. They are intended for the measurement of fields in the range to 2mT(20G) with resolution down to 0.1nT(1μG). The field reading is available as a digital display and an analog output with frequency response from dc to 10Hz. Single axis probes are available in different configurations with cable length to 25m.

Three-Axis for Mapping Environmental Fields

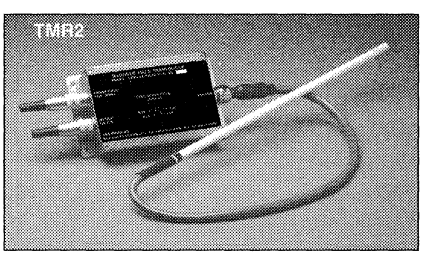


Bartington MAG-03 Fluxgate sensors are appropriate for the measurement of product emissions, monitoring sites for magnetically sensitive equipment, mapping magnetically shielded enclosures or measuring fringing fields from magnets, transformers or inductors. Analog outputs are ±10V for each component of 100μT(1G) or 1000μT(10G) full-scale with frequency response from dc to over 3kHz and a noise level of less than10pTrms/√Hz at 1Hz. Cable lengths to 600m.

Hall Sensor Engineering Kit

The Sentron engineering kit allows you to quickly evaluate new applications of Hall magnetic sensors. With this kit you may easily realize a one-axis or two-axis magnetic field to voltage transducer, current sensor, distance sensor or angular position sensor. Unlike conventional Hall magnetic sensors, all sensors in the Sentron kit are sensitive to magnetic fields parallel with the substrate. They have excellent long term stability, high sensitivity at low bias current and a pure analog output signal without modulation or chopping.

Precision Single-Axis Hall Transducer



The Model TMR2 is a self contained, very high linearity very high stability magnetic field to analog voltage Transducer. It is particularly appropriate for high resolution measurement or control of particle accelerator or spectrometer magnet systems in the field range to 2T (20kG) with better than 0.01% (100ppm) absolute accuracy for dc fields and with frequency response from dc to 10kHz.

Three-Axis Hall Transducer

The Sentron 3MR-1C is a magnetic field-to-voltage transducer with an analog output for each of the three components of the measured magnetic field. All three components of the magnetic field are measured at a single point with active volume of approximately 0.25x0.25x0.2 mm^3. Field range is to 2T with frequency response to 10kHz. This unique transducer can be used for permanent magnet characterization and magnetic field mapping.

Field Units: 0.1nT=1μG, 100nT=1mG, 1mT=10G, 1T=10,000G (10kG)

Refer to EEM 5500 for Precision Current Measurement

GMW *P.O. Box 2578, Redwood City, CA 94064 • Tel: (650) 802-8292*
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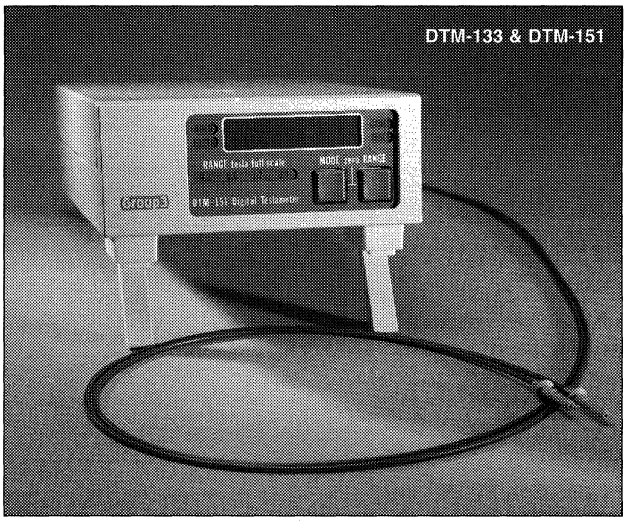
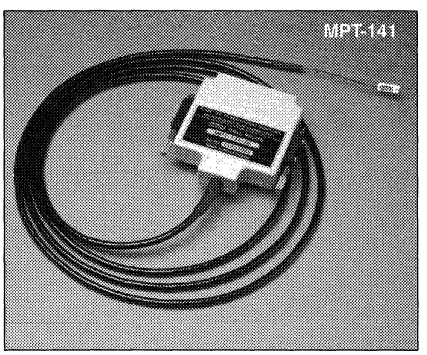
Precision Magnetic Field Measurement



Group 3 Digital Hall Teslameters provide superior accuracy and long term measurement reliability combined with digital interfacing options not found on any other comercial instruments. All Group 3 Hall Probes are precalibrated against an NMR (nuclear magnetic resonance) measured field. An EPROM in the probe cable connector stores the unique field and temperature characteristics of each probe, allowing probes to be interchanged without recalibration.

DTM-133 and DTM-151 Single-Axis Digital Hall Teslameters

Two instruments are offered in the same compact package with high visibility LED display. The DTM-133 has 12 bit resolution with 7 digit display and the DTM-151 has 16-bit resolution with a 7 digit display. Both Teslameters have improved circuitry to ensure very high reliability in electrically noisy environments. Field units may be tesla or gauss. Digital interface options are RS-323-C and serial fiber optic or IEEE-488.



	DTM-133	DTM-151
Display, high brightness LED	7 character	
Field range/resolution with standard range probes (without digital filtering)	0.03T/5μT 0.06T/10μT 0.12T/20μT 0.3T/0.05mT 0.6T/0.1mT 1.2T/0.2mT 3.0T/0.5mT	0.03T/0.5μT 0.06T/1μT 0.12T/2μT 0.3T/0.005mT 0.6T/0.01mT 1.2T/0.02mT 3.0T/0.05mT
Measurement rate	30/sec	10/sec
Peak hold mode	digital	
Digital Filtering	selectable	
Analog Output	±3V fs (not corrected) dc to 9kHz(-3dB)	±3V fs (not corrected) dc to 3kHz(-3dB)
Digital interface options	RS-232-C, fiber optic, IEEE-488	
Power	9V to 12V, 900mA. 115Vac plugpack incl.	
Operating temperature	0°C to 50°C	
Dimensions (WxDxH)	125 x 217 x 50mm (4.9 x 8.5 x 2 inches)	
Weight	1.2 kg (2.6 lbs)	

	For DTM-133				For DTM-151			
PROBES	**LPT-230**	**MPT-230**	**LPT-130**	**MPT-132**	**LPT-231**	**MPT-231**	**LPT-141**	**MPT-141**
Selectacble ranges, full-scale (T)	0.03, 0.06, 0.12, 0.3		0.3, 0.6, 1.2, 3.0		0.03, 0.06, 0.12, 0.3		0.3, 0.6, 1.2, 3.0	
Precision (% of full-scale)	0.03	0.03	0.03	0.03	0.03	0.03	0.01	0.01
Temperature coefficient (ppm/°C)	520	520	60	140	25	25	10	10
Sensor active volume (mm x mm)	4x1.6	1x0.5	4x1.6	1x0.5	4x1.6	1x0.5	4x1.6	1x0.5

Field Units: 0.1nT=1μG, 100nT=1mG, 1mT=10G, 1T=10,000G (10kG)

Refer to EEM 5500 for Precision Current Measurement

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Fax: (650) 802-8298 • Email: sales@gmw.com • Web: www.gmw.com/eem

Precision Magnetic Field Measurement

General Purpose, Three-Axis Hall Teslameter

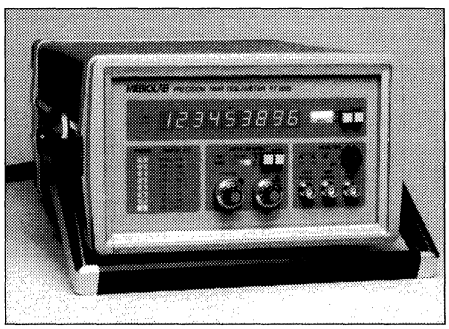
Metrolab 7025 is a simple, hand-held, battery-operated instrument with a three-axis Hall probe for simultaneous measurement of the dc field components Bx, By, Bz up to 2T (or to 20T on special order). Vector amplitude and the component readings are displayed and available via an RS-232-C interface.

Typical applications range from surveying the fringing field around MRI or NMR spectrometer magnets for operator and equipment safety to automated quality control of permanent magnets.

7025 Three-Axis Hall Teslameter	
Ranges (dc fields)	20mT, 200 mT, 2000mT (2T) autoranging or manual
Resolution	0.01 mT, 0.1 mT, 1 mT
Display	3 1/2 digits in mT
Reading	B or Bz (Bx, By via RS-232-C)
Accuracy	2% of reading or 0.01mT
Temperature coefficient	0.05% /°C
Update rate	0.4 s or hold
Operating – temp. – field	0 to 40°C 0.1 T (1.5 T, battery removed)
Output	RS-232-C
Battery	9 Volt, SLM 9V (Lithium 22h)
Size – instrument – sensor	160 x 80 x 30mm (6.3 x 3.2 x 1.2 inch) 12 x 12 x 100mm (.05 x 0.5 x 4 inch) 1.5m (60 inch) probe cable
Weight	250 g (0.55lb)

Very High Resolution and Stability

Metrolab NMR (Nuclear Magnetic Resonance) and ESR (Electron Spin Resonance) Teslameters provide absolute accuracy of better than 5ppm and resolution of 0.1μT(1mG) for fields up to 14T. Applications include mapping and stabilization of imaging and spectrometer magnets, as a reference for magnetic sensor calibration and precision magnetic field stabilization. Multi-sensor probe systems provide improved accuracy and faster acquisition for precision mapping of large magnets such as MRI.



2025

2025 NMR Teslameter	
High brightness LED	8 1/2 digit, tesla or MHz
Field range	0.043 to 13.6T (NMR probes) 0.55 to 3.2mT (ESR probes)
Resolution	0.1μT or 1Hz
Absolute Accuracy	±5ppm
Stability (10°C to 40°C)	<1ppm
Aging (1 year)	<2ppm
Reading rate	1/sec, 10/sec
Interfaces	RS-232-C & IEEE-488
Input power	110/220Vac, 50/60Hz
Dimensions (WxDxH)	260 x 340 x 145mm (10.2 x 13.3 x 5.7 inch)
Weight	6.8 kg (15lb)

Calibration Magnets. Industrial Magnet Systems. Computer Control.

GMW also offers complete magnet systems for laboratory and industrial applications. For help in getting the right equipment for your needs, including technical literature and pricing, please contact GMW.

Field Units: 0.1nT=1μG, 100nT=1mG, 1mT=10G, 1T=10,000G (10kG)

Refer to EEM 5500 for Precision Current Measurement

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HAEFELY TRENCH Haefely Trench, Inc. 1308 Devils Reach Road Woodbridge, VA 22192
Phone +1.703.494-1900 Fax +1.703.494-4597

HIGH VOLTAGE TECHNOLOGY

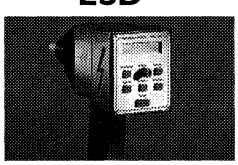
EMC Test Equipment

Emission International standards	European standards		EN 50081-1 Residential, commercial and light industry	EN 50081-2 Industrial environment
CISPR 22	EN 55022 ClassB	30-1000 MHz 0.15-30 MHz 0.15-30 MHz	30-37 dBQP 66-56 dBQP 56-46 dBAV 40-30 dBQP 30-20 dBAV*	
CISPR 11	EN 55011 ClassB	30-1000 MHz 0.15-30 MHz		30-37 dBQP 79-73 dBQP 66-60 dBAV
CISPR 14	EN 55014		discontinuous interference	
IEC 1000-3-2	EN 60555-2	0-2 kHz	class A,B,C,D	class A,B,C,D*
IEC 1000-3-3	EN 60555-3			*

Immunity International standards	European standards		EN 50082-1 Residential, commercial and light industry	EN 50082-2 Industrial environment
IEC 1000-4-2	EN 61000-4-2	ESD Contact/Air discharge	4 kV contact* 8 kV air	4 kV contact 8 kV air
IEC 1000-4-3	ENV 50140	80-1000 MHz 80% AM	3V/m*	10 V/m
	ENV 50204	900 MHz 50% / 200 Hz	3V/m*	10 V/m
IEC 1000-4-4	EN 61000-4-4	EFT/Burst 5/50 ns	1 kV ac power line 0.5 kV control line	2 kV ac power line 1 kV control line
IEC 1000-4-5	EN 61000-4-5	Voltage Surge 1.2/50 us (8/20 us)	2 kV common mode* 1 kV differential mode*	4 kV common mode* 2 kV differential mode*
IEC 1000-4-6	ENV 50141	0.15-80 Mhz 80% AM	3V*	10 V
IEC 1000-4-8	EN 61000-4-8	50 Hz Magnetic field	3 A/m*	30 A/m
IEC 1000-4-11	EN 61000-4-11	Voltage Dips interruptions	30% / 10 ms* 60% / 100 ms* >95% / 5000ms*	30% / 10 ms* 60% / 100 ms* >95% / 5000ms*

Actual EN standard * prEN or informative

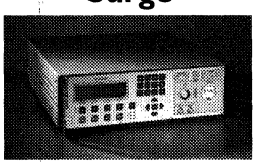
ESD



PESD 1600

IEC 1000-4-2
EN 61000-4-2
Contact discharge
Air discharge
16.5 kV (AD)
9 kV (CD)
Battery or
mains powered

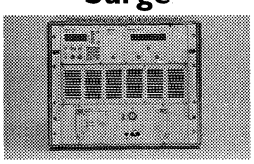
Surge



PSURGE 4010

IEC 1000-4-5
EN 61000-4-5
One phase coupling
Three phases coupling
I/O line coupling
4.4 kV
Combustion waveshape
Reliable semiconductor HV
switch

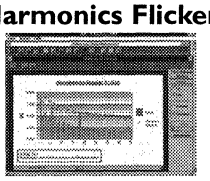
Surge



PSURGE 6

IEC 1000-4-5 / 12
IEEE/ANSI C62-41
ETS 300-047, UL 1449,
other standards
One phase coupling
Three phases coupling
I/O line coupling
6 kV
Modular plug in
Reliable Semiconductor HV
switch

Harmonics Flicker



PHF 555

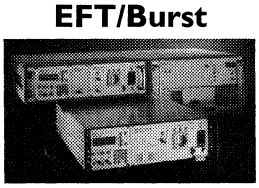
IEC 1000-3-2
EN 61000-3-2/3
Harmonics and flicker
measurement
one phase
16 A
High precision linearity A/D
converter

System Solutions

PATS

all IEC and other standards
Complete EMC test places
Single port system
Fully automatic
customer designed
Robust, versatile

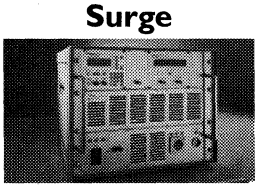
EFT/Burst



PEFT System/PEFT Junior

IEC 1000-4-4
EN 61000-4-4
One phase coupling
Three phases coupling
I/O line coupling
4.5 kV (PEFT junior)
4.5 kV or 8 kV (PEFT)
1 MHz Freq. repetition
5/50 ns in 50 and 1 kΩ

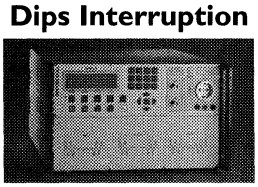
Surge



PSURGE 4

IEC 1000-4-5
EN 61000-4-5
One phase coupling
Three phases coupling
I/O line coupling
4.4 kV
Combustion waveshape
10x700 us waveshape
Reliable semiconductor HV
switch

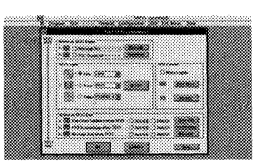
Dips Interruption



PLINE1610

IEC 1000-4-11
EN 61000-4-11
Voltage interruptions, dips
and variations
16 A / 264 Vac
> 500 A inrush capability
2x16A transfo inside

Software



WinPATS

all IEC and other standards
Test automation, test
equipment verification, test
report editing,
EUT monitoring
Windows ® based software
Easy to use
standards data base

HAEFELY TRENCH
HIGH VOLTAGE TECHNOLOGY

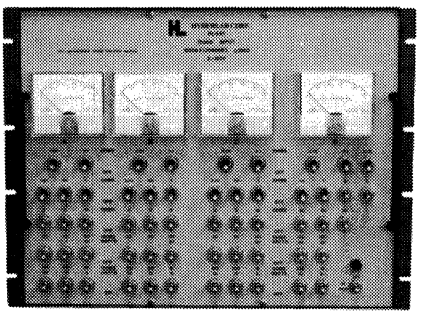
Haefely Trench, Inc.

1308 Devils Reach Road
Woodbridge, VA 22192
Phone +1.703.494-1900
Fax +1.703.494-4597

HL HYBERLAB LOADFLEX

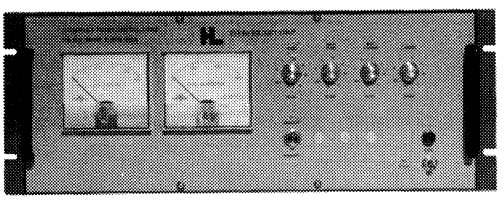
VARIABLE PASSIVE LOADS

FOR LOADS 10W TO OVER 80KW
contact HYBERLAB for user-specified programs with no NRE charges and rapid turn around



- Multiple inputs
- Manual switches or computer controllable thru relays
- Any resistor configurations required
- Overload protection, alarms and meters available

STANDARD LOADS



- Loads up to 500W, 0-250V, 0-150A, DC-25KHz, steps from 0.025-64Kohm
- Binary parallel switched resistor configuration
- Computer interfaceable, or manual switching

✓ **LOADFLEX** equals **SAVINGS** when compared to active loads & costly "in-house" built units.
✓ Ideal for R&D, testing and burn-in applications involving all types of power sources.
✓ **Rugged**, **Reliable** and **NO interactions** of any kind with the connected power source.
✓ HYBERLAB also specializes in contract manufacturing of power products, wire assemblies, etc.

LOADFLEX STANDARD PRODUCT SELECTION GUIDE

MODEL	MAX. POWER	VOLTAGE RANGE @ MAX. POWER	CURRENT RANGE	RESISTANCE STEPS	OPERATING TEMP. (°C)	SIZE (INCHES)
PLB54 PLB55 PLB56	50W	5-50V 2-20V 10-100V	0-10A 0-25A 0-5A	0.8-1.6 kohm 0.12-250 ohm 3.2-6.4 ohm	-10 to 35	1.75H x8W x 6D
PL101 PL102	100W	2-50V 10-250V	0-40A 0-10A	0.1-3.2 kohm 2-64 kohm	-10 to 40	1.75H x 1.75W x 12D
PL201 PL202	200W	2-50V 10-250V	0-80A 0-20A	0.05-1.6 kohm 1-32 kohm	-10 to 50	3.5H x 17.5W x 12D
PL401 PL402	400W	2-50V 10-250V	0-130A 0-40A	0.03-1 kohm 0.5-16 kohm	-10 to 50	7.0H x 17.5W x 17D
PL501 PL502	500W	2-50V 10-250V	0-150A 0-50A	0.025-800 ohm 0.4-13 kohm	-10 to 50	7.0H x 17.5W x 17D

For non-inductive applications (DC-25KHz) add suffix Z.

The PL500 series units are adjustable thru manually set **digital** dials, or thru a **computer interfaceable** D-connector for remote operation. All other models feature toggle switches. All units have **binary configured** switched power resistors in parallel with **16 BIT** resolution - 12 bit resolution for the PLB50 series. Most units come standard with DC meters, optional AC meters (50/60Hz) available as special order. Utilizing the switchable meter bypass, the loads are capable of both DC&AC (DC-1KHz) and complex waveforms (any form factor) inputs. Models feature over-load protection and/or alarm, voltage/current monitors. The floating inputs allows for application flexibility and ease of parallel and/or series operation of many loads. PLB50 and PL100 series loads operate without AC power and are meterless. Standard load accuracy is +/-5%.

See our other products in section 1400 (page C•1052) and section 4000 (pages D•1640-1641)

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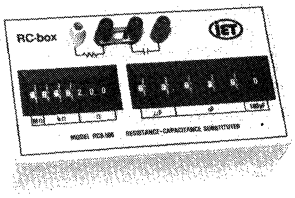
RS - CS - LS Series

Digital Decade Substituters for Resistance • Capacitance • Inductance

R-BOX
RS Series
Digital Resistance Substituter
Available from .01Ω to 999.9999999 MΩ

C-BOX
CS Series
Digital Capacitance Substituter
Available from 1 pF to 999.999999 μF

L-BOX
LS Series
Digital Inductance Substituter
Available from 1 μH to 99.99999 H



RC-BOX
RCS Series
Digital Resistance Capacitance Substituter

- **Direct reading — no fumbling with multiple slide or rotary switches**
- **Wide range**
- **Accurate**
- **Compact, convenient, and rugged**
- **Standard and custom models**
- **Error proof**
- **Color coded**
- **Options:**
  - **Shielded case with grounding post**
  - **Panel mounting**
  - **Low residual impedance switch**
  - **Protection fuse**
  - **Programmable and IEEE-488 option**

STANDARD MODELS — SPECIFICATIONS

MODEL	RS-200	RS-201	RS-200W	RS-201W	CS-300	CS-301	RCS-500	RCS-502	LS-400	LS-400A
TYPE OF SUBSTITUTER	Resistance	Precision Resistance	Wide Range Resistance	Wide Range Precision Resistance	Capacitance	Precision Capacitance	Resistance-Capacitance	Precision Resistance-Capacitance	Wide Range Inductance	Inductance
ACCURACY*	±(1%+25mΩ)	±(0.1%±25mΩ)	±(1%+30mΩ)	±(0.1%+30mΩ)	±(4%+ 3 pF)	±(1%+ 3 pF)			±(2% +0.5 μH)	
DECADES	7		9		6				4	3
RANGE	0-9,999,999 Ω		0-99,999,999.9 Ω		0-99.9999 μF				0-9.999 H	0-999 mH
RESOLUTION	1 Ω		0.1 Ω		100 pF				1 mH	1 mH
TYPE OF COMPONENTS	Metal film resistors; wirewound or resistance wire for 0.9 Ω and under				100-900 pF : mica 0.001-0.009 μF : polystyrene 0.01-0.9 μF : polycarbonate 1-9 μF : polyester 10-90 μF : polarized tantalum		Combines the RS-200 and CS-300	Combines the RS-201 and CS-301	Toroidal Inductors	
RATINGS	0.5 watt**				100 volts (20 V 10-100 μF)				See table below	
RESIDUAL IMPEDANCE†	0.3 Ω(0.04Ω/dec.)†, typ.		0.4 Ω(0.04Ω/dec.)†, typ.		30 pF (5 pF/dec.)†, typ.				0.2 Ω(0.04Ω/dec.)†, typical	
PHYSICAL	8.1 x 7.9 x 5.6 cm; 184 g (3.2 x 3.1 x 2.2 in; 6.5 oz)		12 x 7.9 x 5.6 cm; 235 g (4.7 x 3.1 x 2.2 in; 8.3 oz)		12 x 7.9 x 5.6 cm; 235 g (4.7 x 3.1 x 2.2 in; 8.3 oz)		18.8 x 11 x 6 cm; 410 g (7.4 x 4.3 x 2.4 in; 14 oz)		12 x 7.9 x 5.6 cm; 230 g (4.7 x 3.1 x 2.2 in; 8 oz)	
PRICE	$146.00	$279.00	$269.00	$479.00	$156.00	$299.00	$289.00	$569.00	$569.00	$399.00

* Accuracy after subtraction of the Residual Impedance.

** Higher power resistance substituters (1 watt or higher) available; see optional models below or HPRS data sheet.

† Residual Impedance is reduced to 0.04 Ω or 5 pF for lowest decade with LR Option. This makes for a more effective usage at low impedances. Lowest decade is isolated from others with a switch when desired.

Additional information for Inductance Substituters

INDUCTANCE	FREQUENCY RANGE	MAX. Q	RATING
0.1-0.9 mH	300 Hz-2 MHz	100 @ 800 kHz	700 mA
0.1-0.9 mH	300 Hz-2 MHz	100 @ 800 kHz	700 mA
10-90 mH	300 Hz-800 kHz	80 @ 40 kHz	300 mA
0.1-0.9 H300	Hz-200 kHz	40 @ 20 kHz	100 mA
1-9 H	200 Hz-20 kHz	30 @ 8 kHz	20 mA
10-90 H	200 Hz-6 kHz	60 @ 2 kHz	4 mA

LABORATORY STANDARD MODELS

See HARS and HACS Series data sheets for standards grade resistance and capacitance substituters

OPTIONAL MODELS

In order to satisfy any requirements for decade substituters, generate a part number from the table below,

RS — F — 4 — 0.1 — WC — (Example: 0.1-999.9Ω, 1%, Resistance Substituter in a case)

TYPE OF SUBSTITUTER	†ACCURACY	NO. OF DECADES	IMPEDANCE PER STEP FOR LOWEST DECADE	PACKAGING	RATING
RS Resistance CS Capacitance LS Inductance	X .01% XA .025% A .05% B 0.1% C 0.5% F 1% G 2% H 4%	1 to 11	.01Ω to 100 MΩ 1 pf to 100μF 1 μH to 10H	WC Packaged in a standard case with binding posts PM Supplied without case for panel mounting or other applications	Nil Standard rating Other Specify

OPTIONS

LR Option: Residual Impedance is reduced to .04Ω or 5 pF on lowest decade ..... Add $49.00
SC Option: Shielded case with grounding terminal ..... Add 43.00
FP Option: Unit supplied with series 2A fuse for added protection ..... Add 19.00
(User may substitute other fuses; residual impedance will increase by .06Ω for 2A fuse)
PM Option: Unit supplied without case for panel mounting ..... Subtract $ 5.00
LP Option: Unit supplied with low profile binding posts ..... Add 4.00
Model CC-25 Lead Clip: Plugs into dual binding posts for convenient lead connections 12.00
Programmable Option: ..... See PZS Series

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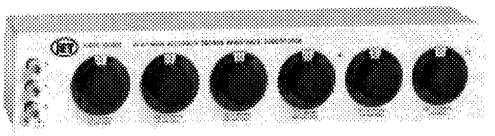
HARS Series High Accuracy Decade Resistance Substituter

Tight tolerance calibration grade decade substituters for applications requiring a cost effective high performance resistance decade box for laboratory and test applications.

- High accuracy
- Low temperature coefficient
- 1 mΩ to 11 MΩ
- High stability
- Low zero resistance
- 1 to 10 decade units



MAJOR SPECIFICATIONS

Accuracy:
LX: ±(20 ppm + 1 mΩ) absolute.
L: ±(25 ppm + 0.5 mΩ) absolute.
X: ±(0.01% + 2 mΩ) from zero setting.
A: ±(0.05% + 5 mΩ) from zero setting.

Zero Resistance:
L,LX: 10 mΩ ± 0.5 mΩ, at dc.
X: <1 mΩ per decade, at dc.
A: <3 mΩ per decade + 2 mΩ, at dc.

Resistance Temperature Coefficient:
LX: <±3 ppm/°C for 100 Ω steps and over;
<±15 ppm/°C for 10 Ω steps;
<±20 ppm/°C for 1 Ω steps and under.
L: <±5 ppm/°C for 100 Ω steps and over;
<±20 ppm/°C for 10 Ω steps and under.
X: <±10 ppm/°C for 100 Ω steps and over;
<±20 ppm/°C for 10 Ω steps and under.
A: <±20 ppm/°C.

Maximum Applied Voltage:
1000 V peak (Higher voltages available).

Power per Step:
LX: 1 W up to 5 W.
L,X,A: 0.5 W for 1Ω steps and over;
0.25 W for 0.1 Ω step;
0.16 W for 0.01 Ω step.

Terminals: Low thermal emf beryllium copper binding posts with standard 3/4 inch spacing plus shield terminal; connection from rear of the instrument is an available option.

STANDARD MODELS (Partial list)

Model	Total Res.	Decades	Resolution	Model	Total Res.	Decades	Resolution
HARS-X*-4-.01	111.1 Ω	4	0.01 Ω	HARS-X*-6-.01	11,111.1 Ω	6	0.01 Ω
HARS-X*-4-.1	1,111 Ω	4	0.1 Ω	HARS-X*-6-0.1	111,111 Ω	6	0.1 Ω
HARS-X*-4-1	11,110 Ω	4	1 Ω	HARS-X*-6-1	1,111,110 Ω	6	1 Ω
HARS-X*-4-10	111,100 Ω	4	10 Ω	HARS-X*-6-10	1,111,100 Ω	6	10 Ω
HARS-X*-4-100	1,111,000 Ω	4	100 Ω	HARS-X*-7-.001	111,111.11 Ω	7	.001 Ω
HARS-X*-4-1k	11,110,000 Ω	4	1 kΩ	HARS-X*-7-.01	111,111.1 Ω	7	.01 Ω
HARS-X*-5-.01	1,111.1 Ω	5	0.01 Ω	HARS-X*-7-0.1	1,111,111 Ω	7	0.1 Ω
HARS-X*-5-0.1	11,111 Ω	5	0.1 Ω	HARS-X*-7-1	11,111,110 Ω	7	1 Ω
HARS-X*-5-1	111,110 Ω	5	1 Ω	HARS-X*-8-.001	121,111.11 Ω	8	.001 Ω
HARS-X*-5-10	1,111,100 Ω	5	10 Ω	HARS-X*-8-.01	1,211,111.1 Ω	8	.01 Ω
HARS-X*-5-100	11,111,000 Ω	5	100 Ω	HARS-X*-9-.001	1,211,111.11 Ω	9	.001 Ω

ACCURACY
*: **X** for 0.01% accuracy;
Substitute **A** for 0.05%;
Substitute **L** for 25 ppm;
Substitute **LX** for 20 ppm;

OPTIONS
RM - Rack mount
RO - Rear output
Single decade units
Programmable versions
20 μΩ resolution continuous

HRRS Series High Resistance Decade Substituter

- High accuracy - 0.03% to 1.0%
- High stability - <100 ppm
- Low zero resistance - 3 mΩ/decade
- Resistance from 10 kΩ to 1 TΩ
- Low temp coefficient
- 5 kV versions available

STANDARD MODELS - (Partial list - up to 1 TΩ available)

Accuracy 0.1%	Accuracy 1%	No. of Decades	Range
HRRS-B-3-1M	HRRS-F-3-1 M	3	0 to 1,110.0 MΩ, 1MΩ steps
HRRS-B-4-0.1M	HRRS-F-4-0.1 M	4	0 to 1,111.0 MΩ, 0.1 MΩ steps
HRRS-B-5-0.1M	HRRS-F-5-0.1 M	5	0 to 11,111.0 MΩ, 0.1 MΩ steps
HRRS-B-6-0.01M	HRRS-F-6-0.01 M	6	0 to 11,111.10 MΩ, 0.01 MΩ steps

VRS - 100 High Resistance Discrete Substituter

High dynamic range, discrete resistance substituter, suitable for checking insulation testers and meggers - 9 values: 1 kΩ, 10 kΩ, 100 kΩ, 1 MΩ, 10 MΩ, 100 MΩ, 1 GΩ, 10 GΩ, 100 GΩ.

- 1 kΩ - 100 kMΩ
- Basic accuracy: 0.5%-1.5%
- Temperature Coefficient: 0.01 -0.1%/°C

RTD-Z-6-.001 High Accuracy RTD simulator

The model RTD-Z-6- .001 is an ideal instrument for the simulation of a resistance temperature detector (RTD). It provides a range of 10 Ω to 1,111.110 Ω, lowest decade resolution of 1 mΩ, and absolute accuracy of 50 ppm. It eliminates the effects of zero resistance and switch control resistance, providing the specified absolute accuracy over the entire range.

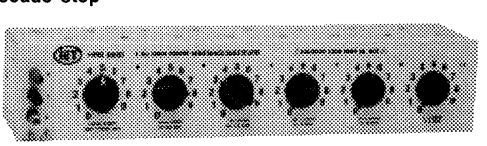
- Minimum setting: 10 Ω
- Number of decades: 6
- Range: 10.000 Ω to 1,111.110 Ω
- Resolution: 1mΩ
- Absolute Accuracy: 50 ppm

HPRS Series High Power Resistance Substituter

- 1000 V rating
- Programmable version available
- 1% accuracy (better available)
- Power of 25 watts/decade step
- 250 watts max
- Resistance from 1 mΩ to 100 MΩ.
- up to 8 decades

STANDARD MODELS (Partial list)

Model	Total Res.	Decades	Resolution
HPRS-F-6-0.001	999.999Ω	6	1 mΩ
HPRS-150	999,999Ω	6	1Ω
HPRS-200	999,999.9Ω	7	0.1Ω
HPRS-F-7-1	9,999,999Ω	7	1Ω
HPRS-200W	9,999,999.9Ω	8	0.1Ω
HPRS-F-9-0.01	9,999,999.99Ω	9	10 mΩ



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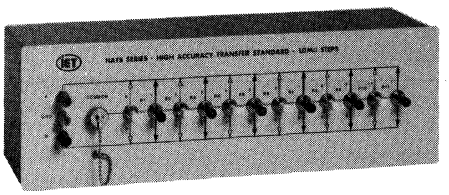
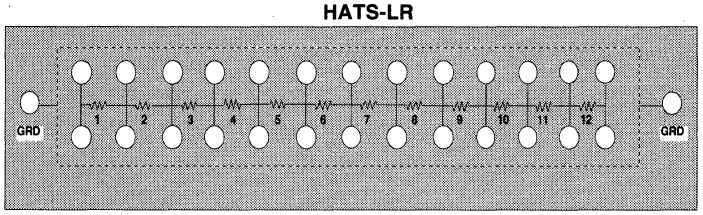
HATS - Series High Accuracy Transfer Standards

In order to make resistance transfer measurements with a high degree of accuracy, the HATS series may be employed. Consisting of matched, stable equal value precision resistors, calibration resistance values are transferred from a standard of one value to a resistance at a different value.

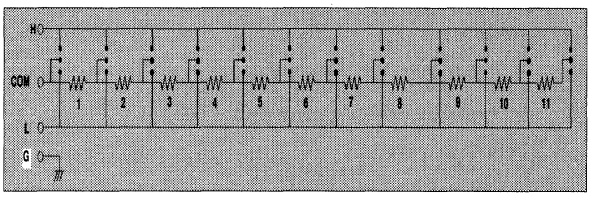


HATS-LR



10 Ω-100 kΩ steps, 12 matched resistors

HATS-Y



100 kΩ-10 MΩ steps, 11 matched resistors

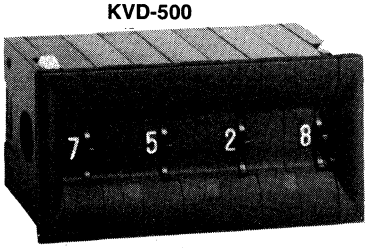
MAJOR SPECIFICATIONS

Step Size:	10 Ω, 100 Ω, 1 kΩ, 10 kΩ, or 100 kΩ	100 kΩ, 1 MΩ, or 10 MΩ
Accuracy:	Initial: ±20 ppm Initial data supplied with instrument Transfer: ±1 ppm, typical.	100 kΩ / 1 MΩ / 10 MΩ Initial: ±20 ppm / ±25 ppm / ±30 ppm Calibration: ±10 ppm / ±10 ppm / ±15 ppm Initial data supplied with instrument. Transfer: ±2 ppm, typical.
Long Term Stability:	±50 ppm for nominal value.	±50 ppm of nominal value.
Calibration Conditions:	Four-wire kelvin measurements, low power, at 23°C	3 terminal measurement, low power, at 23°C
Leakage Resistance:	Greater than 1 TΩ from terminal to case.	Greater than 10 TΩ from terminal to case.
Temperature Coefficient:	Less than ±5 ppm/°C.	Less than ±5 ppm/°C.
Power Coefficient:	±100 ppm/W.	±50 ppm/W per resistor.

KVD - Series Kelvin - Varley Voltage Divider

Precision decade voltage divider employing the Kelvin-Varley circuit, providing known voltage and current ratios for calibration, bridges, linearity determination, and other applications. The Models KVD 600 and KVD 700 provide 1 ppm long term linearity and 0.1 ppm resolution. The KVD 500 is suitable as an instrument component.

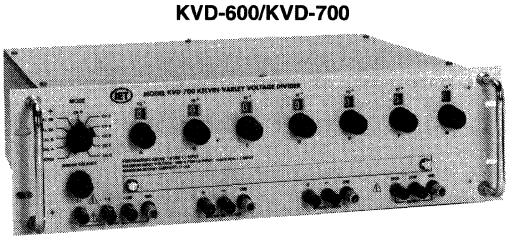
KVD-500



Thumbwheel style - economical - Component series

- **Update instruments with KVD-600 for any digital controls**
- **Eliminates the need for dials and multiturn potentiometers**
- **Precise repeatability of setting**
- **Unlimited choice of resistance values, 1 Ω to 50 MΩ**
- **In-line digital readout**
- **Convenient (snap in) panel mounting with bezel**
- **Excellent for meter calibration, linearity checking ratio measurement, synchro testing, etc.**
- **Number of decades: 1,2,3,4,5, 6 or higher**
- **Linearity temperature coefficient: 20 ppm/°C.**

KVD-600/KVD-700



High Accuracy Laboratory Series

LINEARITY	**KVD-600**	**KVD-700**
Absolute Initial:	±0.5 ppm	±0.1 (self calibrating)
Absolute long term:	±1 ppm	±1 ppm
Temperature Coefficient of Linearity:	±0.2 ppm/°C	±0.1 ppm/°C
Power Coefficient of Linearity:	±1 ppm/W	±0.2 ppm/W

INPUT RESISTANCE: 100 kΩ, accuracy of ±0.005%
NUMBER OF DECADES: 7, others optional
MAXIMUM INPUT: Power: 2.5 watts continuous, 5 watts intermittent
Voltage: 1000 V rms

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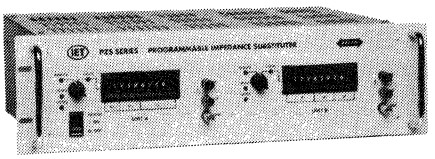
PZS Series Programmable Decade Substituters for Resistance • RTD • Capacitance • Inductance

- **High resolution and wide range, up to 10 decades**
- **Constant "zero" residual impedance**
- **Special relays for low thermal emf and high stability**
- **Special RTD and other custom impedance combinations available**
- **Programmable "open circuit" and "short circuit" states optional**
- **Manual thumbwheel operation or programmable digital input, parallel BCD or IEEE-488 interface**

IEEE-488



SPECIFICATIONS

Accuracy: Indicated accuracy applies after subtraction of "zero" setting residual impedance.

Accuracy (RTD): Absolute accuracy applies without need to subtract "zero" setting.

Min. setting (RTD): ≥ 10Ω customer specified.

Thermal emf: < 15 μV for 0.1% & 0.05% resistance units; < 50-100 μV (depending on setting) for 1% resistance units; due to relay contacts.

Switching time: < 4 ms per change: < 7 ms for 0.05% units.

Digital input: BCD parallel, TTL positive; IEEE-488 optional.

Power requirements: 105-125V or 210-250V; 50-60 Hz, W W

Dimensions: Bench: 8.5" W × 9.25" D × 4.44" H (22 × 24 × 12 cm). Rack: 19" W × 12" D × 7" H (43.2 × 30.4 × 19.8 cm)

STANDARD MODELS

MODEL	PRS-200	PRS-201	PRS-200W	PRS-201W	PRS-202	PRS-202W	PCS-300	PCS-301	PLS400	PLS-400A
TYPE OF SUBSTITUTER	Resistance	Precision Resistance	Wide Range Resistance	Wide Range Precision Resistance	High Precision Resistance	Wide Range High Precision Resistance	Capacitance	Precision Capacitance	Wide Range Inductance	Inductance
ACCURACY*	1% ± 70mΩ	0.1% ± 30mΩ	1% ± 70mΩ	0.1% ± 30mΩ	0.05% ± 15mΩ		4% ± 5 pF	1% ± 1 pF	1.5% max, 1% typ. ± 20μH	
DECADES	7		9		7	9	6		4	3
RANGE	1-9,999,999Ω		0.1-99,999,999.9Ω		1-9,999,999Ω	0.1-99,999,999.9	100 pF-99.9999 μF		1 mH-9.999 H	1 mH-999 mH
TYPE OF COMPONENTS	Metal Film Resistors (0.9Ω & less wirewound)						100-900 pF: Mica .001-.009 μF: Polystyrene .01-0.9 μF: Polycarbonate 1-9 μF: Polyester 10-90 μF: Polarized Tantalum		Toroidal Inductors	
RATINGS	0.5 watt						100 volts (20V 10-100 μF)		See LS data sheet	
RESIDUAL IMPEDANCE	500 mΩ typical constant		800 mΩ typical constant		30 mΩ per decade constant		30 pF typical, constant		See LS data sheet	

* Accuracy for 10 M Ω and over (PRS 201W: 0.5%; PRS 202W: 0.2%)

OPTIONAL MODELS

In order to satisfy any requirements for programmable substituters, generate part number from the table below.

(Example: 100 μH-9999.9 mH, 1%, 50 mA, Rack Mount Programmable Inductance Substituter with IEEE-488.)

PLS - F - 5 - 100 μH - RM - 50 mA - IEEE

TYPE OF SUBSTITUTER	TOLERANCE	NO. OF DECADES	IMPEDANCE PER STEP FOR LOWEST DECADE	PACKAGING	RATING	CONTROL
RS Resistance CS Capacitance LS Inductance RTD RTD Simulator	X .01% XA .025% A .05% B 0.1% C 0.5% F 1% G 2% H 4%	1 to 11	.01Ω to 100 MΩ (in ohms) 1 pF to 100 μF 1 μH to 10H	WC Packaged in a standard case with binding posts RM Rack Mount	Nil Standard rating Other Specify	Nil Standard BCD IEEE IEEE-488

ORDERING INFORMATION

- Select Standard or Special Model
- IEEE Optional (IEEE-488 Remote Programming)
- D Option Front Panel Display of Impedance Setting
- IBM or Compatible IEEE-488 Controller Board
- IEEE-488 Cable

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SR Series Very Low Temperature Coefficient, High Stability Resistance Standard

- Extremely low temperature coefficient
- Requires no oil bath
- Cost effective
- Optional non-standard values

SRL Series

Extremely high precision, sealed on site resistance standard requiring no oil or other temperature bath.

Model	Nominal Value ±2 ppm (Ω)	Calibration Accuracy (±ppm)	Stability* 12 Months (±ppm)	Resistance Change(ppm) (23°C±5°C)	Max Voltage (V)	Power Limit for Accuracy (milliwatts)†
SRL-1	1	1.0	8	3	0.5	200
SRL-1.9	1.9	1.0	8	3	0.38	100
SRL-10	10	1.0	8	3	1.0	50
SRL-19	19	1.0	8	3	1.4	40
SRL-25	25	1.0	8	3	1.6	40
SRL-100	100	1.0	6	3	2.0	10
SRL-190	190	1.0	6	3	4.5	10
SRL-1K	1 k	1.0	6	2	10	5
SRL-1.9K	1.9 k	1.0	6	2	14	4
SRL-10K	10 k	1.0	4	1.5	30	1
SRL-19K	19 k	1.0	4	2	28	-
SRL-100K	100 k	1.0	6	2	100	-
SRL-190K	190 k	1.0	8	2	100	-
SRL-1M	1 M	2.0	8	2	100	-
SRL-1.9M	1.9 M	2.0	9	3	100	-
SRL 10M	10 M	4.0	9	3	200	-
SRL-19M	19 M	4.0	10	4	200	-

* Typical stability < 2 ppm/year. †Add 1 ppm error when test current value exceeds Power Limit.

Retrace:
Permanent shift in resistance is <2 ppm for 23°C to 0°C to 23°C cycle, and 23°C to 40°C to 23°C cycle.

Calibration Report:
Initial calibration data provided in 0.5°C increments for temperature range of 18°C to 28°C.

Other Series:
SRR Series for 1 mΩ, 10 mΩ, 100 mΩ.
SRC Series for 19 MΩ to 190 GΩ.

SRL-1 High Accuracy Resistance Standard

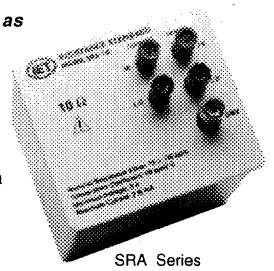
SRX/SRA Series

Designed for use as a standard in industrial, research, and educational laboratories; also available as discrete components for the user's own instruments.

Model SRX- SRA-	Nominal Value (Ω)	Adjustment to Nominal Value (ppm) SRX	SRA	Stability 12 months (ppm) SRX	SRA	Tempco (ppm/°C) SRX	SRA	Power Coefficient (ppm/W)	Wattage (max in W) SRX	SRA
0.01	0.01	200	500	50	100	20	50	100	2	2
0.1	0.1	200	500	50	100	20	50	100	1	1
1	1	20	100	20	50	10	20	100	0.25	1
10	10	10	30	10	18	3	5	50	0.1	1
100	100	10	20	10	15	1	5	50	0.1	1
1K	1 k	10	20	10	15	1	5	50	0.1	1
10K	10 k	10	20	10	15	1	5	50	0.1	1
100K	100 k	10	20	10	15	1	5	50	0.1	1
1M	1 M	20	50	15	20	3	10	50	0.1	0.1
10M	10 M	20	50	15	50	5	10	50	0.01	0.01

Temperature Range:
SRX: 15 to 30°C.
SRA: 10 to 40°C.

Calibration Report:
Initial calibration data is provided.



SRA Series Resistance Standard

SL · SC Series Capacitance • Inductance • Standards

- High stability, low temperature coefficient sealed capacitors
- High stability low temperature coefficient toroidal inductors

CAPACITANCE

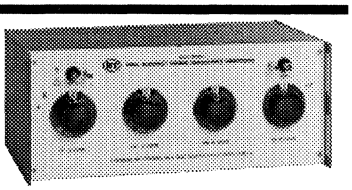
Nominal Value: 1 pF to 1 F.
Adjustment to Nominal: ±200 ppm or ±0.1 pF (better available).
Stability: 100 ppm ±0.1 pF per year.

INDUCTANCE

Nominal Value: 100 µH to 10 H.
Adjustment to Nominal: 0.1% (better available).
Stability: 0.05% per year.

HACS Series High Accuracy Decade Capacitance Substituter

- High accuracy: 0.1% or 0.05%
- Broad range of user choices
- Programmable version available
- Special and custom configurations available
- Optional double shielded construction for virtually equivalent 2- or 3-terminal measurement
- Trimmable capacitors for lower decades



4 Decade Model with Double Shielded Construction

MAJOR SPECIFICATIONS

Accuracy:
A: ±(0.05%+0.05 pF) at 1 kHz, at 23°C.
B: ±(0.10%+0.50 pF) at 1 kHz, at 23°C.
(measured with 3-terminal connection for optional double shielded construction).

Dissipation Factor at 1 kHz:
<.0017 for 100 pF and 1 nF steps;
<.0005 for 10 nF, 100 nF and 1 µF steps;
<.002 for 10 µF steps and over.

Range:
100 pF to 1000 µF, 100 pF steps (others available).

Stability:
A: better than ±(100 ppm+0.05 pF) per year.
B: better than ±(250 ppm+0.10 pF) per year.

Rating:
500 V peak up to 10 kHz.

Temperature Coefficient:
A: <±20 ppm/°C between 10-50°C.
B: <±75 ppm/°C between 10-50°C.

Insulation Resistance:
>50,000 MΩ.

Operating Temperature Range:
10 to 50°C.

Shielding:
Standard: single shielded construction.
Optional : double shielded construction.

Dimensions:
43.2 cm W x 17.8 cm H x 23.9 cm D.
(17" x 7.0" x 9.4"), for 4 decade models.

FREE! See page D1225 for free instrument offer FREE!

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Dept. EM, 534 Main Street Westbury, NY 11590 (516) 334-5959 (800) 899-8438 FAX: (516) 334-5988

HACS-Z Series — High Accuracy Low Level Decade Capacitance Substituter

Whenever low capacitance or small capacitance increments are required, the HACS-Z series may be used. It provides very low zero capacitance with high accuracy and excellent stability.

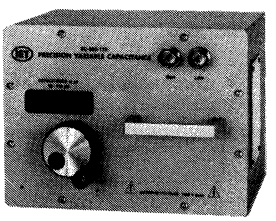
- Basic accuracy of 0.1% or 0.05%
- Capacitance from 1 pF to 1 F
- High stability
- Very low zero capacitance <0.1 pF
- 3-Terminal shielded construction
- Optional BCD output

SC-900 Series — Precision Variable Capacitor

The IET SC-900 Series capacitors are stable and precise variable air capacitors intended for use as a continuously adjustable primary standard of capacitance. In addition to general purpose applications, the SC-900 is ideally suited for ac bridge measurements. It can also be used to verify phase accuracy of phase angle calibration standards.

Model	SC-900-110	SC-900-1100	SC-900-D (Dual)
Range	10-110 pF	50-1100 pF	35-115 pF (Range 1) 100-1150 pF (range 2)
Adjustment to Nominal	±0.1 pF	±0.6 pF	±0.3 pF (Range 1) ±1.5 pF (Range 2)
Accuracy, Corrected	±0.04 pF or better	±0.3 pF or better	±0.04 pF (Range 1) ±0.03 pF (Range 2)

- High accuracy
- High stability
- High resolution
- Precision worm gear drive
- Low temperature coefficient
- Calibrated vernier scale indicator



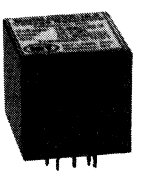
HSVR Series — High Stability Voltage Reference

The HSVR is a highly stable compact voltage reference with a very low temperature coefficient. It is suitable for printed circuit board mounting and may be used whenever precision voltages are required, for test, calibration, digital and analog conversions, etc...

Model	Input Voltage	Output Voltage Max.	Output Current
HSVR-1.01	9-15 V	1.01V	1 mA
HSVR-6.3	15-20 V	6.3V	1 mA
HSVR-12.6	18-25 V	12.6V	1 mA
HSVR-18.9	25-35 V	18.9V	1 mA

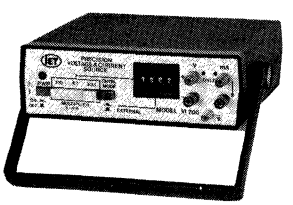
Output Voltage Stability: 1 ppm per 24 hours; 10 ppm per month; 25 ppm per 6 months.

Temperature Coefficient: <1 ppm/°C for temperature range of 0°C to 50°C.



VI-700 — Precision Manual or Programmable Voltage and Current Source

- Voltage output range of 100 μV to 20V
- Current output range of 0.1 μA to 20 mA
- 3½ digit resolution
- High accuracy and low noise
- Manual thumbwheel operation or programmable digital input—parallel BCD or IEEE-488 interface
- High output current
- Battery operation optional
- Suitable for calibration—testing of A/D-D/A converters—gain & linearity evaluation—waveform synthesis with digital input



IEEE-488

SPECIFICATIONS

VOLTAGE	OUTPUT RANGES:	200 mV, 2V, 20V (200V with HV option)
	RESOLUTION:	100μV, 1mV 10mV (100 mV with HV option)
	ACCURACY:	0.0075% ±0.5 LSD (least significant digit) @ 23°C nominal line voltage no load, after warmup;worst case error <0.75LSD (0.5% for >20V)
	OUTPUT CURRENT:	70 mA, maximum load; with LED overload indicator (10 mA with HV option)
	OUTPUT IMPEDANCE:	5 mΩ typical, 40 mΩ for 20V range
	NOISE AND RIPPLE:	50 μV on 200 mV & 2 V ranges, 100 μV rms on 20 V range
	TEMPCO:	±10 ppm/°C typical, ±15 ppm/°C max
CURRENT	OUTPUT RANGES:	200 μA, 2 mA, 20 mA, (200 mA with HI option)
	RESOLUTION:	0.1 μA, 1 μA, 10 μA, (100 μA with HSI option)
	ACCURACY:	0.0075% ±0.75 LSD (least significant digit) @23°C nominal voltage after warmup;worst case error <1 LSD
	COMPLIANCE:	0-20V; with LED overload indicator
GENERAL	DIGITAL INPUT:	3½ digit parallel BCD or IEEE-488 interface; front panel pushbuttons select range and REMOTE OR LOCAL operation
	POWER REQUIREMENTS:	105-125V or 210-250V; 50-60 Hz; 5W
	BATTERY OPERATION: (Optional)	NiCd rechargeable batteries; up to 8 hours operation; low battery warning indicator and automatic shutoff
	DIMENSIONS:	8.5" W x 2.8" H x 9.0" D (7.1 x 12.6 x 22.9 cm); 8.5" W x 9.25" D x 4.4" H (22 x 12 x 24 cm) for IEEE option.
	WEIGHT:	5 lbs. (2.3 kg)

ORDERING INFORMATION:

Model VI-700 Precision Voltage and Current Source $679.00
— BP-5U Battery Pack 629.00
— BCD Option (Parallel BCD Remote Programming) 395.00
— IEEE Option (IEEE-488 Remote Programming) 595.00
— IBM or Compatible PC IEEE-488 Controller Board 475.00
— HV Option (200V Output) 395.00
— HI Option (200mA Output) 395.00

IET DESIGNS & MANUFACTURES TO MIL-SPEC & COMMERCIAL CUSTOM REQUIREMENTS

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IMF-600A Manual/Autoranging Digital Impedance and Meter

Combines most of the commonly needed laboratory measurements

- Automatic measurements
- Analog, digital, 4-20 mA outputs
- Dissipation for capacitors & 1/Q for inductors
- Wide range:

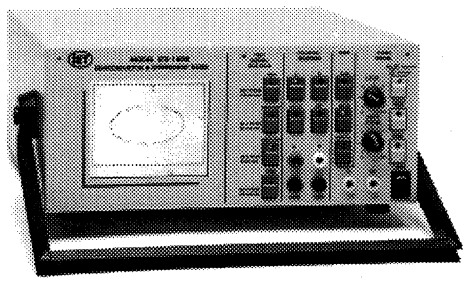
CAPACITANCE(C)	INDUCTANCE(L)
0.1 pF to 2000 µF	0.1 µH to 200.0 H
RESISTANCE	INDUCTANCE(G)
1 mΩ to 2,000 kΩ	0.1 µS to 20 S
DISSIPATION(D or 1/Q)	
0.001 to 2000	

- Companion comparator unit
- 1 kHz test frequency
- Optional Autoranging
- 4-Terminal shielded Kelvin test terminals
- 0.25% basic accuracy

ORDERING INFORMATION

Model IMF-600A Impedance Meter	$1189.00
-R Option (Autoranging)	399.00
-DO Option (Digital Output)	249.00
-I Option (4-20 mA output)	425.00
-HSC Option (High Sensitivity 20.00 pF)	269.00
-HSL Option (High Sensitivity 20.00 µH)	269.00
Model LC-603 Single Channel Digital Limits Comparator	789.00

STS-1600 Semiconductor and Component Tester



Economical, yet powerful troubleshooting tool available with the most flexible and advanced features.

- Current vs. voltage characteristics display of suspect component compared with a good "reference" component, alternating at an operator selectable rate
- Built-in synchronized pulse generator or various 3-terminal components like SCR's and optocouplers
- Optional STS-1510 component comparator extends testing conveniently to DIP devices of up to 40 pins with cables for in-circuit testing
- Quantitative test device - can locate faults without expensive ATE equipment and without tedious or experienced troubleshooting
- Integrated 6.9 cm (2.7") CRT display

Test Signal:
Waveform : Sine wave
Frequency: Operator selectable, 50/60 Hz, 400 Hz, or 2 kHz
Level: 4 operator selectable ranges: 10 V, 15 V, 20 V, and 60 V peak

Pulse Signal:
Output waveform: Positive and/or negative pulses or dc level.
Amplitude: Adjustable from 0 to ±5 V.
Duty Cycle: Adjustable from 0% (dc) to 50% (square wave) for positive and/or negative pulses.
Output: 50 mA at 100 Ω output impedance for each output.

LCR-500 Autoranging Handheld High Performance Digital LCR Bridge

Economical powerful handheld LCR meter with features rivaling expensive benchtop systems.

- Broad measurement range: 1mΩ to 10 MΩ; 0.1 pF to 10 mF; 0.1 µH to 10,000 H
- Autoranging and manual ranging
- Large easy to read 4 digit LCD display with annunciators and status indicators
- Automatic statistical recording
- Two frequency operation: 120 Hz and 1 kHz
- Sorting capability with selectable tolerances
- Relative mode to eliminate "zero"
- Auto power off; standard 9 V battery

MAJOR SPECIFICATIONS

CAPACITANCE (C)
Full scale ranges: 1,000 pF to 10 mF, in 8 ranges.
Resolution: 0.1 pF - 0.001 mF.
Accuracy: ±0.7% basic.
D(Dissipation): ±(0.7% + 100/C rdg + 5 LSD), basic accuracy.

INDUCTANCE (L)
Full scale ranges: 1 mH to 10,000 H, in 8 ranges.
Resolution: 0.1 µH - 1 H.
Accuracy: ±0.7% basic.

RESISTANCE (R)
Full scale ranges: 10 Ω to 10 MΩ, in 7 ranges.
Resolution: 1 mΩ - 0.001 MΩ.
Accuracy: ±0.5% basic.

GENERAL SPECIFICATIONS

Displays:
L/C/R: Maximum display of 9999 except at 10 mF (120 Hz) and 1 mF (1 kHz) measurement ranges which have a maximum display of 1999.
D/Q: 3 digits, maximum display 999 (auto range).

Status: Annunciators for units, low battery, frequency, open fuse; audio tone for tolerance testing, and other test conditions.
Ranging Mode: Auto and manual.
Test Frequency: 1kHz and 120 Hz.
Test Signal Level: 0.9 Vrms approximately.
Measurement Rate: 1 measurement/second, nominal.
Measurement Terminals: 2 banana jacks and 2 easy-insert component strips.
Operating Modes: Relative, calibration, tolerance sorting, and max/min/avg recording.
Input Protection: 70 mA fast-blow 250 V fuse.
Auto Power-off Time: Approximately 5 minutes; may be disabled.
Power Requirements:
1) Battery, dc 9 V battery
2) External adapter, 12-15 Vdc, 50 mA.
Dimensions: 19.2 cm L, x 9.0 cm W x 3.7 cm H (7.56" x 3.54" x 1.46").
Weight: 390 g (3 oz).

The LCR-500 is an excellent combination of features and performance

ORDERING INFORMATION

Model LCR-500 Autoranging LCR Meter	299.00
Model LCR-5001 ac Adapter	21.00
Model LCR-5002 Carrying Case	19.00
Model CC-25 Component clip for axial components	21.00

FREE! See page D1225 for free instrument offer FREE!

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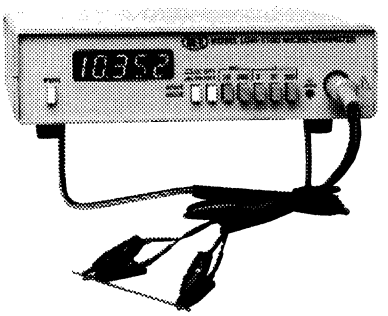
LOM-510A Series High Accuracy Micro-Ohmmeter

The Model LOM-510A has features and accessories to assure that any low-ohm measurement you'll ever need to make can be accomplished accurately, easily and economically.



Range (Full Scale)	Drive	Max Dissipation dc	Max Dissipation SW	Resolution
19.999 mΩ	1 A	20 mW	5.0 mW	1 μΩ
199.99 mΩ	.1 A	2.0 mW	.50 mW	10 μΩ
1.9999 Ω	10 mA	.2 mW	.05 mW	100 μΩ
19.999 Ω	1 mA	.02 mW	.005 mW	1 mΩ
199.99 Ω				

Accuracy:
Switched dc: 0.02% + 2 counts + 2 μΩ
Continuous dc: 0.04% + 2 counts + 2 μΩ
Pulsed Mode: 0.02% + 4 counts + 2 μΩ

Zero Adjust: Active only in Continuous dc mode.

Noise Rejection: 80 dB for switched dc and Pulsed Mode; 60 dB for continuous dc mode.

Switched dc Mode: Current switched on for 166 milliseconds, then off for 500 milliseconds (duty cycle = 0.25).

Pulsed Mode: One cycle of Switched dc Mode. Enabled by shorting two contacts on rear panel connector.

Display: 41/2 digit, 0.5 inch, red LED display.

Display Overrange Indication: Flashes for continuous dc and Switched dc; blanks in Pulsed Mode.

Measurement Rate: 1.5 readings/second.

Connections to Unknown: 4-terminal Kelvin leads with shield.

Outputs: Parallel BCD.

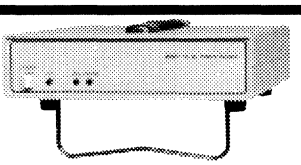
- **Portable**
- **0.02% basic accuracy**
- **Digital output**
- **1 μΩ resolution**
- **Pulsed, switched dc or constant dc**

ACCESSORIES

Various test clips and probes to access any resistance from PCB traces to rails and pipes.
LOM 512A for digital output and sorting.
BP-511 Battery Pack.

BP-511 Battery Driven AC Power Source

- **Makes almost any lab instrument, e.g. DVM or scope, portable**
- **Small size**
- **40 W, 120 V (or 220 V) 60 Hz output**
- **Charging and low battery indicators**



Receive your FREE "personal" portable test equipment

Model LCR-500
Autoranging Handheld High Performance Digital LCR Bridge

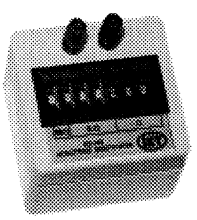
- 1 mΩ to 10 MΩ
- 0.1 pF to 10 mF
- 0.1 μH to 10,000 H
- D and Q

Priced at: $299
See pg. D1224

- **True bridge complex impedance**
- **Auto power off**
- **Automatic statistics**
- **Sorting capability**

-OR-

Model RS-201
Precision Digital Resistance Decade Substituter



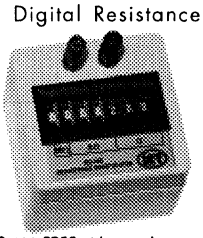
- 0 to 9,999,999 Ω
- 0.1% Accuracy

Priced at: $279
See pg. D1218

- **Direct reading**
- **Accurate**
- **Error proof**
- **Color coded**
- **Compact and rugged**

Receive the LCR-500 or RS-201 FREE with any order for instruments or calibration totaling over $1999

Model RS-200
Digital Resistance Decade Substituter



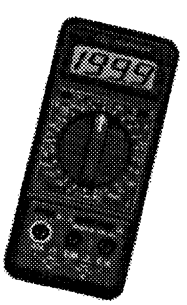
- 0 to 9,999,999 Ω
- 1% Accuracy

- **Accurate**
- **Error proof**
- **Color coded**
- **Compact and rugged**

Priced at: $146 See pg. D1218

Receive the RS-200 FREE with any order for instruments or calibration totaling over $899

Autoranging Digital Multimeter



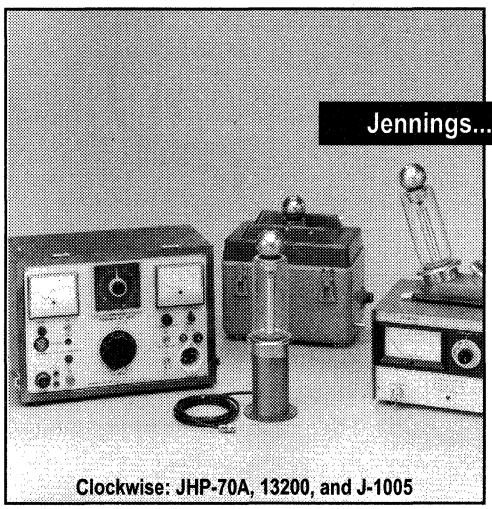
- **Resistance**
- **dc and ac voltage**
- **Continuity beeper**
- **Many other features**

Receive your Autoranging Digital Multimeter FREE with *any order* for calibration, instruments or options over $99

FREE! **See page D1225 for free instrument offer** FREE!

JENNINGS

High Voltage Test Equipment



Clockwise: JHP-70A, 13200, and J-1005

Jennings...The leader in high quality test equipment

Jennings high voltage instruments allow direct measurement of the most important voltage parameters that apply to all AC waveforms, whether sinusoidal, pulse, repetitive transient or combination signals. The instruments are small, easily portable, and operate directly from line voltages. The instruments are versatile in a variety of applications including production processing on continuous monitoring of voltage withstand, use in laboratories for verification of design capabilities, and troubleshooting for onsite installations. Comprehensive data sheets on individual instruments are available upon request. Our sales engineers can provide an on-site demonstration if requested.

Solid State AC Voltmeter Model J-1005
A compact, portable instrument for the accurate, direct reading of very high voltages at RF, audio and power frequencies; determination of the amplitude of pulses with oscilloscope connections for viewing wave shapes; removable high voltage input circuit for remote panel mounting of the meter; internal battery and AC line operation.

Portable AC High Voltage Tester Model JHP-70A
The smallest and lightest instrument available at its power level the JHP-70A will generate and measure 70,000 volts peak for on-site testing of high voltage components such as capacitors, switches, transformers, bushings, vacuum tubes, etc.

High Voltage AC Divider Model 13200
These dividers can be used with an oscilloscope to measure and observe voltages up to 50 kV at frequencies up to 20 MHz. Their low circuit loading design and shielding construction make them particularly suitable for RF measurement applications including tank circuit and transmission line voltages, pulse parameters, modulation voltages, and transient wave characteristics.

Jennings Technology Corporation
970 McLaughlin Ave.
San Jose, CA 95122, U.S.A.
Phone: (408) 292-4025
Fax: (408) 286-1789
URL: http://www.jenningstech.com

Model Number J-1005

Voltage Ranges (Peak kV)	(single-ended) 0-2.5, 0-5, 0-10, 0-25, 0-50 (double-ended) 0-2.5, 0-5, 0-10, 0-25, 0-50, 0-100
Frequency Response	10 Hz to 30 MHz at full rate voltage
Accuracy	3% of full scale on all voltage ranges
Oscilloscope Connection (Approx.)	600 to 1 division ratio
Meter Calibration	The meter is calibrated in peak kilovolts with linear voltage scales of 0-2.5, 0-5, 0-10, 0-25, 0-50
Input Impedance	> 2 X 10^{12} ohms and approx. 4 pF single-ended to ground 2 pF double-ended
Power Supply	117 / 230 volts ± 10% 50/60 Hz, 5 watts, or rechargeable battery
Dimensions (Inches)	16 H X 10 3/4 W X 8 D
Net Weight (Approx.)	12 lbs.

Model Number JHP-70A

Maximum Output Voltage		70 kV Peak
Maximum Continuous Current		21 ma RMS
Short Circuit		100 ma RMS
Power Requirements		105-125 Volts RMS *
Frequency		50-60 Hz
Current		15 Amps
Surge Current		20 Amps
Weight:	**Control Cabinet**	28 lbs.
	Transformer	43 lbs.

Model Number 13200

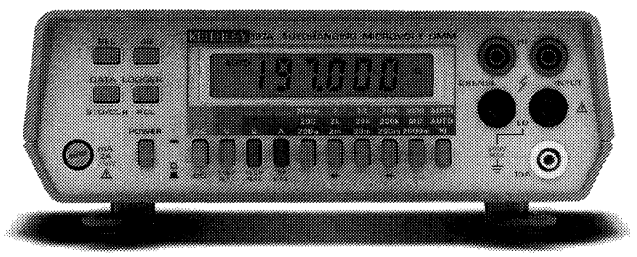
Voltage	50 kV peak
Current	12.5 Amps RMS
Input Impedance	Above 10^{12} ohms, 4 pF
High Frequency Response	Flat to 10 MHz at 50 kV peak max. frequency 50 MHz at 20 kV peak
Division Ratio As Requested	325 : 1, 1000 : 1, 2000 : 1, or 10,000 : 1
Low Frequency Response	when operated into shunt resistance of: 1 megohm 1000 Hz 10 megohms 100 Hz
Weight	2 lbs.-4 oz.

* **Note:** 230 volt version available upon special request.

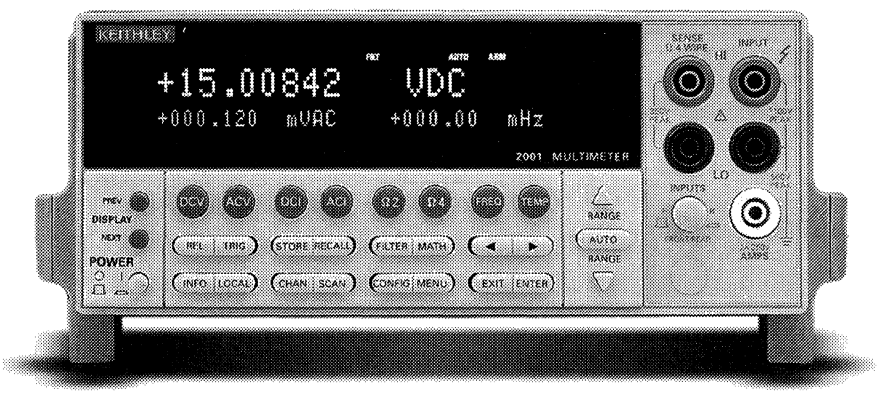
Accurate Measurements

Keithley Digital Multimeters

Keithley offers a wide range of bench and system DMMs with excellent resolution, speed and accuracy. The Model 2000 features 13 measurement functions and the best speed and accuracy in its class. Other units have built-in autoranging, expanded memory, IEEE interfaces, battery packs, scanner options, and more.



MODEL 197A
MICROVOLT DMM



MODEL 2001 MULTIMETER

MODEL	175A	197A	2000	2010	2001	2002
Digits	4½	5½	6½	7½	7½	8½
Display	LCD	LCD	VFD	VFD	VFD	VFD
DC VOLTS						
Sensitivity	10 µV	1 µV	100 nV	1 nV	10 nV	1 nV
Accuracy	0.03%	0.011%	0.002%	0.0018%	0.0018%	0.0006%
AC VOLTS						
Sensitivity	10 µV	1 µV	100 nV	100 nV	100 nV	100 nV
Accuracy	0.5%	0.35%	0.05%	0.05%	0.03%	0.02%
OHMS						
Sensitivity	10 mΩ	1 mΩ	100 µΩ	1 µΩ	1 µΩ	100 nΩ
Accuracy	0.05%	0.018%	0.008%	0.0032%	0.0032%	0.0007%
DC AMPS						
Sensitivity	10 nA	1 nA	10 nA	10 nA	10 pA	10 nA
Accuracy	0.15%	0.1%	0.03%	0.03%	0.03%	0.027%
AC AMPS						
Sensitivity	10 nA	1 nA	1 µA	1 µA	100 pA	100 pA
Accuracy	0.8%	0.8%	0.1%	0.1%	0.1%	0.1%

KEITHLEY

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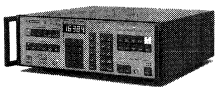
KROHN-HITE group

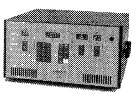
KROHN-HITE CORPORATION

The features shown below cover a variety of instruments in the Krohn-Hite group product line. For complete details, visit our website at www.krohn-hite.com.



FILTERS and FILTER/AMPLIFIERS

- Tunable and Fixed
- Programmable/Benchtop/Systems
- Number of Channels: 1 to 128
- Frequency Range: 0.03Hz up to 25.6MHz
- Responses: Butterworth, Bessel, Elliptical
- Functions: HP, LP, BP, BR
- Rolloff Rate: 6dB up to 115dB/octave
- Input/Output Gains to 70dB
- Stopband Attenuation <100dB
- Amplifer Mode to 70dB
- Non-Volatile Memory
- Overload Indicators
- Battery Operation



WIDEBAND POWER AMPLIFIERS

- Frequency Range: DC to 1MHz
- Output Power: 17 Watts to 75 Watts
- Output Voltage: 125V to 282V rms
- Gain: 1 to 100
- Frequency Response: 0.1dB

PHASEMETERS

- Frequency Range: 10Hz to 10MHz
- Phase Accuracy: 0.05°
- Resolution: 0.1° and 0.01°
- Input Volts: 0.01V to 320V rms
- Input Waveforms: Sine, Square, Pulse
- Display Range: 0 to 360°, ±180°, Auto
- Analog/BCD Outputs

SIGNAL SOURCES

- Frequency Range: 0.002Hz to 10MHz
- Output Voltage: 20V to 30V p-p (o.c.)
- DC Offset: ±10V to ±15V
- Distortion: as low as 0.0002%
- Waveforms: Sine, Square, Triangle, Pulses Ramps, ARB
- Modes: Cont., Gate, Trig, Burst, Lin/Log Swp

DISTORTION ANALYZERS

- Frequency Range: 1Hz to 110kHz 5Hz to 1MHz
- Totally Automatic
- Input Voltage: 0.01V to 130V rms
- Display: 3 Digits
- Distortion Range: 0.003% to 50.0%
- Voltmeter/Frequency Counter

ELECTRONIC DEVELOPMENT CORPORATION

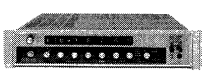
DIVISION of KROHN-HITE CORPORATION

CALIBRATORS, REFERENCES, STANDARDS AND SOURCES

All EDC instruments are traceable to N.I.S.T. and certification is supplied with all new instruments. Applications include design engineering, quality control, calibration, field service, imbedded standards and simulation for process control systems and data logging systems.

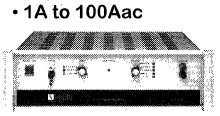
LOW NOISE DC VOLTAGE & CURRENT

- 100nV to 100Vdc (Optional 1kVdc)
- 10nA to 100mAdc



AC & DC CURRENT

- 10µA to 10Aac/dc
- 1A to 100Aac

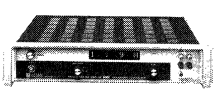


AC VOLTAGE

- 1mV to 120Vac (Optional 1kVac)

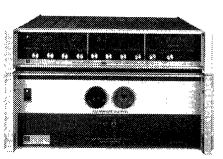
RESISTANCE

- 1Ω to 19MΩ



WATT (hour) CALIBRATION

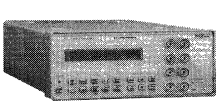
- 0.25A to 100Aac
- 1mV to 1kVac



PREMA® Offered and supported by KROHN-HITE

7½ DIGITAL MULTIMETERS

- Functions: Volts ac/dc, Current ac/dc, Ω, °C and Hz/Period
- Resolutions: 10nV, 100pA, 10µΩ, 0.001°C and 8 digits
- Stability: 4ppm
- Accuracy: 20ppm
- Math Programs: Offset, % Deviation, Ratio and ax + b
- Full Scale: 30 100 000
- Integration Times: 20ms to 100s
- Temperature Measurements with RTD Sensors (Pt10, Pt25, Pt100, Pt500 and Pt1000)
- Onscreen Graphics with Simultaneous Readouts
- IEEE-488 and RS-232 Interface Standard



PRECISION THERMOMETER

- Display: °C, °F or Kelvin
- Range: -200°C to 850°C
- Resolution: 0.001°C
- Measurement Time: 100ms to 100s
- Internal Scanner: up to 32 Channels
- IEEE-488 and RS-232 Interface

SCANNER

- Switches up to 80 Measuring Points
- (80 X 1-pole, 40 X 2-pole, 20 X 4-pole)
- Low Thermoelectric EMFs
- High Reliability
- IEEE-488 and RS-232 Interface Standard

ARBITRARY WAVEFORM GENERATOR

- Frequency Range: 100µHz to 20MHz
- Waveform Size: 130,000 Points
- Vertical Resolution: 12 Bit (4096 Points)
- Output: 10Vp-p into 50Ω
- Rise Time: 20ns
- 14 Standard Waveforms
- Filters for Waveform Smoothing
- Synchronization of Multiple Units
- IEEE-488 and RS-232 Interface Standard

For complete information on any KROHN-HITE group product, contact us directly or visit us at www.krohn-hite.com

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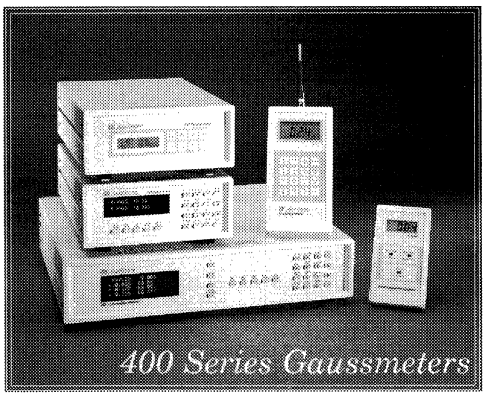
Tel: (508) 580-1660; Fax: (508) 583-8989; E-Mail: krohnhite@aol.com

Precision Magnetic Measurements



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Gaussmeters & Fluxmeters

Hand-held, bench, single-channel, and 3-channel gaussmeters, plus the Model 412 Electromagnetic Field Meter, now available.

Access all operating functions with one key stroke.
Achieve resolution to 5¾ digits.
Measure magnetic fields from 0.02 mG to 300 kG.
View two functions simultaneously.
IEEE-488, serial and analog interfaces.
Frequency DC and 10 to 400 Hz; hand-held AC meters 15 Hz to 300 kHz.
Over 60 standard, transverse and axial probes.
Choose from a full line of Hall effect probes.
Custom probe assemblies also available.

Gaussmeters,

Fluxmeters,

Laboratory Electromagnets,

Magnet Power Supplies,

Electromagnet Platforms,

Vibrating Sample Magnetometers,

Hall Effect Measurement Systems,

AC Susceptometers / DC Magnetometers,

Sensors,

Hall Probes,

Training and Installation,

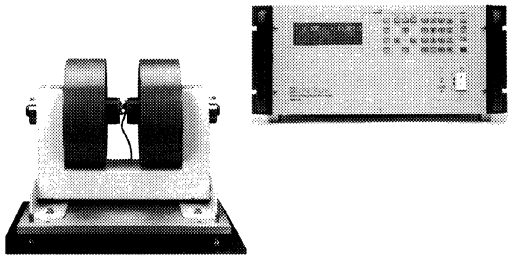
and more....

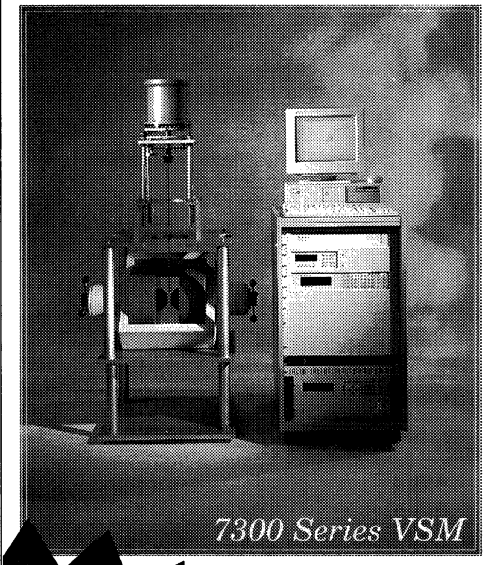
Lake Shore.

Laboratory Electromagnets

Four Quadrant Magnet Power Supplies

Electromagnet Platforms (power supplies, gaussmeters, and electromagnets with field control software)





Vibrating Sample Magnetometers

Compact, turnkey systems; 2-axis and 3-axis vector (torque) measurement; autorotation option for angular variation of sample; improved sensitivity.

Hall Effect Measurement Systems

Measure Hall voltage, sample resistance, resistivity, magnetoresistance, Hall coefficient, carrier concentration and mobility, and current voltage characteristics; measure van der Pauw, 6-contact Hall bar, and 4-lead resistance samples; variable temperatures and fields.

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AC susceptibility; DC moment; harmonic susceptibilities; AC and DC resistance.

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THE PERMANENT MAGNET USER'S EQUIPMENT STORE!

GAUSSMETER MODEL 912 TESLAMETER MODEL 912T

Features:

- Wide Measurement Range:
  0.01 to 100,000 Gauss (Model 912)
  0.01mT to 10 Tesla (Model 912T)
- High Resolution 4 1/2 Digit Display
- Built-In Precision Calibrat ion
- Measures DC, AC and Permanent Magnet fields
- Wide Variety of Hall Probes Available

GAUSSMETER MODEL 915 TESLAMETER MODEL 915T

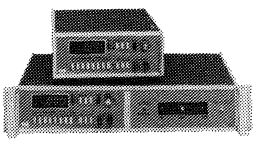
Features:

- **Measures DC, AC(RMS, and Pulsed Peak Fields**
- **Wide Measurement Range (Switchable)**
  0.01 to 100,000 Gauss (Model 915)
  0.01mT to 10 Tesla (Model 915T)
- **High Resolution 4 1/2 Digit Display**
- **Built-In Precision Calibration**
- **Wide Variety of Hall Probes Available**

FLUXMETER MODEL 916

Features:

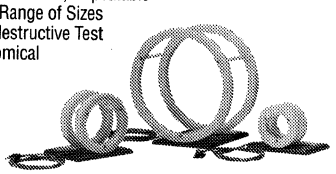
- Measures Magnetic Field
- Three Modes of Operation: Normal (PM/DC), Peak and Average AC
- 3 1/2 Digit LED Display
- Measurements from 1 x 10^3 to 2 x 10^9 Maxwell-Turns
- Helmholtz Coils, Surrounding Coils, Field Coils and Potential Coils, are available.



HELMHOLTZ COILS FOR FLUXMETERS

Features:

- Simple, Easy to Use, Fast
- Highly Reliable, Repeatable
- Wide Range of Sizes
- Non-destructive Test
- Economical



HALL EFFECT PROBES FOR GAUSSMETERS AND TESLAMETERS

Description: Hall Effect Probes Manufactured by Magnetic Instrumentation, Inc. are available in a wide range of styles and sizes. Each Probe is supplied with magnetic, electrical, temperature stability and calibration data for each measurement range.

Transverse (Flat) Probes

Transverse (Flat) Probes are used to measure magnetic fields perpendicular to their flat surfaces, and are available in thicknesses of 0.015 inch (.038 cm) to 0.080 inch (.203 cm). The Model 025 and Model 039 Probes have fiberglass/epoxy sleeves protecting the sensitive Hall element.

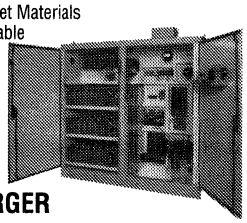
Axial Probes

Axial Probes are used to measure magnetic fields parallel to the probe handle, such as the field in a solenoid. The Hall element is located at the tip of the Probe. The Axial Probes are available in diameters of 0.098 inch (.248 cm) to 0.312 inch (.792 cm).

HIGH ENERGY CAPACITIVE DISCHARGE MAGNETIZER MODEL 8500 SERIES

Features:

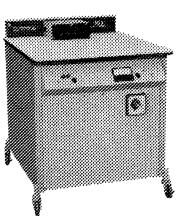
- Energy Levels from 2.4 KJ to 100KJ
- High Speed, Fast Recharge Operation
- Heavy Duty Construction
- Suitable for All Magnet Materials
- Production Line Suitable
- Modular Design
- Custom Fixtures for All Magnet Sizes and Magnet Assemblies



MAGNET CHARGER MODEL 942A

Features:

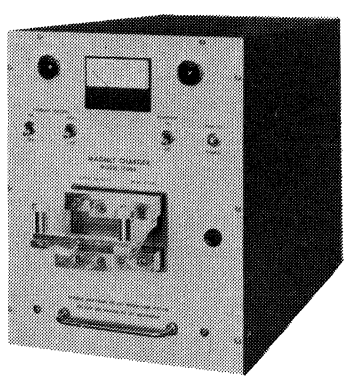
- High Power
- Used with Wire-Wound or Solid Copper and Iron Fixtures
- Self-Contained, Floor Mounted with Casters for Portability
- Stored Energy From 900 to 3600 WAtt-Seconds
- Charging Transformers Available
- Will Process Alnico, Ferrite and Rare Earth Magnets



MAGNET CHARGER MODEL 1500A

Features:

- Low to Medium Power
- Used with Wire-Wound, Solid Copper, and Pulse Transformer Fixtures
- Bench Mounted
- 56 or 225 Watt-Seconds of Stored Energy
- Will Process Alnico and Ferrite Magnets



CUSTOM INDUSTRIAL MAGNET PROCESSING EQUIPMENT

Magnetic Instrumentation, Inc. can meet your every need from a flexible range of existing designs, modified designs and custom designs. Our innovative and experienced engineers can provide magnetizing, measuring, stabilizing and demagnetizing measuring systems built to NEMA 12/ JIC specifications. These systems, including automatic parts feeding, are designed to your specifications.

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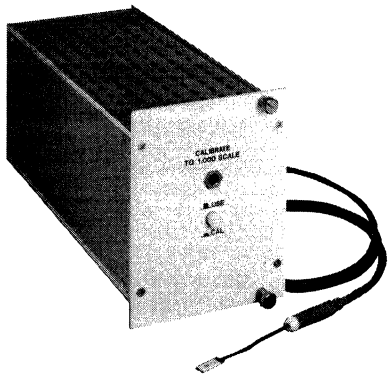
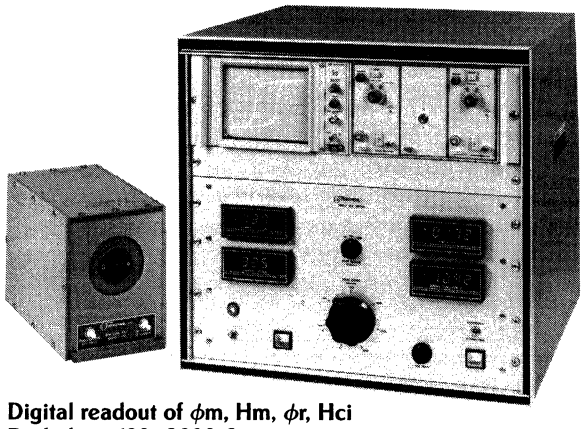
MAGNETIC TEST EQUIPMENT

Model 1607 Field Monitor



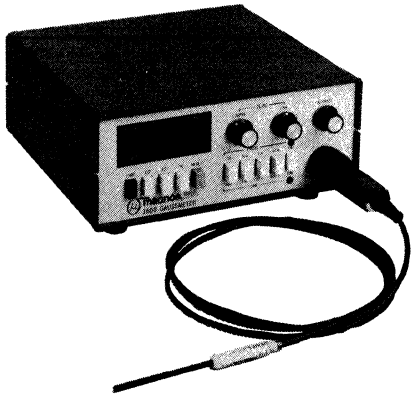
- High stability field to volts transducer for O.E.M. applications.
- Sensitivity 0.1V/kG standard Other scale factors available
- Includes pre-calibrated low temperature coefficient probe
- Bare-board version available

Model 1246L-2 B, H Tape Test



- Digital readout of ϕm, Hm, ϕr, Hci
- Peak drive 100–3000 Oe
- Flux sensitivity .1 maxwell to 2 $\times$ 10^3 maxwells
- Accommodates single tape samples as well as loose powder in tubes
- Complete test in less than 10 seconds
- 50 Hz operation available

Model 1600 Hall Effect Gaussmeter



- Scale ranges from 10–100k gauss for standard probes
- DC, AC (to 1k Hz), PEAK modes of operation
- Instrument scales automatically coordinated with probe sensitivity
- Compact rugged case

Model 1618 Fluxmeter

- DC flux measurement
- Scale range 1.000 to 9.999 kilomaxwells times 10^1 to 10^3
- DC drift less than 100 Mx turns per minute.

MAGNOS, Incorporated supplies complete test systems for magnetic analysis and quality control for hard and soft materials, laboratory electromagnets and power supplies, coil test sets, and a complete line of magnetic measuring instruments.

Custom design and assembly of electronic equipment is also available. Manufacturing services include circuit board, chassis, and harness assembly, and are fully supported by in-house facilities for short-run machining, sheet metal fabrication and coil winding.

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Calabasas, CA 91302

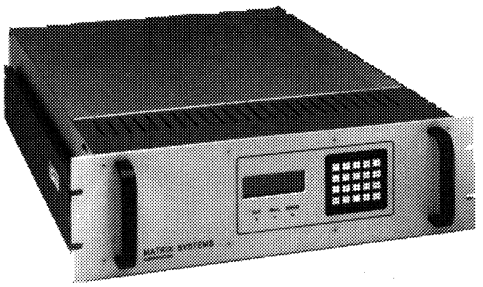
Switching Systems

We Specialize In Specials

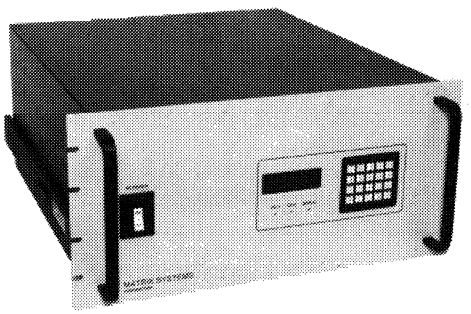
Specials

Let us supply your switching system to your specifications using our standard coaxial and /or Triaxial relay modules.

Matrices, Scanners and Multi-pole, Multi-throw with RS-232C, RS-422, RS-485, IEEE-488 and keypad control. Units are assembled in Model 11600 rack mount unit and tested to your specifications.



Standards



R.F. / IF Switching Matrices

Model 12479	32in x 40out, 5-200MHz, Non-blocking, Unity gain with RS-232C, IEEE-488 and keypad control.
Model 10840	32in x 32out, 5-200MHz, Non-blocking, Unity gain with RS-232C, IEEE-488 and keypad control.
Model 10991	16in x 16out, 5-250MHz, Non-blocking, Unity gain with RS-232C, IEEE-488 and keypad control.
Model 11777	10in x 10out, Combiner/Splitter, 50-90MHz, Unity gain with IEEE-488 and keypad control.
Model 11826	16in x 16out, Non-blocking, DC to 80MHz Video & 16in x 16out Non-blocking, 3-250MHz R.F. matrix packaged together. Unity gain with RS-232C, IEEE-488 and keypad control.

Video Switching Matrices

Model 11633	16in x 16out, DC-120MHz, Non-blocking, Unity gain with RS-232C, IEEE-488 and keypad control.
Model 10990	32in x 20out, DC-110MHz, Non-blocking, Unity gain with RS-232C, IEEE-488 and keypad control.
Model 10693	32in x 32out, DC-100MHz, Blocking, Bi-directional R.F. / Video with RS-232C and keypad control.
Model 11821	Dual 8in x 32out, DC-100MHz, Blocking, Bi-directional R.F. /Video with RS-232C, IEEE-488 and keypad control.
Model 11865	64in x 64out, DC-20MHz, Blocking, Bi-directional R.F. /Video with RS -232C and keypad control.
Model 12664	RGBHV Video A/B Desk Top Switch with RS-232C and paddle switch control.

Solid State Audio / L.F. Switching Matrices

Model 10980	48in x 48out x 2 Wire, DC-150KHz, Non-blocking, Unity gain pair with RS-232C, IEEE-488 and keypad control.
Model 11652	128in x 64out, DC-700KHz, Non-blocking, Unity gain coaxial with RS-232C, IEEE-488 and keypad control.
Model 11703	128in x 64out, DC-500KHz, Blocking, Bi-directional coaxial with RS-232C, IEEE-488 and keypad control.
Model 11668	64in x 64out x 2 Wire, DC-20KHz, Non-blocking, Unity gain with RS-232C, IEEE-488 and keypad control.

Hard Contact 2 Wire Switching Matrix

Model 6801B	10in x 20out x 2 Wire, DC-100KHz, Blocking, Bi-directional pair with RS-232C or IEEE-488 control.

Digital Switching Matrices

Model 12620	Dual 16in x 16out, Differential clock and data ECL, DC-400MHz, Non-blocking coaxial with RS-232C, IEEE-488 and keypad control.
Model 12430	32in x 32out, Dual full duplex RS-422 buffered with RS-232C, IEEE-488 and keypad control.
Model 12429	32in x 32out, Full duplex RS-422 buffered with RS-232C, IEEE-488 and keypad control.
Model 10046	12in x 24out x 25 Wire, Simplex RS-232C Bi-directional with RS-232C and keypad control.

High Voltage Switching Systems

Model 11075	Quad 1in x 60out, 2000 volt, Bi-directional Scanner with RS-232C, IEEE-488 and keypad control.
Model 11831	20in x 32out, 500 volt, Bi-directional Matrix with RS-232C, IEEE-488 and keypad control.

Video & R.F. Distribution Amplifiers & Converters

Model 12744	Dual 8 way Coaxial Distribution Module, DC-80MHz, Unity Gain.
Model 12742	Dual 8 way Triaxial Distribution Module, DC-80MHz, Unity Gain.
Model 12741	9 each Differential Triaxial to Coaxial Converter Module, DC-80MHz, Unity Gain.
Model 12740	9 each Coaxial to Differential Triaxial Converter Module, DC-80MHz, Unity Gain.
Model 12116	RETMA Chassis to house, & power and cool the above Modules.

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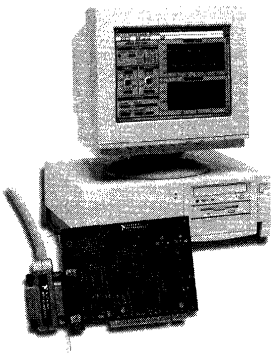
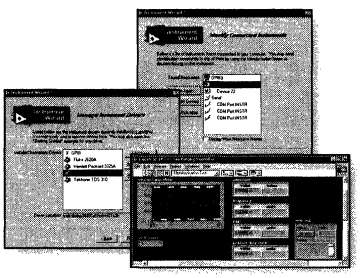


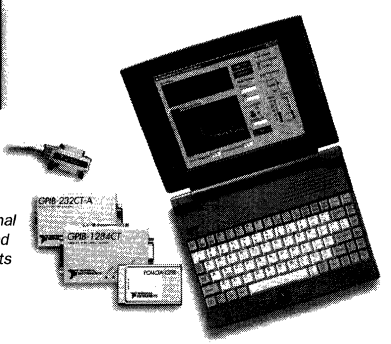
Take reliable measurements faster by adding a National Instruments IEEE 488.2 controller to your PC.

Features:

- Maximum performance with PCI and HS488™
- Easy installation
  - –Get up and running quickly with our plug and play GPIB interfaces for Windows NT/95
- Rugged cables, bus extenders, and bus expanders
- IEEE 488.2 chips
  - –TNT4882™ single chip interface
  - –NEC upd 7210 and TI TMS9914A replacement parts
- Software makes it easy
  - –Industry-standard NI-488.2™ software
  - –More than 600 instrument drivers for LabVIEW™ and LabWindows™/CVI from more than 45 vendors



The leading instrumentation software, LabVIEW™ and LabWindows™/CVI, make GPIB programming easy.



Equip your notebook PC with a National Instruments IEEE 488.2 controller and software and automate measurements wherever you go.

IEEE 488 Instrument Control Solutions

Bus	GPIB Board	Plug and Play	TNT4882C	Max IEEE 488.1 Transfer Rate	Max HS488 Transfer Rate	NI-488.2 Software
ISA	AT-GPIB/TNT (PnP) AT-GPIB/TNT+	Yes	Yes	1.5 Mbytes/s	1.6 Mbytes/s (ISA) 3.4 Mbytes/s (EISA)	DOS, Windows 3, Windows 95, Windows NT
ISA	AT-GPIB/TNT	No	Yes	1.5 Mbytes/s	1.6 Mbytes/s (ISA) 3.4 Mbytes/s (EISA)	DOS, Windows 3, Windows 95, Windows NT, OS/2
PC Card	PCMCIA-GPIB PCMCIA-GPIB+	Yes	Yes	1.5 Mbytes/s	2.3 Mbytes/s	DOS, Windows 3, Windows 95, Windows NT
PCI	PCI-GPIB, PCI-GPIB+	Yes	Yes	1.5 Mbytes/s	7.7 Mbytes/s	Windows 95, Windows NT
EISA	EISA-GPIB	No	Yes	1.5 Mbytes/s	7.5 Mbytes/s	DOS, Windows 3, Windows 95
PC/XT	GPIB-PCII/IIA	No	No	400 kbytes/s	N/A	DOS, Windows 3, Windows 95
USB	GPIB-USB	Yes	Yes	TBD	N/A	Windows 95
PC Serial Port	GPIB-232CT-A	N/A	No	Depends on baud rate	N/A	DOS, Windows 3
PC Parallel Port	GPIB-1284CT	N/A	Yes	300 kbytes/s (EPP)	N/A	DOS, Windows 3
PC Ethernet	GPIB-ENET	N/A	No	50 kbytes/s	N/A	Windows 3, Windows 95, Windows NT

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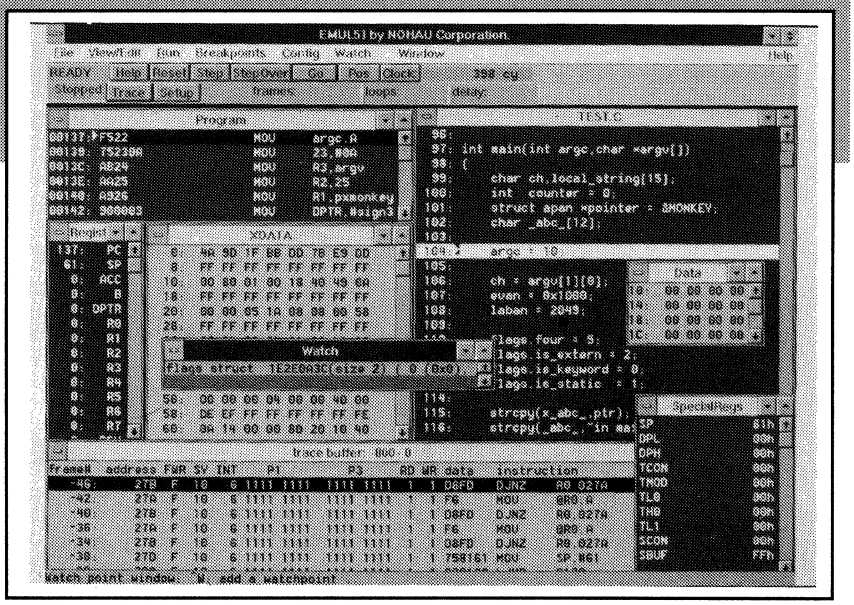
8051 Family In-Circuit Emulator



Web Site:
http://www.nohau.com
E-Mail: sales@nohau.com

EMUL51-PC is a high performance in-circuit emulator specifically designed to give an optimized environment to develop your 8051 family microcontroller hardware and software.

The EMUL51-PC system consists of an emulator board which connects to a POD board through a flexible cable. The system communicates through a standard parallel port or via direct ISA plug-in boards. Communication through a parallel port is achieved by using Nohau's new external High Speed Parallel (HSP) Box solution, which operates virtually as fast as ISA plug-in boards while keeping the port available for regular printing use. Yet another option, the LanICE, allows EMUL51-PC to run on workstations like SUN or HP.

The optional Trace board features advanced trace functions with sophisticated trigger capabilities.

The World's Most Popular 8051 Emulator
Since its introduction in 1986, Nohau has delivered over 10,000 EMUL51-PC emulators. Each emulator is often utilized in several projects where different 8051 derivatives are used--only a change of the probe is required when a new derivative needs emulation support.

Choice of Different User Interfaces
Early in the evolution of the EMUL51-PC's user interface, it became clear that each customer had different opinions of how they would like the interface to work and what features were important to them. On these pages we show one of the three main user interface choices for the EMUL51-PC: *Microsoft Windows* 3.x./'95/NT ChipView's Borland Keypress compatible and Nohau's original pull-down/command line versions are not shown. Recognizing EMUL51-PC's enormous popularity, several third party compiler vendors have ported their user software to the EMUL51-PC to provide emulator software similar to their simulator interfaces. Among these vendors are Tasking Keil and Produc-tion Languages Corporation.

Hardware Configurations
The EMUL51-PC system consists of an emulator board which connects to a POD board through a flexible cable. The system communicates through a standard parallel port or via direct ISA plug-in boards. Communication through a parallel port is achieved by using Nohau's new external High Speed Parallel (HSP) Box solution, which operates virtually as fast as ISA plug-in boards while keeping the port available for regular printing use.

The optional Trace board features advanced trace functions with sophisticated trigger capabilities.

To use the EMUL51-PC on XWindows workstations such as SUN or HP, the Nohau LanICE is available. Because LanICE uses a high speed (10 Mbit/second) local area network, not only can it be placed far away from the workstation, but it maintains the relatively high code loading speed of an Nohau emulator plugged into your PC on your desk top.

Real Time Trace
The EMUL51-PC offers trace features not always found in other emulators. For instance, the trace buffer can record up to 256K bus cycles with 64 bits of data. The trace can be operated "on-the-fly", which means that it can be viewed, programmed and retriggered without disturbing program execution. With the trace setup menu, you can define exactly what events are to be stored in the trace buffer. The real-time trace can be stopped (triggered) at a selected event or after a combination of multiple events. By aligning the trigger point anywhere in the trace buffer, you have a full choice of pre- and post-triggering.

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EMUL51-PC Saves time on all 8051 family projects

Web Site:
http://www.nohau.com
E-Mail: sales@nohau.com

EMUL51-PC is an in-circuit emulator dedicated to the 8051 family.
EMUL51-PC truly emulates the microcontrollers from all manufacturers of 8051 derivatives. This means that your EMUL51-PC will work just like your microcontroller when it is plugged into your target.

System Specifications

Host
IBM PC/XT/AT, PS/2 or compatible.
Minimum 640K of RAM.
SUN, HP and other workstations.

External High Speed Parallel Box Solution
The emulator boards can be installed in an external box High Speed Parallel (HSP) box with direct communication to the PC's parallel port, while keeping the port available for regular printing use.

Languages Supported
Third party assemblers, PL/M-51 and C-51 compilers.

High-Level Debugging
Window for source-level debugging. Single step or line step with breakpoints marked directly in the code. Full support for local or global variables in C-51.

In-line Assembler and Disassembler
Full instruction set and symbols supported.

Symbolic Support
Full symbolic debugging and type checking. Same symbols can be used in different modules.

File Formats Supported
Intel HEX/OBJ/OMF/SYM, Avocet, IAR Franklin/Keil, BSO/Tasking, Intermetrics/ Whitesmiths.

Real Time Emulation
Full speed emulation up to 42 MHz.
No wait states and no intrusion on memory, stack, I/O or interrupt pins.

Emulation Memory
64K XDATA memory and 64K CODE memory. Up to 256K with bankswitch option.

Memory Mapping
Mappable in 4K pages.

Macros
Test session automation and macro command definition. IF/ELSE, REPEAT/ WHILE structures.

Debug Session Logging
Record emulation session and all setups to a file.

Breakpoints
64 K program breakpoints.
64 K data read and write breakpoints.
Break on external signal.
Break on direct access to internal bit or byte memory.
Break on a range of addresses. With the trace board option, you can break on any 48 bit combination of address, data, RD, WR, OP code fetch, interrupt level, ports or external signals.

Single Stepping
Single-or multiple-instruction stepping.
Step over calls and interrupts.
Line stepping in high-level languages.

Execution Timer
Resolution down to half a cycle.

Real Time Trace (optional)
256K deep by 64 bits wide with timestamp.

Trace Operation
With each bus cycle, 48 bits of address, data, ports and external signals are compared with eight independent "48 bit registers" to produce eight "condition signals". These eight conditions are then combined with six bits from a "state-machine". The combination of these 14 signals creates a new state (or retains the old state). It also produces a TRIG and a FILTER signal that is used to control what is saved in the trace buffer. If the eight condition signals are named A, B, C, D, E, F, G and H, an example of how this could be used follows:

A THEN B THEN C THEN D THEN E THEN F THEN G THEN H where A - H could be code addresses.

The trace buffer can be viewed, reprogrammed and restarted without affecting emulation.

Trigger Breakpoint
The 48-bit trace trigger qualifiers can be used to define complex breakpoints also on program execution.

Trace Display
Display trace in disassembled symbolic or binary/hex form, or as high-level source code. Display can be saved to a file. Trace can be started, stopped and displayed independent of program execution.

Program Performance Analyzer
Histogram and statistical information of program execution in real time.

Supported chips

Intel
8051, 8052, 8031, 8032, 80C51, 80C52, 80C31, 80C32, 8751, 8752, 87C51, 8344, 8X51SL, 80C152, 80C452, 8XC51FA, FB, FC, 80C51GB, 8XC54, 8XC58 Also 3 volt

OKI 80C31, 80C51, 80C154

Siemens
8051, 8031, 8031A-20, 80512, 80532, 80535, 80C535, 80C515, 80C537, 80C517, 80C515A, 80C517A, 2083, SAB501/502/503

Philips, Signetics
8051, 8031, 80C31/8XC51, 80C32/8XC52, 8XC053, 8XC054, 80CL31/51,8XC51FA, 8XC51FB, 8XC451, 8XC542, 80C552, 8XC562, 8XC652, 8XC654, 8XC524, 8XC748, 8XC749, 8XC750, 8XC748, 8XC749, 8XC750, 8XC751, 8XC752, 8XC851, 8XC524, 8XC528, 8XC550, 8XCL580, 8XCL410, 8XC592, 8X053/54, 83CL781/782, 8XC575, 8XC576, 8XL51FX, 8XC851 3 volt also

AMD
8051, 8031, 80C51, 80C31, 80C321, 8751, 87C51, 8053, 8753, 80535, 80C52T2, 80C32T2

MHS
80C31/51, 80C31/51S, 80C32*/52, 80C32/52S, 80C154* *up to 42MHz

Dallas
DS5000, DS5000T, DS5001FP, DS5000FP, DS5002FP, DS80C320

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In-Circuit Emulator for Intel's MCS®251 Architecture

EMUL251™-PC

Web Site:
http://www.nohau.com

E-Mail: sales@nohau.com

Key Features

- High-level support for popular C-compilers
- Three trigger levels: programmable pre/post trigger location, Ext. address, and data
- Real-time trace up to 512 K frames deep, 104 bits wide (frame) with timestamp
- Window for source-level debugging
- Full support of local and global variables
- Reconstructed port 0, port 2, and P3.1 - P3.7 for all configurations
- Support for
  8XC251SA/SB/SP/SQ
  8XC151SA/SB
  Intel
  8X930AX/HX

Product Information
Nohau Corporation, the market leader for in-circuit emulators, announces the EMUL251™-PC emulator for Intel's MCS®251 architecture.
Many of today's applications need a higher performance microcontroller with more addressing space, register-based instructions, larger internal data RAM, more stack space and effective high-level language programming. MCS®251 satisfies these requirements and provides an easy, high performance upgrade path for the MCS®51 architecture. Nohau's EMUL251-PC supports this next generation microcontroller.

Hardware Configuration
The EMUL251-PC system consists of an emulator board which connects to a POD board through a flexible cable. An optional Trace board features advanced trace functions with sophisticated trigger capabilities.

The EMUL251-PC system communicates through a standard parallel port or via direct ISA plug-in boards. Communication through a parallel port is possible using either of the following options:

- Nohau's new external High Speed Parallel (HSP) Box solution, which runs virtually as fast as ISA plug-in boards and allows use of the EMUL251-PC outside your PC. This option runs through a standard PC parallel port while keeping the port available for regular printing use; or
- Nohau's new Emulator Parallel Cable (EPC), which connects from the parallel port to the emulator system directly, eliminating the need for a box or use of ISA slots.

The pod boards are designed around Intel's "special" technology for accurate emulation of both single chip and external mode operation. The POD-251SB contains a 8xC251SB special emulation microcontroller chip – the first product with the MCS®251 architecture. The 8xC251SB can be configured into either Binary mode or Source mode, and this capability is in turn supported by the POD-251SB. When 8xC251SB is configured in Binary Mode, it is binary code compatible with the MCS®51 microcontroller and can execute 8031 or 80C51 application code directly without any modification or rewriting. Therefore, you can plug the 8xC251SB into an 8031 or 80C51 socket, resulting in an immediate performance boost for your application.
The POD-251SB also has a 16 MHz crystal; 256 kilobytes of emulation RAM for instructions and data, and circuits for driving the cable bus.
The EMUL251-PC supports real-time emulation at 16 MHz, and has 256K of emulation RAM for instructions and data with no wait states or intrusion on memory I/O or interrupt pins.
For those using workstations such as Sun or HP, Nohau's LanICE is available. Nohau also offers a PC card (PCMCIA compatible) for use with laptops as an alternative to the plug-in board (does not support trace and ShadowRAM).

User Interface
With the EMUL251-PC *Windows*-based user interface, you can single-step or line-step with breakpoints marked directly in the code. In addition, the POD-2515B logic is software configurable for flexibility.

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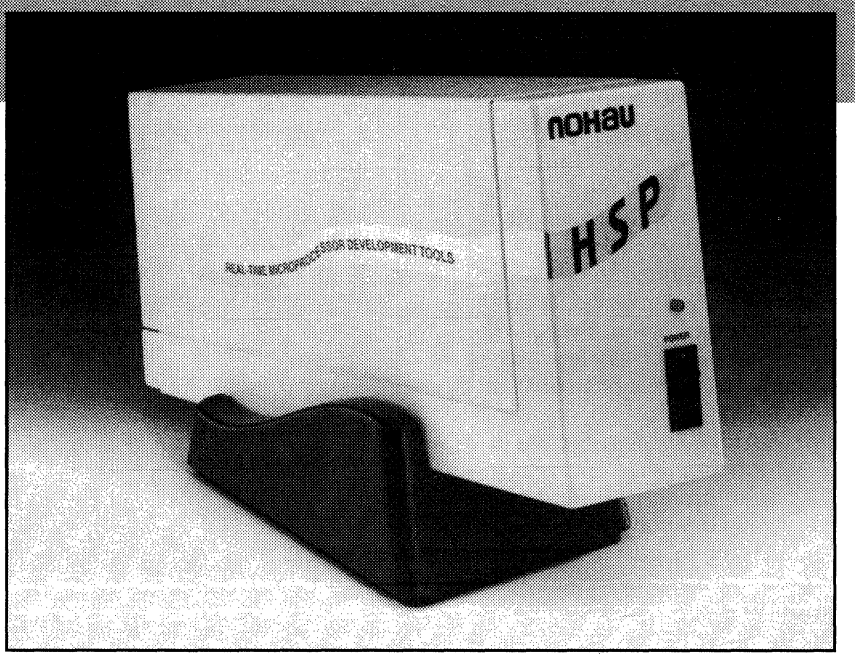
In-Circuit Emulator for the Philips P51XA

EMUL51XA™-PC



Web Site:
http://www.nohau.com
E-Mail: sales@nohau.com

- *Microsoft Windows* 3.x/'95/NT user interface
- Symbolic and source-level support
- Availability of source, register, data, program, and trace windows
- Uses Philips' bond-out technology for accurate emulation
- Supports real-time emulation
- Hardware breakpoints using RAM for high flexibility
- Support for 256K combined code and data on-pod memory
- Hardware breakpoints on code
- Supports real-time trace, 104 bits wide (frame), 32K, 128K, or 512K frames deep
- Workstation support through Nohau's LanICE (SUN, HP, etc.)

Product Information
The EMUL51XA-PC is a high performance in-circuit emulator specifically designed to give an optimzed environment for developing your P51XA family hardware and software. Our *Microsoft Windows*-based user interface has the availability of Source, Register, Data, Program, and Trace windows, and will support symbolic assembly as well as high-level C debugging.
The EMUL51XA-PC system consists of an emulator board which connects to a POD board through a flexible cable. The system communicates through a standard parallel port, a PCMCIA compliant card or via direct ISA plug-in boards. Communication through a parallel port is possible using either of the following options:

- Nohau's new external High Speed Parallel (HSP) Box solution, which runs virtually as fast as ISA plug-in boards and allows use of the EMUL51-XA-PC outside your PC. This option runs through a standard PC parallel port while keeping the port available for regular printing use; or
- Nohau's new Emulator Parallel Cable (EPC), which connects form the parallel port to the emulator system directly, eliminating the need for a box or use of ISA slots.

For those using workstations such as Sun, or HP, Nohau's LanICE is also available. A PCMCIA compliant PC card for use with laptops is also offered as an alternative to the plug-in board (does not support trace and shadow RAM). The optional Trace board features advanced trace functions with sophisticated capabilities:
–Three trigger levels; programmable pre/post trigger location, address and data
–40 bit timestamping
–Loop counting
–Filtering
–Complex trigger and break
–Supports real-time trace, 104 bits wide (frame), 32K, 128K, or 512K frames deep

Microcontrollers Supported
P51XA G3

Host Systems Supported
386 or better
Workstation support with Nohau's LanICE
Laptops

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68HC11 Family In-Circuit Emulator

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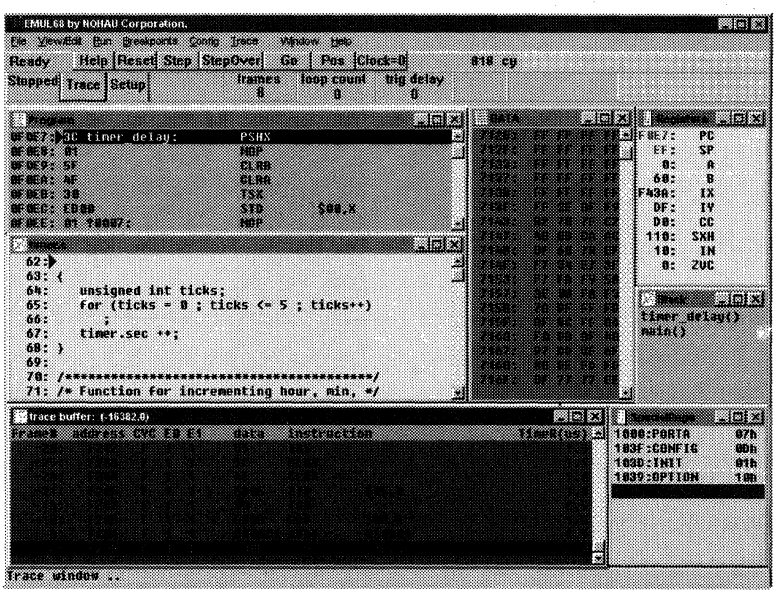

EMUL68-PC™ was designed to provide an extensive set of features at a reasonable cost, with minimal intrusions into your hardware or software. And, to save you valuable time, it was designed to be fast. Emulation occurs in real time at full processor speed without requiring any memory space, I/O pins, interrupt pins, wait states or stolen bus cycles.
The EMUL68-PC system consists of an emulator board which connects to a POD board through a flexible cable. The system communicates through a standard parallel port or via direct ISA plug-in boards. Communcation through a parallel port is achieved by using Nohau's new external High Speed Parallel (HSP) Box solution, which operates virtually as fast as ISA plug-in boards while keeping the port available for regular printing use.
The optional Trace board features advanced trace functions with sophisticated trigger capabilities.
Nohau's new external High Speed Parallel (HSP) Box solution, which operates virtually as fast as ISA plug-in boards while keeping the port available for regular printing use.
The optional Trace board features advanced trace functions with sophisticated trigger capabilities.
In short, EMUL68-PC is a sophisticated tool to help you perfect HC11 hardware and software designs in the shortest possible time.

User Friendly

One of the key features of EMUL68-PC is its user friendly *Microsoft Windows* 3.x/'95/NT interface. Pull-down menus, mouse support and on-line help make infrequent users feel instantly at home. More experienced users will appreciate the easy to use hot keys.

EMUL68-PC is designed to minimize debugging time. Therefore, all information regarding the microcontroller and your application software is available right on the screen.
The data windows on the screen contain up-to-date information on symbols and memory areas. All commands are supported with context sensitive help information. If more help is needed, the entire manual is on-line, available with a key stroke.

High Level Debugging

Using a high-level language for code generation is a way to cut development time. Therefore, EMUL68-PC gives full support for debugging directly in C or Modula-2 source code. This eliminates tedious symbolic debugging in assembly language.
With EMUL68-PC, you can mark breakpoints directly in the source code window and it's easy to follow the program execution on the screen listing. All variables, both local and global, can easily be shown or altered in one of the dedicated windows. All variables are shown in the form they were declared in your software. This way you can work directly with floats, arrays, pointers, structures, etc.

Real Time Trace

EMUL68-PC offers trace features often not found in other emulators. For instance, the trace buffer can record over 16,000 bus cycles with 64 bits of data. The trace can be operated "on-the-fly", which means that it can be viewed, programmed and retriggered without disturbing program execution.
With the trace setup menu, you can define exactly what events are to be stored in the trace buffer. The real-time trace can be stopped (triggered) at a selected event or after a combination of multiple events. By aligning the trigger point anywhere in the trace buffer you have a full choice of pre- and post- triggering.

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EMUL68-PC

The smart solution for 68HC11 development

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EMUL68-PC offers you complete control of your 68HC11 hardware or software project at a very attractive price level. EMUL68-PC gives you more features than any other system, regardless of price.

System Specifications

Host
IBM PC/XT/AT, PS/2 or compatible.
Minimum 640K of RAM.
Monochrome, CGA, EGA or VGA.
LanICE for workstations.

External High Speed Parallel Box Solution
The emulator boards can be installed in an external High Speed Parallel (HSP) box with direct communication to the PC's parallel port, while keeping the port available for regular printing use.

Languages Supported
Third party C and Modula-2 compilers and assemblers.

Source-Level Debugging
Window for source-level debugging. Single-step or line-step with breakpoints marked directly in the code. Support for local and global variables.

In-line Assembler and Disassembler
Full instruction set and symbols supported.

Symbolic Support
Full symbolic debugging and type checking. Same symbols can be used in different modules.

File Formats Supported
Motorola S1, Avocet, HIWARE/Archimedes, IAR, Intermetrics, Introl, Microtec, Microtek and more.

Real Time Emulation
Full speed emulation up to 16 MHz.
No wait states and no intrusion on memory, stack, I/O or interrupt pins.

Emulation Memory
Full 64K of emulation memory.
Bankswitch option up to 512K.

Memory Mapping
The memory is mappable in 4K (optionally 64 byte) pages either to emulator or target. Memory areas can be write-protected.

Macros
Test session automation and macro command definition, IF/ELSE, REPEAT/WHILE structures.

Debug Session Logging
Record emulation session and all setups to a file.

Breakpoints
64 K program breakpoints.
64 K data read and write breakpoints.
Break on address ranges and external signal. With the Trace board, it's possible to break on any 48-bit combination of address, data, RD/WR, OP code fetch, ports and external signals.

Single Stepping
Single or multiple instruction stepping.
Line stepping in high level languages.

Execution Timer
Resolution down to 250 ns.

Real Time Trace Memory (optional)
16 K deep by 64 bits wide.
Trace address, data, ports, control signals, timestamp and a maximum of 18 external signals.

Trace Filter
16 qualifiers of 48 bits to filter tracing.
Post view filtering can record up to 15 frames after a match.

Trace Trigger
Two sets of triggers with 8 qualifiers each. Trigger on combinations of the qualifiers including sequential combinations and loop counter.
Qualifiers can be AND/OR combinations of address, data, ports, op-code fetch, RD/WR, EXT0, EXT1 and interrupt levels.
Trigger point can be selected anywhere within the 16K buffer to give pre/post trigger alignment.
Trigger can be modified without stopping emulation.

Trace Display
Display trace in disassembled symbolic or binary/hex form, or as high-level source code.
Display can be saved to a file.
Trace can be started, stopped and displayed independent of program execution.

Trace Timestamp
The Timestamp can be used to display exact execution time, or time from last frame in the trace memory.

Program Performance Analyzer
Histogram and statistical information of program execution in real time. Exact timing information on execution time in each program routine.

Presently supported chips

68HC11A0, A1, A7, A8, 811A8, E0, E1, 811E2, E8, E9, 711E9, E20
68HC11D0, D3, 711D3
68HC11F1
68HC11G5, 711G5, G7
68HC11J6, 711J6
68HC11K0, K1, K3, K4, 711K4,
68HC11KAO/KA1/KA2/KA3/KA4/ 711KA2/711KA4
68HC11KA0/KA1/KA2/KA3/KA4/ 711KA2/711KA4
68HC11L0, L1, L5, L6, 711L6
68HC11P2, 711P2, 68HC11N4, 68HC11C0, 711N4
(Support for new chips added as they become available.)
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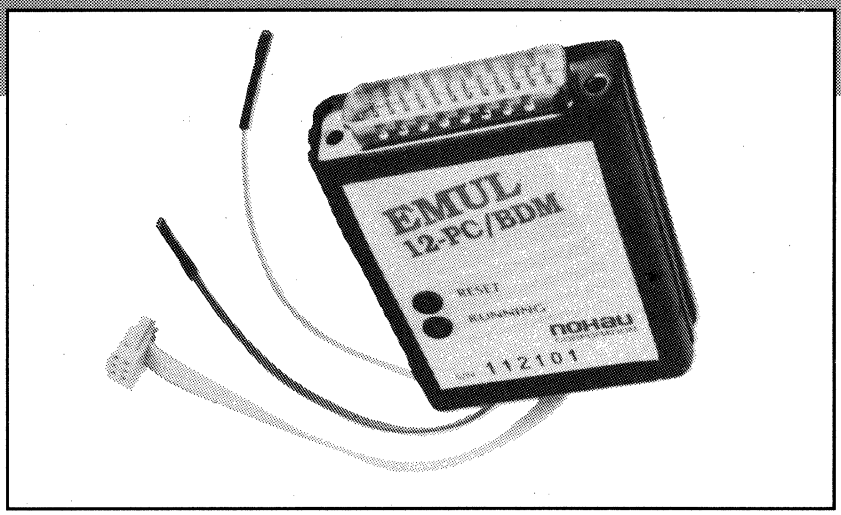
Background Debug Mode Emulator for Motorola's 68HC12

EMUL12-PC/BDM



Web Site:
http://www.nohau.com
E-Mail: sales@nohau.com

Features Highlights:

- Emulates at maximum chip speed
- Support targets working with 2.5V to 5V power supply
- In-depth high level support for popular C Compilers
- Same Microsoft Windows-based user interface as all Nohau emulators
- Single-step in RAM and ROM
- Shadow RAM for internal and external memory
- Ability to write to the target memory "on the fly"
- Supports for "blank check", erase, program and verify the on-chip EEPROM and FLASH memories
- Chips Supported:
  68HC812A4
  68HC12B34

Nohau's EMUL12-PCM/BDM supports non-intrusive emulation for Motorola's 68HC12 through the new single wire BDM interface of the HC12.
A EMUL12-PC/BDM system consists of a small emulator board, a six foot ribbon cable, BDM pod, a Windows user interface program, and a manual.
The EMUL-12-PC/BDM system communicates through a standard parallel port or via direct ISA plug-in boards. Communication through a parallel port is possible using either of the following options:

- Nohau's new external High Speed Parallel (HSP) Box solution, which runs virtually as fast as ISA plug-in boards and allows use of the EMUL 12-PC/BDM outside your PC. This option runs through a standard PC parallel port while keeping the port available for regular printing use; or

- Nohau's new Emulator Parallel Cable (EPC), which connects from the parallel port to the emulator system directly, eliminating the need for a box or use of ISA slots.

The BDM pod is connected to a cable terminated in a Motorola specified "6 pin BERG connector" which is connected to the target system. Two extra wires with pin sockets can be hooked up to MODA and MODB, in which case jumpers on these signals will not be necessary.

User Friendly
The user software is the same as the one used with all other Nohau in-circuit emulators. It runs under Microsoft's *Windows* 3.1 / '95 / NT, providing a user-friendly interface.
Pull-down menus, mouse support and on-line help make infrequent users feel instantly at home.

All information about the microcontroller and your application software is available right on the screen, minimizing debugging time.

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68HC16

Web Site:
http://www.nohau.com
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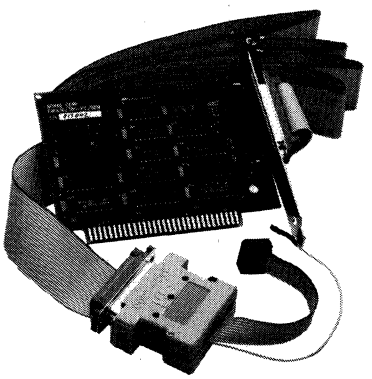
EMUL16/300™-PC
68300 Family
In-Circuit Emulator

EMUL16/300-PC is a high performance emulator for two families of microcontrollers: the 68HC16 and the 68300. Develop hardware and debug software faster with EMUL16/300-PC. Full-speed emulation, an optional Trace board, and up to 1 Megabyte of Shadow RAM on the emulator give you the control you need to get your job done quickly and easily.

User Friendly
The EMUL16/300-PC software is a *Microsoft Windows* 3.x/'95/NT application, therefore easy to learn and easy to use. The software features windows for editing variables, RAM, registers, and instructions, resulting in simple look and feel.

Through the Dynamic Data Exchange interface, other *Windows* applications can receive automatic updates about changes in the target data without slowing the target.

High Level Debugging
Using a high-level language for code generation is a way to cut development time. EMUL16/300-PC fully supports debugging C source from several vendors. With EMUL16/300-PC, you can mark breakpoints directly in the source code window, execute a single source statement, or step over a single C function or library call. All variables, both local and global, are displayed and edited using their declared type, including structures, unions, arrays, and floats.



Low Cost Alternative
While EMUL16/300-PC is a full blown in-circuit emulator, EMUL16/300-PC/BDM is a low cost "Background Debug Mode" emulator that uses the same Windows-based user interface as EMUL16/300-PC.

Real Time Trace
EMUL16/300-PC offers instruction tracing, a feature not available from simpler, serial-based emulators. The Trace is up to 512K records deep and 104 bits wide, including a 40 bit timestamp. Full pipeline decoding prevents false triggers on non-executed code. Triggerscan test a combination of address and data. The trace can also provide hardware breakpoints. The trace buffer can be viewed, reprogrammed, and restarted without affecting emulation.

Hardware Configuration
The EMUL 16/300-PC system communicates through a standard parallel port, a PCMCIA compliant card or via direct ISA plug-in boards. Communication through a parallel port is possible using either of the following options:

- Nohau's new external High Speed Parallel (HSP) Box solution, which runs virtually as fast as ISA plug-in boards and allows use of the EMUL 16/300-PC outside your PC. This option runs through a standard PC parallel port while keeping the port available for regular printing use or;
- Nohau's new Emulator Parallel Cable (EPC), which connects from the parallel port to the emulator system directly, eliminating the need for a box or use of ISA slots.

LanICE for SUN, HP Workstations
LanICE is a high performance PC without a monitor. All screen output is sent to a workstation running XWindows or to an XWindows terminal. LanICE sends TCP/IP messages containing the changes to the screen image, to the workstation along with all the font and other information XWindows needs to display that output in either a MS-DOS window or a *Microsoft Windows* window.

On the *Windows screen,* the XWindows mouse operates just as though it is a serial mouse connected directly to the LanICE. The XWindows fonts needed to reproduce the MS-DOS screen appearance are included with LanICE.

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EMUL16/300-PC

Web Site:
http://www.nohau.com
E-Mail: sales@nohau.com

System Specifications

Host
386 or higher.
Minimum of 1 Meg. of RAM.
Microsoft Windows 3.x/'95/NT

Languages Supported
All third-party assemblers that produce Motorola S-records are supported.
"C" compilers from HIWARE, Tasking, Introl, MRI, SDS, Sierra, and others are also supported. Call for the current list of supported high-level languages and vendors.

High-Level Debugging
EMUL16/300-PC has separate windows for source display and variable display. Global, static, and local (automatic) variables, arrays and structures are all supported and displayed in their declared format.

In-line Assembler
Point and click to choose an instruction to change. The full instruction set and all configuration registers are supported. Changes to the program can be saved to an S-record file.

High-Level Symbol Support
Variables are displayed and edited by name in their declared type.
Name scopes are correctly preserved across modules, functions and blocks.

File Formats Supported
Motorola S-record files and object files from Introl, Intermetrics, SDS, Sierra, HIWARE, P & E, MASM, MRI and others.

Real Time Emulation
Full speed emulation up to maximum chip speed.
0 wait state Emulation RAM.
Support for fast termination bus cycles.

Shadow RAM
64 Kilobytes to 1 Megabyte.
Updated without slowing emulation.
Shadow RAM Window display updated continuously.
RAM can be displayed in 8-bit, 16-bit, or 32-bit words as either hexadecimal words, unsigned integers, or signed integers.

DDE Interface
Automatically updates other *Windows* applications as target conditions change. Up to 50 simultaneous RAM addresses or variables can be exported. EMUL16/300-PC includes a DDE Interface status window that indicates the number of connections, and the status of each.

Emulation Memory
Up to 4M of 0 wait state static RAM.

Breakpoints
Set breakpoints by clicking on a C source line, an assembly line or by typing an address in a dialog box.
Once created, breakpoint may be active or inactive without being deleted.

Single Stepping
A step can be one assembly instruction, one C source line, or one function call.

Real Time Trace (optional)
The EMUL16/300-PC Trace Board supports both the 68HC16 and 683XX families. Each captured bus cycle includes the 24-bit address, a 40-bit timestamp, 16 data bits, 16 status bits, and 8 external bits.

Detailed Trace Control
User can specify the addresses that are captured (filtering). Sampling can be qualified by the type of access: data read, data write, or opcode, or by the data value.
A trigger event can consist of virtually any number of addresses in combination with data where each can be qualified as a data read, data write, or first opcode fetch of an instruction. Two tracing modes are provided. The normal mode allows you to specify up to three trigger events. Each event can consist of virtually any number of addresses or address ranges. The second mode, window mode, uses one trigger to turn on recording and one to turn off recording. A centering counter allows positioning of the trigger point anywhere in the trace buffer. This allows you to trace before, after, or around the trigger.

Trace Capacity
Depending upon the configuration purchased, the Trace board contains enough RAM to capture 32K records, 128K records, or 512K records.

Trace Trigger
The Trace trigger has three levels and a 16-bit counter on the last level.

Code Coverage
The code coverage feature can monitor up to 1Mb of addresses. The specified addresses do not have to be continuous. All accesses, including data and opcode prefetches, are captured.

Trace Display
"Start of Instruction" decoding makes disassembly show only executed code and keeps the display synchronized with what actually happened.

Pipeline Support
Full pipeline decoding prevents false triggers on non-executed addresses and capturing records for discarded instructions.

Trace Input/Output
A trigger can be input through a BNC connector on the trace board. The other BNC connector carries a trigger output signal. The 25-pin "D" connector carries both of those plus 8 input signals recorded with every bus cycle.

CURRENTLY SUPPORTED 68HC16 FAMILY CHIPS:
68CM,CK, HC1121, 68HC16VO, V1, 68HC16Z2, 68HC16Y1

CURRENTLY SUPPORTED 68300 FAMILY CHIPS:
68330, 68331, 68332, 68F333, 68334, 68335, 68336, 68340, 68341, 68360

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EMUL196™-PC 80C196 Family In-Circuit Emulators

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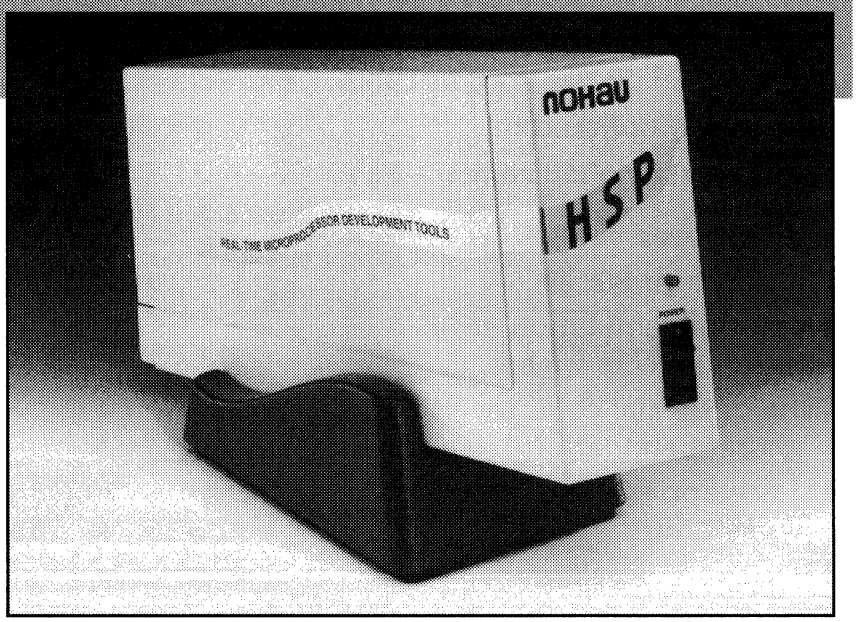

Shown here is one of the key features of the EMUL196-PC: its user-friendly *Microsoft Windows* 3.x/'95/NT interface. Pull-down menus, mouse support, and on-line help make infrequent users feel instantly at home. More experienced users will appreciate the easy to use hot keys. EMUL196-PC is designed to minimize debugging time. Therefore, all information regarding the microcontroller and your application software is available right on the screen. *Windows* gives the flexibility to size and position the information on the screen. Of course, all setup information can be saved to a file enabling you to start an emulation session quickly with the setup you had when you left it. This includes the CCB's.
All commands are supported with on-line help information.

Abbreviated System Specifications

Supported 80C196 Derivatives
80C194, 80C196KB, 80C196KC, KD, KR, KS, KT, JR, JT, JQ, NP, NT, NV, 80C198 and more.

Hosts 386 or 486 Base
IBM PC/XT/AT, PS/2 or compatible. SUN, HP and other workstations with LanICE.

High-Level Debugging
Window for source-level debugging.
Single-step or line-step with breakpoints marked directly in code. Full support for local and global variables.
Currently support for Intel OMF, Intel Extended OMF BSO/Tasking and more.

In-Line Assembler and Disassembler

Symbolic Support
Full symbolic debugging with type information.
Same symbols can be used in different modules.
All special functions registers supported.

Real Time Emulation
Full-speed emulation up to the chip limit. No wait states and no intrusion on memory, stack, I/O or interrupt pins.

Emulation Memory
64 K DATA memory and 64 K CODE memory using 16 bits address.
256K memory if using 24 bits address.

Memory Mapping
Mappable down to an even byte.

Breakpoint
Hardware and Software breakpoints.
Unlimited program breakpoints.
Break on internal access on address or data.
Break bit mask for internal access on both data and address.
With the trace board option, it's possible to break on any address, data or external signals.

Single-Stepping
Single or multiple instruction stepping.
Step over calls and interrupts.

Real Time Trace
Up to 512K deep, 104 bits wide with time-stamp. Three trigger levels, trigger on address and data.
Instruction queue decoding prevents false triggers.

Hardware Configuation
The EMUL-196-PC system communicates through a standard parallel port, a PCMCIA compliant card or via direct ISA plug-in boards. Communication through a parallel port is possible using either of the following options:

- Nohau's new external High Speed Parallel (HSP) Box solution, which runs virtually as fast as ISA plug-in boards and allows use of the EMUL 196-PC outside your PC. This option runs through a standard PC parallel port while keeping the port available for regular printing use; or
- Nohau's new Emulator Parallel Cable (EPC), which connects from the parallel port to the emulator system directly, eliminating the need for a box or use of ISA slots.

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In-Circuit Emulators for the MCS®296 Architecture

EMUL296-PC

Web Site:
http://www.nohau.com
E-Mail: sales@nohau.com

Key Features

- Support for 80C296SA
- Real-time emulation at maximum chip speeds
- Use of special chips for accurate emulation
- Hosted on PCs and workstations
- Hardware breakpoints
- Fast break writes: break execution, update one address with one 8-or 16-bit value, then resume execution all within 16 microseconds or less
- High-level support for popular C compilers
- SpecialRegs window customizable for special function registers
- Trace board up to 128K deep, 96 bits wide; triggering and filtering with full instruction queue decoding
- Code Coverage
- CCB's controlled from user interface (wait states, timing mode, bus width and more)

The EMUL296-PC hardware configuration consists of an emulator board which connects to POD board through a flexible cable. The EMUL296-PC system consists of an emulator board which connects to a POD board through a flexible cable. The system communicates through a standard parallel port or via direct ISA plug-in boards. Communication through a parallel port is possible using either of the following options:

- Nohau's new external High Speed Parallel (HSP) Box solution, which runs virtually as fast as ISA plug-in boardsand allows use of the EMUL296-PC outside your PC. This option runs through a standard PC parallel port while keeping the port available for regular printing use; or
- Nohau's new Emulator Parallel Cable (EPC), which connects from the parallel port to the emulator system directly, eliminating the need for a box or use of ISA slots.

An important part of an emulator system is the physical connection or your target board. Nohau provides adapters that go between the pod board and the target board.The pod boards are designed around Intel chips which are specially designed for in-depth emulation.

User Friendly Interface

One of the key features of the EMUL296-PC is its user-friendly Microsoft *Windows* 3.X/'95/NT interface. Pull-down menus, mouse support and on-line help make infrequent users feel instantly at home. More experienced users will appreciate the easy-to-use *hot keys.* The EMUL296-PC is designed to minimize debugging time, with all information about the microcontroller and your application software available right on the screen. EMUL296-PC has a window which may be customized for special function registers called the *SpecialRegs* window. Menu items in the *SpecialRegs* window let you add, delete, or edit any special function register defined for the processor you are using. This list is saved, then restored, upon exiting and re-entering the Project.

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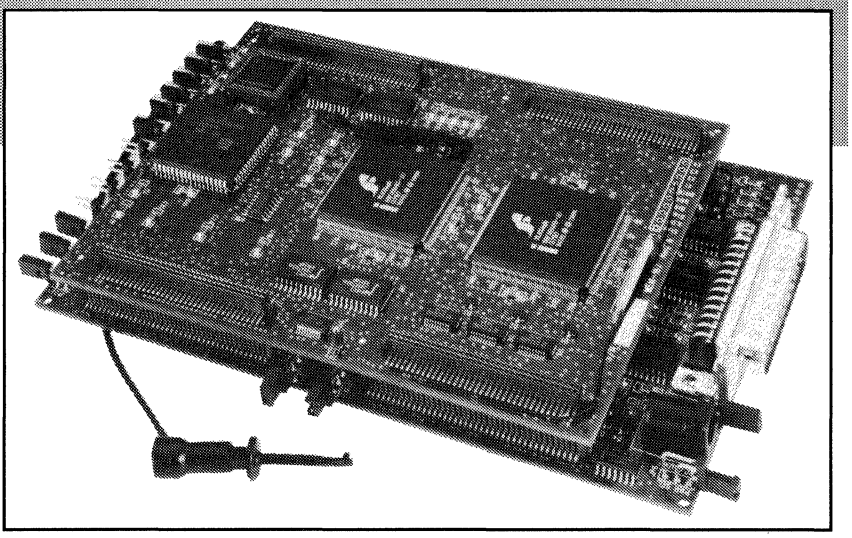
Supporting the Siemens C166 Microcontroller Family

EMUL166-PC

Web Site:
http://www.nohau.com
E-Mail: sales@nohau.com



Key Features

- Support for C166 family
- Real-time emulation at maximum chip speeds
- Use of bondout chips for accurate emulation
- Hosted on PC's and workstations
- Hardware breakpoints
- Fast break writes: break execution, update one address with one 8-or 16-bit value, then resume execution all within 10 microseconds or less
- High-level support for popular C compilers
- SpecialRegs window customizable for special function registers
- Trace board up to 128K deep, 96 bits wide (plus an additional 96 bits trace by using the internal trace board option). Triggering and filtering with full instruction queue decoding
- Code Coverage
- Chip configuration can be controlled from user interface (write mode, bus width and more)

The EMUL166-PC hardware configuration consists of an communication board with connects to POD board through a flexible cable. The system communicates through a standard parallel port, a PCMCIA compliant card or via direct ISA plug-in boards. Communication through a parallel port is possible using either of the following options:

- Nohau's new external High Speed Parallel (HSP) Box solution, which runs virtually as fast as ISA plug-in boards and allows use of the EMUL 166-PC outside your PC. This option runs through a standard PC parallel port while keeping the port available for regular printing use.
- Nohau's new Emulator Parallel Cable (EPC), which connects from the parallel port to the emulator system directly, eliminating the need for a box or use of ISA slots.
- The External Trace board is 128K deep and 96 bits wide, and mounts directly on top of the POD, resulting in higher speed capabilities. An extra 96 bits can be added with the optional Internal Trace piggy-back board.

An important part of an emulator system is the physical connection or your target board. Nohau provides adapters that go between the pod board and the target board. The pod boards are designed around Siemens' bondout chips which are specially designed for in-depth emulation. The pod (containing the controller, memory and logic), consists of two PCB boards with allowances to connect to a third board for tracing capabilities.

User-Friendly Interface
One of the key features of the EMUL166-PC is its user-friendly Microsoft *Windows* 3.x/'95/NT interface. Pull-down menus, mouse support and on-line help make infrequent users feel instantly at home. More experienced users will appreciate the easy to use *hot keys.* The EMUL166-PC is designed to minimize debugging time, with all information about the microcontroller and your application software available right on the screen.

Supported C166 Derivatives:

Siemens:
C167, C167CR, C167SR
C165, C163, C161

SGS Thomson:
ST10F167, ST10R165,
ST10F163, ST10R163.

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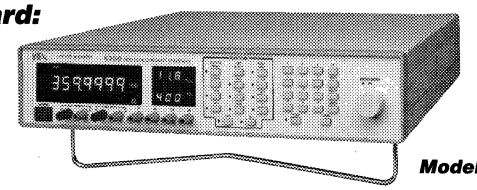
Synchro/Resolver/LVDT Instrumentation

Model 5300 Resolver/Synchro Standard:

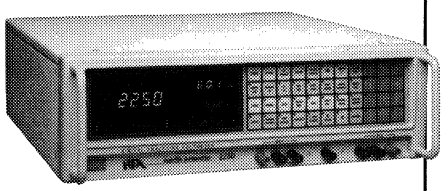
- Midband accuracy: 2 arc seconds.
- Resolution: 0.0001 degrees.
- Frequency range: 47 Hz to 20 khz.
- Variable reference-to-signal phase shift.
- Programmable dynamic outputs.
- IEEE-488 programmable.
- Up to 4 VA output.



Model 5300

Model 2250 and 2251 Digital Analyzing Voltmeters:

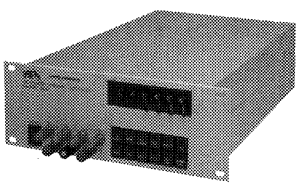
- Measures: Total, Fundamental, in Phase, Quadrature, Phase Angle, Harmonics, THD.
- Transformation ratio.
- Wideband —10 Hz to 100 kHz.
- Null meter.



Model 2250

Model 5330 Resolver/Synchro Simulator:

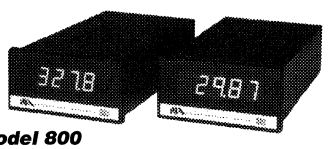
- Midband accuracy to 0.003 Degrees.
- Resolution to 0.001 Degrees.
- Dynamic output capability.
- Frequency Range: 47 Hz to 1000 Hz or 360 Hz to 10 kHz.
- IEEE-488 programmable.



Model 5330

Models 800/801 Synchro Panel Meters and 8500/8800/8810 Angle Position Indicators:

- 800/801: Resolution — 0.1 degree to 0.01 degree.
- 8500: Resolution — 0.01 degree, with 0.03 degree accuracy.
- 8800/8810: Resolution — 0.001 degree with 0.004 degree accuracy.
- IEEE-488, MATE available.

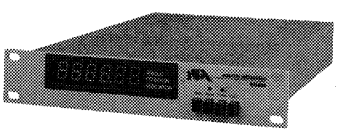


Model 800

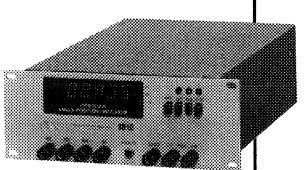
Model 801

Model 2000 Phase Meter:

- 0.02° phase accuracy.
- High immunity to distortion and noise.
- Floating inputs.
- Simultaneous readout of frequency and phase.
- 0.01 Hz to 700 kHz frequency response.



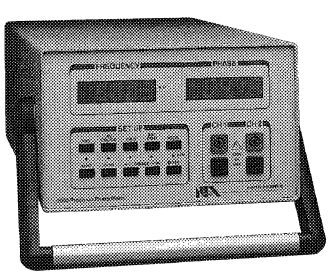
Model 8500



Model 8810

Model 540/10 Synchro/Resolver Bridge: (not shown)

- Constant Null gradient output.
- Accuracy — 2 arc/second.
- Resolution — 0.0001 degree.



Model 2000

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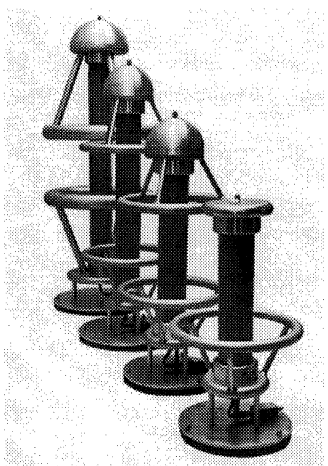
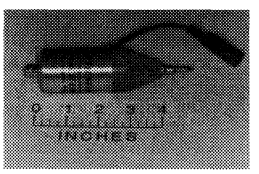
State of the Art Voltage Probes!

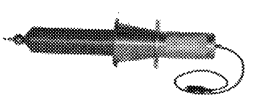


VD series probes

North Star Research has made major advances in the art of high voltage, high frequency measurement which allow us to offer a line of "state of the art" high voltage probes. Both free standing (VD-Series) and portable (PVM-Series) probes are available covering a range of up to 300 kV. High voltage probes with bandwidths to 120 MHz are offered as standard products. Cable lengths up to 100 ft or longer can be supplied with minimal effect on probe bandwidth, and all of our probes use standard coaxial cables to make connections, simplifying measurements. These probes are appropriate for use with any oscilloscope or meter, and they are provided in rugged nylon housings for use in a variety of environments. All of our probes can be provided with multiple attenuations constructed so that changing attenuations takes only a few seconds. A small selection of the many available probes is outlined.



PVM-10



PVM-5

Model Number	PVM-12	PVM-1	PVM-5	VD-60	VD-100
Max DC/Pulsed V (kV)	25/30	40/60	60/100	60/120	100/180
Max Frequency (MHz.)	90	90	90	20	20
Cable Length (ft.)	15	15	15	30	30
DC accuracy	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Resistance (Megohms)	300	400	400	800	1600
Capacitance	10	10	10	20	20
Price (US $)	600	975	1800	1400	1900

High Voltage Power Supplies and Pulse Generators

North Star builds a wide variety of "State of the Art" DC power supplies and Pulsed Power supplies to 1.5 Million volts. Power Factor Correction is available on these devices if required. We also build Flashlamp initiation systems, and Thyratron Driver and Spark gap trigger boards are also available.

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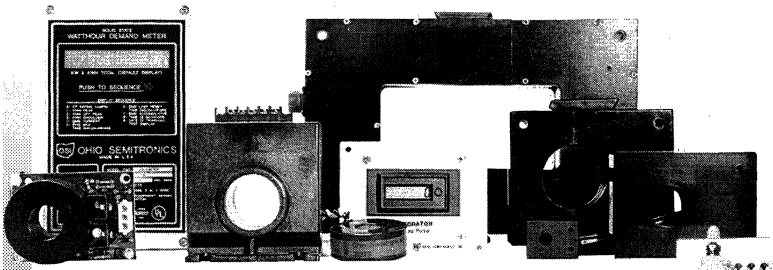
Unlimited Design Selection



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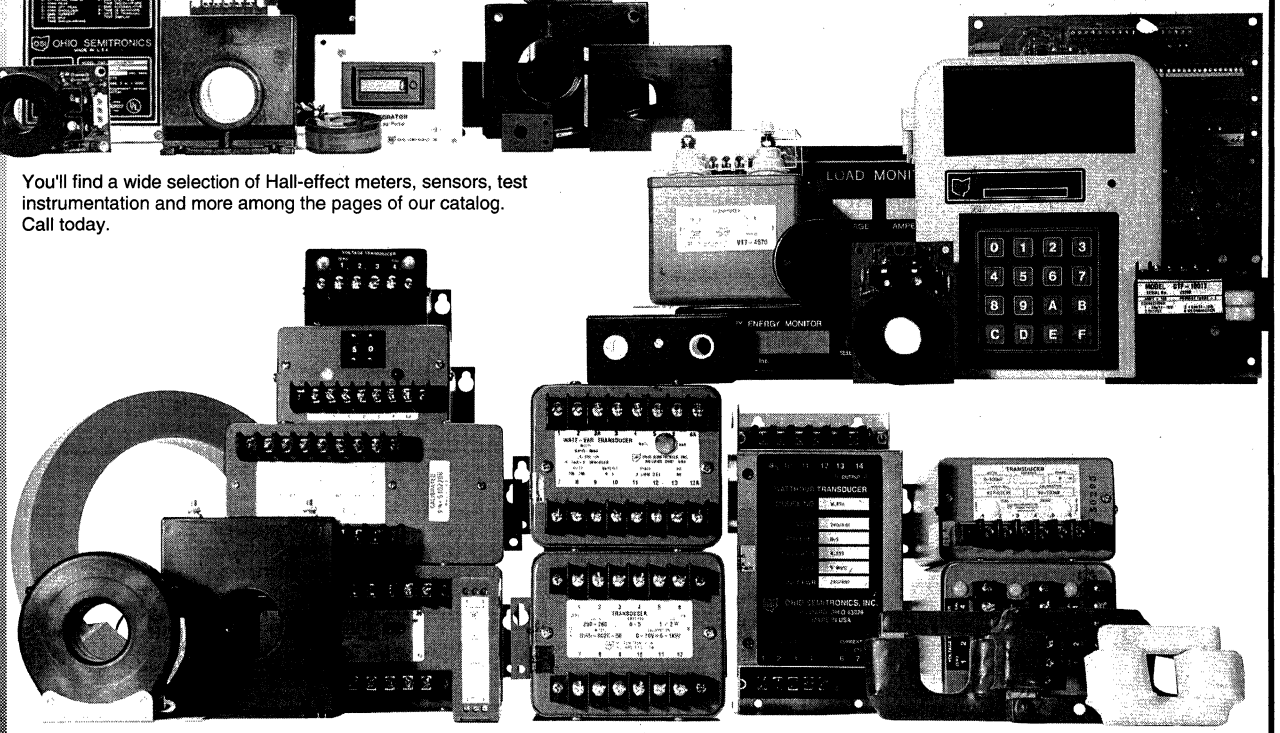

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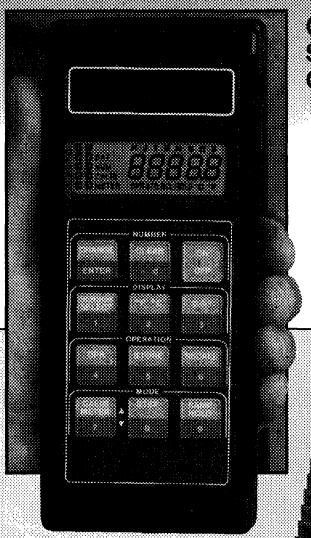
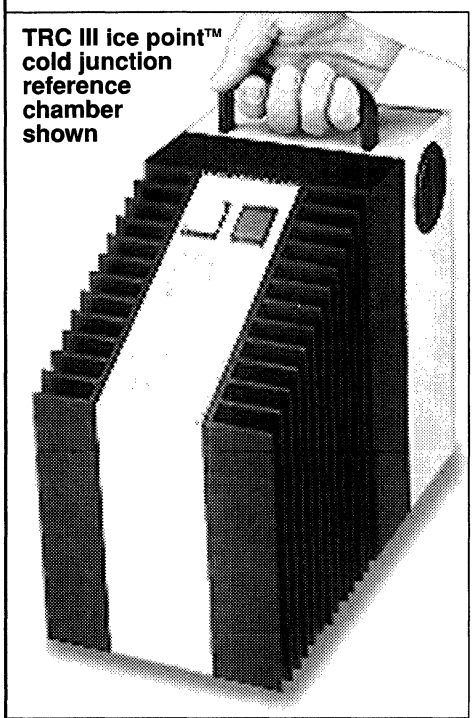


CL20 Series Calibrators

This Product Can Be Found in the OMEGA® Handbook Set, Temperature Measurement, Section K.



TRC III ice point™ cold junction reference chamber shown

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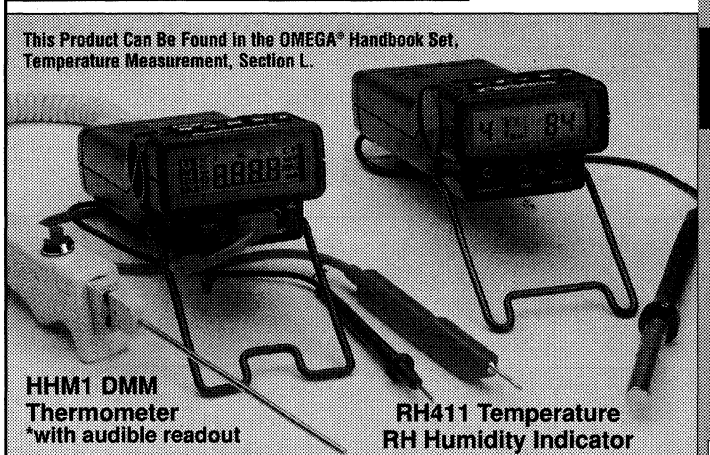

This Product Can Be Found in the OMEGA® Handbook Set, Temperature Measurement, Section L.

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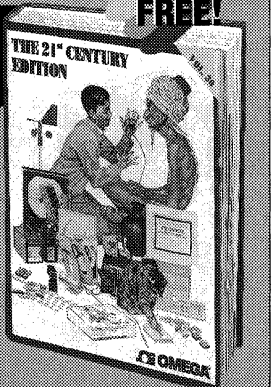

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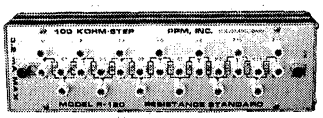
RESISTANCE STANDARDS

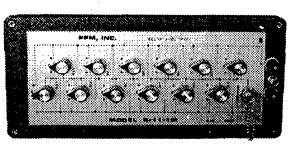
MODEL RX SERIES

The PPM Model RX series of decade resistor boxes is a line of precision resistance standards suitable for use as laboratory secondary standards. They are available as three to seven decade units in various resistance values ranging from 0.001 ohms/step to 100 megohms/step. The accuracy is ±0.01% of setting plus the zero resistance plus 2 milliohms.



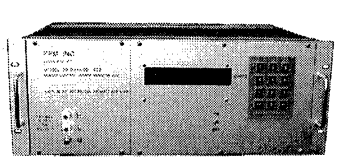
MODEL R120 SERIES

The Model R120 series of resistance standards are available from 1 ohm/step to 100K ohms/step. All units have 12 resistors in series, with the capability of making four-terminal measurements on any resistor or series string of resistors. Optional shorting bars can provide a precision resistor with 1/10 of the value of an individual resistor. Accuracy is ±25 ppm.



MODEL R11-X

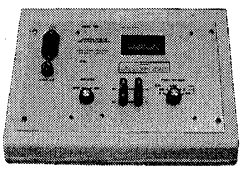
The Model R11-X Resistance Standards are available from 100K ohms/step to 10 megohms/step. All units have 11 resistors in series, with the capability of connecting groups of resistors in parallel or series-parallel. All boxes are sealed and employ hermetically-sealed resistors. Accuracy is ±25 ppm, with temperature drift less than 5 ppm per degree C.



MODEL RX-488 SERIES

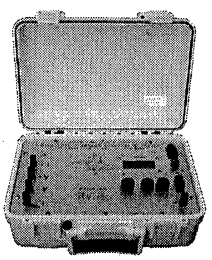
These units are similar to the Model RX series, but operate under computer control via either RS-232 or IEEE-488 interface. A front panel keypad and display allow for local control of the RX-488. Accuracy is ±0.01% of setting plus 2 milliohms, referenced to the zero resistance setting, at 23 ±1 degrees C.

OHMMETERS



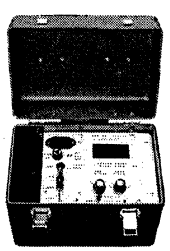
MODEL R1L-B

The Model R1L-B Digital Low Resistance Ohmmeter is a portable digital ohmmeter designed to measure low values of resistance using the four-wire technique. The R1L-B has five resistance ranges, covering two milliohms to 20 ohms full scale. Kelvin clips (for four-terminal measurements) are furnished with each instrument. Power is from internal storage cells and/or standard line power.



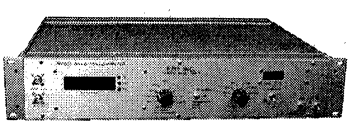
MODEL R1L-C

The Model R1L-C Ground Resistance Tester is a portable digital ohmmeter that is designed to measure grounding system resistance, as well as soil resistivity, over ranges from two ohms to 20K ohms full scale. Two, three, or four-point measurement techniques allow choice of a method to eliminate errors caused by the resistance of the leads. An optional accessory kit includes electrical safety gloves, four stainless-steel ground rod electrodes, and all required test cables.



MODEL R1M-A

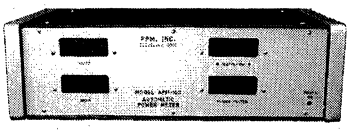
The Model R1M-A Megohmmeter is a portable megohmmeter designed to measure high values of resistance. Four test voltages of 50, 100, 250, and 500 volts DC are provided. Resistance ranges are 1, 10, and 100 megohms, and 1, 10, and 100 gigohms. All ranges include 100% over-range capability.



MODEL R1M-D

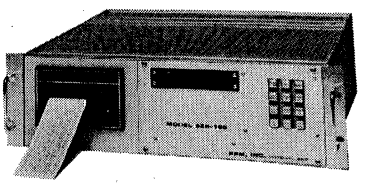
The PPM Model R1M-D Teraohmmeter is a portable terohmmeter designed to measure extremely high resistances. Six test voltages of 1, 5, 10, 50, 100, and 500 volts DC are provided. Eight resistance ranges are 10 and 100 megohms, 1, 10, and 100 gigohms, and 1, 10, and 100 terohms; also auto-ranging is available. An IEEE-488 interface brings all functions and controls to a remote controller (not furnished).

OTHER PRODUCT EXAMPLES



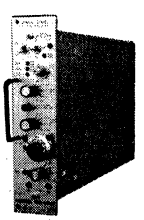
AUTOMATIC POWER METERS

The Model APM-100 Automatic Power Meter is an instrument used to make true RMS measurements of AC or DC Volts, Amperes, Watts, and Power Factor. All four readings are displayed simultaneously on large illuminated digital displays. Ranging is automatic.

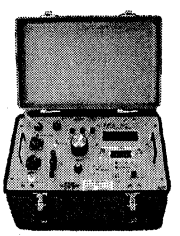


SEQUENTIAL EVENTS RECORDERS

The Model SER-100 series of sequential events recorders provide a printed record of independent on-off events occurring at a number of points. The SER-100 may be set to record either the turn-on or turn-off time, or both, along with the point identification. Units to scan thousands of points, in as little as five microseconds, are available.



MODEL SG-16-3



MODEL SGI-100

SIGNAL CONDITIONERS

PPM signal conditioners and amplifiers provide ultra-stable excitation, bridge balance, and calibration circuits for use with strain-gauge and RTD transducers. Model SG-16-3 contains a stable, low noise excitation power supply, a precision adjustable-gain wide-band amplifier, a 4-step, 2-pole, low pass filter, auto-balance circuit, and 4-step bipolar calibration circuitry. Model SGI-100 is a single channel, portable load cell indicator.

ELECTRONIC LOADS

The PPM Model EL-100-A is an air cooled DC Electronic Load with programmable current for testing DC sources. Maximum voltage is +600 volts, maximum current is 200 amperes, and maximum power is 10 KW. Other models are available with power handling capacity up to 100 KW.

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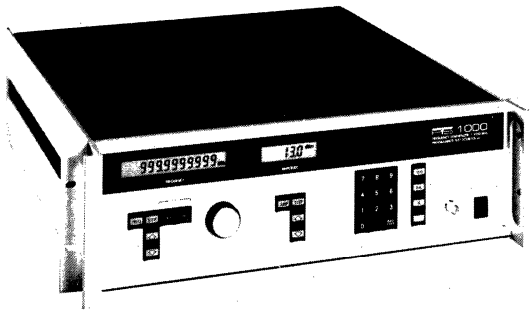
	Frequency Range	Resolution	Switching Time[1]	Phase-Continuous Switching[2]	Rack-Mount Cabinet Dim.[3]	Remote-Control Interface	Price Example[4]
PTS 040	.1-40 MHz	optional .1 Hz to 100 KHz	1-20μs	optional	5¼"H×19"W	BCD (std) or GPIB (opt)	$5,330.00 (1 Hz resol., OCXO freq. std.)
PTS 120	90-120 MHz	optional .1 Hz to 100 KHz	1-20μs	optional	5¼"H×19"W	BCD (std) or GPIB (opt)	$5,330.00 (1 Hz resol., OCXO freq. std.)
PTS 160	.1-160 MHz	optional .1 Hz to 100 KHz	1-20μs	optional	5¼"H×19"W	BCD (std) or GPIB (opt)	$6,495.00 (1 Hz resol., OCXO freq. std.)
PTS 250	1-250 MHz	optional .1 Hz to 100 KHz	1-20μs	optional	5¼"H×19"W	BCD (std) or GPIB (opt)	$7,440.00 (1 Hz resol., OCXO freq. std.)
Type 1 **PTS 310** Type 2	.1-310 MHz	1 Hz	1-20μs	standard	3½"H×19"W	BCD (std) or GPIB (opt)	1 Hz resol., OCXO: $6,425.00 1 Hz resol., OCXO: $5,850.00
PTS 500	1-500 MHz	optional .1 Hz to 100 KHz	1-20μs	optional	5¼"H×19"W	BCD (std) or GPIB (opt)	$8,720.00 (1 Hz resol., OCXO freq. std.)
PTS 620	1-620 MHz	optional .1 Hz to 100 KHz	1-20μs	optional	5¼"H×19"W	BCD (std) or GPIB (opt)	$9,625.00 (1 Hz resol., OCXO freq. std.)
PTS 1000	0.1-1000 MHz	optional .1 Hz to 100 KHz	5-10μs	optional	5¼"H×19"W	BCD (std) or GPIB (opt)	$11,830.00 (1 Hz resol., OCXO freq. std.)
PTS 3200	1-3200 MHz	1 Hz	1-20μs	optional	5¼"H×19"W	BCD (std) or GPIB (opt)	$14,850.00 (1 Hz resol., OCXO freq. std.)
PTS x10	user specified 10 MHz decade	1 Hz	1-5μs	standard	3½"H×19"W	BCD (std) or GPIB (opt)	$3,000.00 (1 Hz resol., OCXO freq. std.)
PTS D310	two channels .1-310 MHz	.1 Hz	1-20μs	standard	5¼"H×19"W	BCD (std) or GPIB (opt)	$8,560.00 (.1 Hz resol., OCXO freq. std.)
PTS D620	two channels 1-620 MHz	.1 Hz/.2 Hz	1-20 μs	standard	5¼"H×19"W	BCD (std) or GPIB (opt)	$13,240.00 (.1 Hz/.2 Hz resol., OCXO freq. std.)



1 Switching Time is dependent on digit (decade) switched; see detailed instrument specifications.

2 For applicable digits, see detailed instrument specifications.

3 Bench cabinets are 17" wide.

4 Prices are U.S. only and include Manual and Remote (BCD) Control; PTS 3200 Digital Front Panel.

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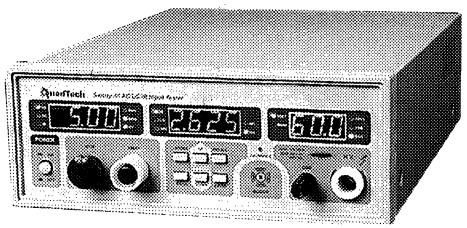
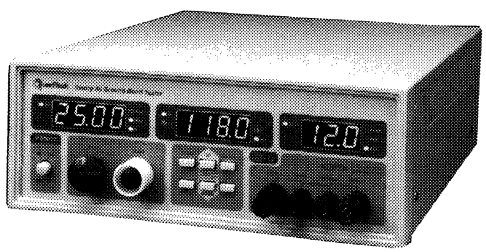


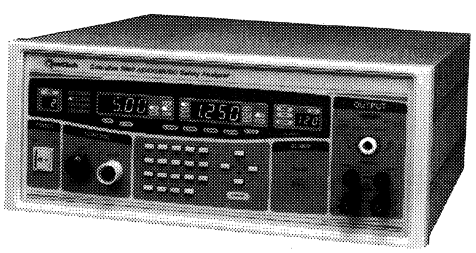
Sentry 10/20/30 AC/DC Hipot Testers

- AC & DC Hipot to 5KVAC/6KVDC
- Current Detection, 10μA - 15mAAC/7.5mADC
- Insulation Resistance Measurements
- Ground Continuity Check
- Programmable Hi & Lo Current Limits
- Remote Start with Pass/Fail Output
- Test Setup Storage, 10



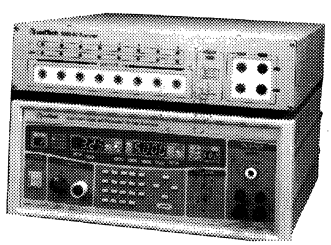
Sentry 50 Ground Bond Tester

- Output Current 1 to 30AAC
- Resistance Measurements 0.1 to 510mΩ
- Programmable Hi & Lo Resistance Limits
- Remote Start with Pass/Fail Output
- Test Setup Storage, 10
- Automatic Zero Offset
- Interface to Sentry 10/20/30 Hipot Tester



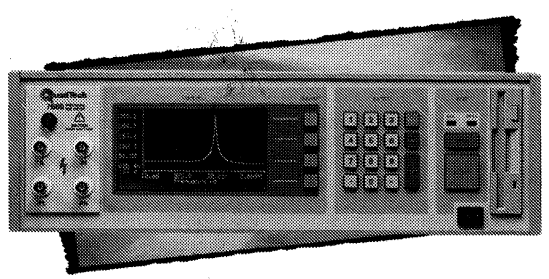
Guardian 5000 Electrical Safety Analyzer

- AC & DC Hipot to 5KVAC/6KVDC
- Current Detection, 0.3mA - 40mAAC/20mADC
- Insulation Resistance Measurements
- Ground Bond Test to 30 Amps
- Programmable Hi & Lo Test Limits
- IEEE - 488 Interface
- Test Setup Storage, 50
- Sequential Testing



Automatic Multipoint High Voltage Scanning System

- High Voltage, High Current Scanning
- Parallel or Sequential Testing
- Active Channel Indicators
- Remote Control via Guardian 5000
- Up to 64 Connections (optional)
- Rack Mounting (optional)



7000 Series Precision LCR Meters

QuadTech's new family of Precision LCR Meters has been designed to meet your needs, whether you work in calibration, R&D, QA, production testing, or incoming inspection.

All models include capabilities for swept measurements to characterize up to 14 impedance parameters; AutoAcc™ (Automatic Accuracy Calculation); test sequencing; binning; pass/fail testing; a broad selection of display formats and test set-ups and data storage in standard ASCII format files on floppy disk.

Model 7400

- Frequency range: 10 Hz to 500 kHz
- Basic measurement accuracy : LCR±0.05% DQ±0.0005

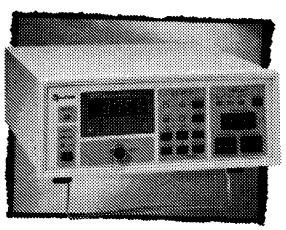
Model 7600

- Frequency range: 10 Hz to 2 MHz
- Basic measurement accuracy : LCR±0.05% DQ±0.0005

DIGIBRIDGE AUTOMATIC LCR TESTERS

QuadTech's impedance measurement instruments are used to characterize the performance of passive electronic components, materials and circuits in a wide range of applications. A variety of models are offered to address the differing needs of our customers.

MODEL	1657	1659	1692	1689 1689M	1693
Frequency Range	100 Hz or 120 Hz, 1 kHz	100 Hz, 120 Hz, 1 kHz, 10 kHz	100 Hz, 120 Hz, 1 kHz, 10 kHz, 100 kHz	12 Hz to 100 kHz	12 Hz to 200 kHz
Basic Accuracy LCR DQ	 ±0.2% ±0.001	 ±0.1% ±0.0005	 ±0.05% ±0.0003	 ±0.02% ±0.0001	 ±0.02% ±0.0001

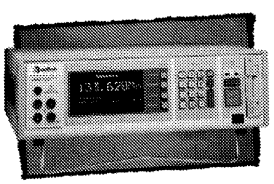


MILLIOHMMETER

Our low resistance Milliohmmeter offers user friendly front panel controls to assure that measurements on switches, relays, connector contacts, printed circuit board tracks and other devices can be made easily and affordably. This instrument offers a wide measurement range with constant current and an optional IEEE-488 interface capability, making it readily adaptable in automating production applications.

Model 1880*

- DC resistance: 1μΩ-2MΩ
- Basic accuracy: ±0.05%
- High & low limits for Go/No Go testing



MEGOHMMETERS AND INSULATION RESISTANCE METERS

Our Megohmmeters measure high resistance with superior measurement accuracy, wide measurement ranges and test voltages. The 1865 is a digital Megohmmeter and IR Tester in one easy-to-use unit. QuadTech also offers analog Megohmmeters.

MODEL	1863 ANALOG	1864 ANALOG	1865 DIGITAL
Voltage Range	50 - 500 VDC	10 - 1090 VDC	1 - 1000 VDC
Resistance Range	50 kΩ - 20 TΩ	50 kΩ - 200 TΩ	1 kΩ to >100 TΩ
Basic Accuracy	±3%	±3%	±0.5%

Repair and Calibration Services

QuadTech provides high quality, reasonably priced repair and calibration services for QuadTech and GenRad instruments. QuadTech's calibration services are traceable to the National Institute of Standards and Technology (NIST).

Service and repair from QuadTech, the original manufacturer of QuadTech, GenRad and GR instruments, will increase your confidence in your instrument's accuracy. QuadTech has the capital equipment, expertise, knowledge, and spare parts necessary for full calibration and repair services.

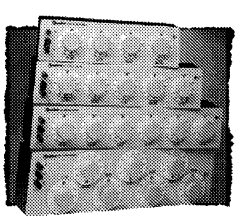
The QuadTech service program allows you to protect your instrument investment, guarantee measurement accuracy and maximize instrument up-time.

The QuadTech Guarantee

In the U.S., all QuadTech products are covered by QuadTech's Lifetime Protection Policy. The plan includes an unconditional 45-day money back guarantee, a toll-free product and application support hotline, an extendible product warranty program, and a guaranteed trade-in allowance.

Order Information

QuadTech's network of sales, manufacturer's representatives and distributors provides technical assistance and service worldwide. Please call our toll-free number, ***1-800-253-1230****, for applications assistance or for more information on individual instruments or services.*



STANDARDS AND DECADES

QuadTech's Standards and Decades have been recognized for years as primary references with which working standards can be compared. Engineers in metrology and calibration laboratories consider GenRad, and now QuadTech, a trusted supplier of capacitance, inductance and resistance standards and decades.

*Not available in some countries
All specifications subject to change without notice

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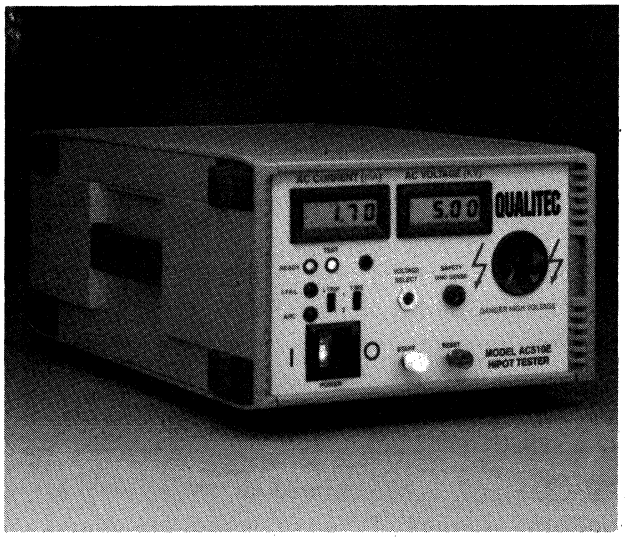


DIGITAL AUTOMATIC

- HIPOT TESTERS
- ATE SYSTEMS
- MEGOHMMETERS
- 10, 25, 30 AMP GROUND CONTINUITY TESTERS
- REMOTE CONTROLS
- IEEE-488
- MANY OPTIONS

GPIB
HPIB

FEATURES

- Variable High Voltage Insulation Testing
- Leakage Current Testing
- Ground Continuity Testing
- Automatic Test Cycle
- Solid State Controls
- Super Sensitive Arc Detection (Less Than 3 µsec)
- Super Fast Shutdown (Less Than 2 msec)
- Zero Crossing Ramp Control
- Switch Selectable and Continuously Adjustable Voltage Ramp Rates
- Remote Controls
- IEEE-488 Programmable (GPIB & HPIB)
- Digital Panel Meters
- Compact and Lightweight
- Safety Ground Interlock
- User Adjustable Ground Resistance Monitor Levels
- Separate Audible and Visual Failure Alarms for Arcs, Excessive Leakage Current and Ground Continuity Failures
- Usable on products with 2 or 3 Wire Power Cords
- Usable also on products without Power Cords
- Visual "Ready" and "In Test" Status indicators
- Switch Selectable and Continuously Adjustable Leakage Current Monitor Levels
- Switch Selectable and Continuously Adjustable Test Dwell Times
- Operates on both 115VAC and 240VAC, 50Hz and 60Hz Line Power Sources
- Made in USA

SIMPLE and ACCURATE

QUALITEC testers are easy to use. They can be operated accurately and consistently by low skilled personnel who have no prior experience with High Voltage testing. QUALITEC testers incorporate several non-destructive tests in one test cycle, including ARC detection, LEAKAGE CURRENT monitoring, INSULATION RESISTANCE measurement, and GROUND CONTINUITY monitoring with separate audible and visual failure alarms for each type of test; and indicates exactly which type of failure occurred for quick, easy, accurate troubleshooting of the device under test.

VERSATILE

QUALITEC testers have many features which allow versatile use by design engineers, test engineers, reliability engineers, quality control inspectors, production operators and others. A QUALITEC tester is versatile enough to be operated even by your personal computer which will allow you to record, analyze and print out test results. All of QUALITEC's AUTOMATIC Hipot Testers, Insulation Resistance Testers, Meghometers, and 10, 25, 30 Amp Ground Continuity Testers have DIGITAL PANEL METERS and are available with Remote Controls. QUALITEC testers have every feature you need...just **ASK US.**

COMPLIANCE

QUALITEC testers test in compliance to virtually all regulatory agency requirements including UL, CSA, VDE,IEC,BSI, BABT, TUV, FCC, JIS and MIL-SPECS.

ROD-L ELECTRONICS, INC.

TOLL FREE
1-800-548-6305
Fax: (650) 326-1993
Web: www.rodl.com

ROD-L The First Manufacturer Of UL Listed Hipot And Ground Continuity Testers.

Automated Test Systems

The world's first U.L. safety certified Hipot and Ground Continuity testers
Winner of the consumer product safety award

GPIB Controlled Systems
Model M1088

The M1088 interfaces between GPIB controllers and ROD-L test instruments

- Drivers available for Lab View and Lab Windows.
- Controls up to five instruments (simultaneously or sequence)
- Separate packaging eliminates EMI problems commonly seen when microprocessor based IEEE 488 interface circuitry is located in close proximity to high voltage

Compatible with:

- AC Hipot—Model M150AC
- DC Hipot*—Models M100DC and M120DC
- High Current Ground*—Models M10, M25, M30, M35
- Leakage Current Test*—Model M450LT

* Requires option 19 remote control

High Voltage Switching Matrix
Model M650

Ideal for testing any product requiring the application of high voltage to multiple points

- Designed for use with all ROD-L hipot testers
- Optional GPIB or RS-232 compatibility

M2000 Safety Control Cabinet
The ultimate in test automation

The M2000 features ROD-L safety test instruments mounted in a customized cabinet employing a master power control panel.

- Hands-off controls provide the ultimate in operator safety
- Customize your test station using your choice of ROD-L instruments in a variety of combinations

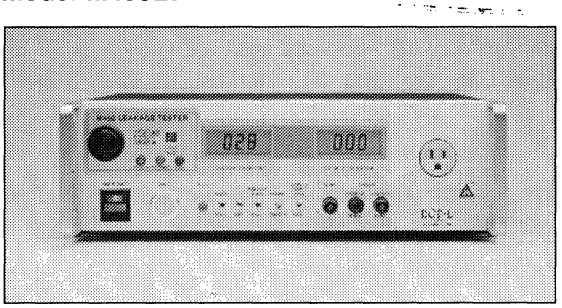
MC30 Safety Test Control Solution

The MC30 provides remote control and data acquisition for ROD-L Hipot and Ground Continuity test instruments

- Control critical parameters from any MS Windows computer
- Automatically log and print all test results by bar code data, product type or serial number
- Interface system with barcode scanner and use scanner to trigger test cycle

Leakage Current and Ground Continuity

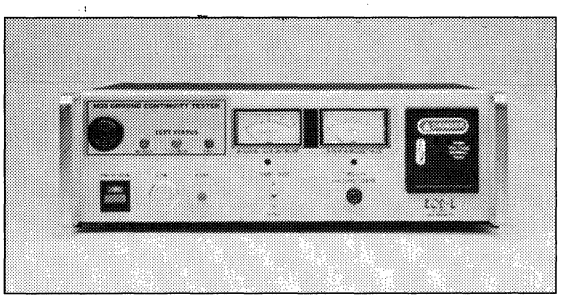
Leakage Current Test Instrument
Model M450LT



The Model M450LT performs leakage current tests in compliance with IEC 601, UL 544, UL 2601 as well as other medical and non-medical standards

- Designed to interface with ROD-L Hipot and Ground Continuity Testers

Ground Continuity Tester
Models M10, M25, M30, M35



Models M10, M25, M30, M35 high-ground continuity testers perform ground continuity test in full compliance with BSI, VDE, BABT and IEC

- Measures AC resistance from chassis of device under test to power-cord ground lead

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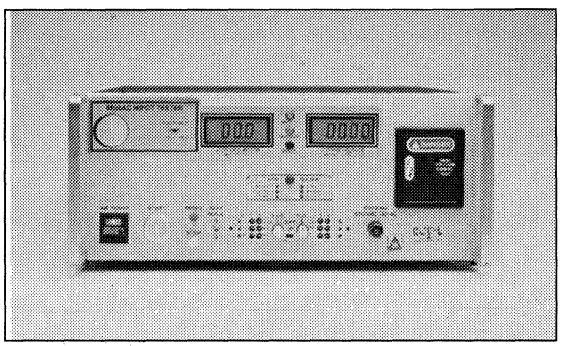
ROD-L The First Manufacturer Of UL Listed Hipot And Ground Continuity Testers.

Hipot Testers (AC, DC) and Insulation Resistance

All Rod-L hipot testers have adjustable electronically controlled test voltage ramp control and timing circuits. In addition, Rod-L hipot testers are compatible with all Rod-L Ground Continuity and Leakage Current test instruments.

AC HIPOT TESTERS

Model M150AC



IEEE 488 BUS compatible Hipot test system with fully programmable test parameters

Standard Equipment:

- Digital meters (Voltage and Current)
- Universal analog and digital control interface that allows for remote control and monitoring of hipot test parameters
- GPIB compatibility (see 1088)
- Hipot failure analysis indicators

Available Configurations:

Voltage Range	*Current Range*
100V–5kV	.5–50mA, .1–5mA
100V–2.5kV	.5–100mA

M100BVS5

AC hipot tester with concurrent ground continuity tests

Available Configurations:

Voltage Range	*Current Range*
100V–2.8kV	.1–5mA, .1–10mA, .1–25mA, .1–40mA
100V–5.0kV	.1–5mA, .1–10mA, .1–25mA

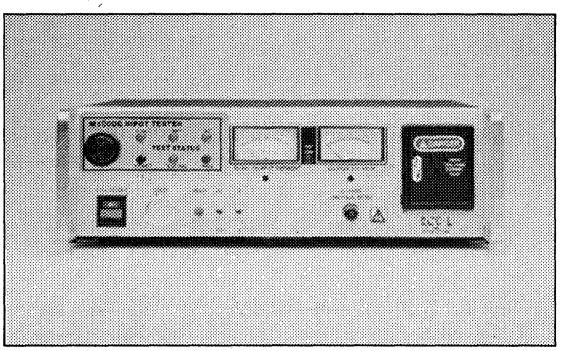
M500BVS5

Available Configurations:

Voltage Range	*Current Range*
100V–2.8kV	1–100mA, 1–200mA
100V–5.0kV	1–100mA

DC HIPOT TESTERS

Model M100DC



DC hipot tester with concurrent ground continuity tests

Available Configurations:

Voltage Range	*Current Range**
100–5kV	.2–10µA, 2–100µA, 10–500µA, .02–1mA
100–7kV	.1–5mA, .2–10mA

M120DC

DC hipot tester equipped with standard front panel test parameter controls

Available Configurations:

Voltage Range	*Current Range**
100–5kV	.2–10µA, 2–100µA, 10–500µA,
.02–1mA, 100-7kV	.1–5mA, .2–10mA

* DC Units with 1mA or less full scale current must be equipped with option 09

Insulation Resistance

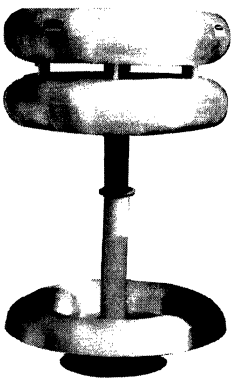
M300RT

DC insulation resistance tester

Test Voltage	*Resistance Measurement Range*
1000V	.25–4,000Mega Ohms
500V	.25–4,000Mega Ohms
100V	.25–4,000Mega Ohms

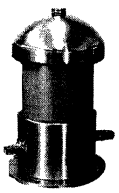
WIDEBAND HIGH VOLTAGE VOLTAGE DIVIDERS AND PROBES FOR OSCILLOSCOPES AND METERS

DC - 10MHz 1KV TO 900KV PK

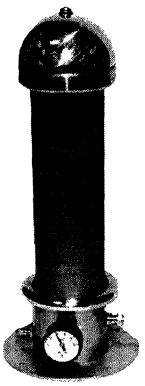


300KV PK-900KV PK
INDOOR

1KV-5KV PK

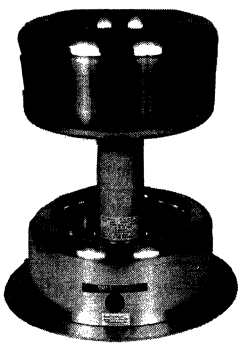


10KV-30KV PK



30KV-240KV PK

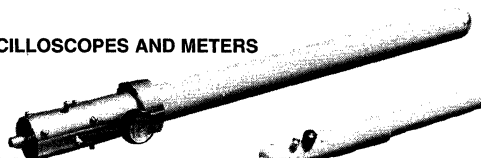
WIDE BAND VOLTAGE DIVIDERS



30KV PK-240KV PK
SHIELDED

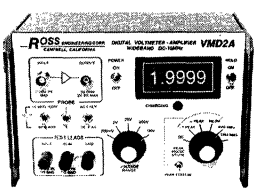
OUTDOOR POWER CLASS
15KV PK-900KV PK

PROBES FOR OSCILLOSCOPES AND METERS



15KV-400KV PK
WIDEBAND DC-10MHz

15KV PK-150KV PK
DC, 50/60 HZ



DC-10MHz
DIGITAL
MULTIMETER
VMD2A
0.01% DC
0.1% AC
3dB 10MHz

High voltage digital multimeter designed to supplement high voltage probes and HV voltage dividers. Also useful 10µV to 1000V direct

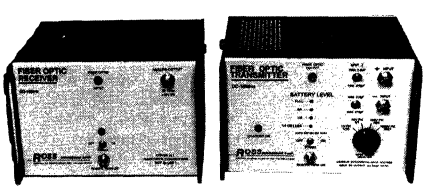
ROSS ENGINEERING CORPORATION'S HV wideband DC to over 10 megahertz voltage dividers can be made to match most instrument impedances and sensitivities. Most units are hermetically sealed with a low pressure non-toxic insulating gas. They can also be ordered for use in oil. Accuracies 0.01% to 0.2% DC, 0.5% to 1% 50-400Hz, 3% wide band DC-1 MHz, 3DB 5-10 MHz.

Power class dividers and probes are capable of accurate measurement and wide-band transient recording with full Basic Impulse Level withstand capability, 600V to 500KV RMS class to 1350KV PK BIL.
Also available are ***weatherproof outdoor models*** for use up to 900 KV DC or AC PK. They are compensated resistance-capacitance wide-band DC to 10MHz and are balanced to provide safe voltage gradients with less loading capacitance, better high frequency accuracy and low corona.

Applications include use with panel meters, recorders, digital multimeters, oscilloscopes or computers to measure, view and record DC, AC transient pulse or pulse train and modulated CW. Also operate with Ross Engineering Corporation's DC to 35MHz matching amplifiers and analog fiber-optic amplifiers and transmission systems wide band DC to 1 MHz.

*See our additional HV products in **Volume B,** Relays - Sect. 4500, and **Volume D,** Instruments, Test & Measuring - Sect. 2900, and Control Systems & Components - Sect. 2200*

FIBER OPTIC TRANSMISSION SYSTEMS AVAILABLE!
ANALOG DC-1MHz
±0.1V PK to 1000V PK input ±10V PK output
115V/230V AC, 12V DC battery powered
or isolated 110V/230V AC powered



WIDEBAND HIGH INPUT IMPEDANCE MATCHING AMPLIFIER/ COAXIAL CABLE DRIVER
DC-35MHz. 12V to 240VPK-PK input. 12VPK-PK output into 75 ohms. 500Kohm signal to output isolation battery or AC powered.

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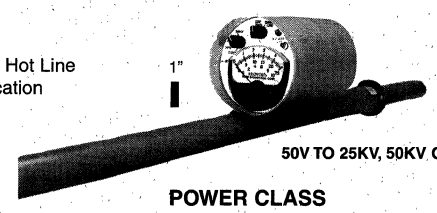
HIGH VOLTAGE MEASUREMENT DEVICES

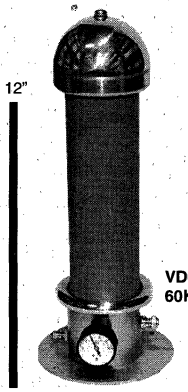
Also Hot Line Indication



VM25E-ALP-6
50V TO 25KV, 50KV OR 100KV RMS

POWER CLASS Hi-Z™ HV VOLTMETERS SAFE POWER LINE USE FOR UTILITIES, CONTRACTORS & FIRE & SAFETY DEPARTMENTS

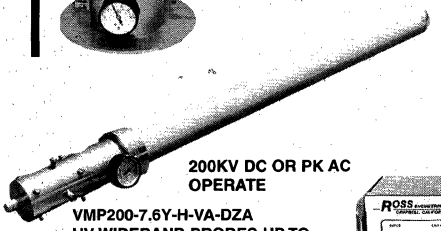
Fully safe, portable, all solid state, 2% to 5% accuracy. Taut band shielded high voltage measurement with minimum circuit loading. 0.001 V to 100KV AC and DC. Ideal for use with Elbow capacitance tap voltage test points. For cable test point or direct line voltage and phasing, or differential measurement. Digital also available with 0.5%-I% accuracy.



WIDE BAND HV VOLTAGE DIVIDERS AND PROBES FOR OSCILLOSCOPES AND METERS DC-10 MHz

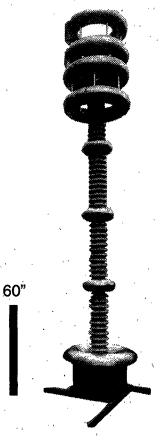
Precision compensated resistance-capacitance voltage dividers for 1KV to 900KV, DC up to 10MHz or to 0.02μ Sec rise time pulse. 1,000/1 ratio matched to 1 megohm, 20 to 50 pf display or recorder. Other ratios and loads as required. Accuracy and stability: 0.01 % to 0.1 % DC. 0.2% to 1% AC 3% DC-1MHz. 3DB 10MHz.

VD60-6.2-B-LB-A
60KV PK OPERATE



200KV DC OR PK AC OPERATE

VMP200-7.6Y-H-VA-DZA
HV WIDEBAND PROBES UP TO 400KV DC OR PK AC TO 1MHz

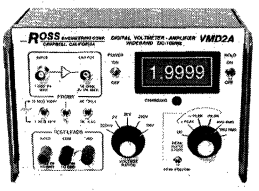


WEATHER PROOF WIDEBAND . HIGH VOLTAGE DIVIDERS For Power Line Use

High accuracy 5KV RMS to 345KV RMS power class. 30KV PK to 900KV PK operate. 60KV to 1350KV basic impulse level. DC to 1MHz frequency response. For DC, AC and transient measurement and recording.

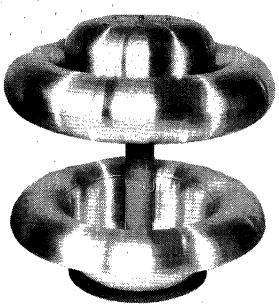
VD900-20-T-KB-B
900KV PK OPERATE

VMD2A



HV DIGITAL MULTIMETERS DC - 10MHZ

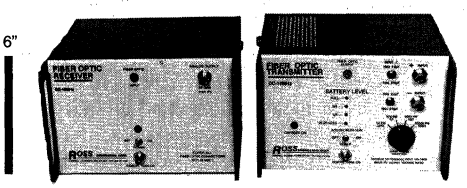
Easy to read, 41/2-digit display; 0.1% and 0.01% accuracy. 0.0001 volt to 900KV. Battery/AC with charger. Recorder and scope outputs. DC, AC RMS average, AC RMS true, AC PK Ripple & Wide Band DC-10MHz. 1 microsecond PK pulse capture.



HIGH ACCURACY HV SHIELDED VOLTAGE DIVIDER 0.01 % DC, 0.20%-3% AC

Special high accuracy, shielded, compensated resistance capacitance voltage dividers up to 900KV wideband DC to 1MHz. Matched to 1 megohm, 50 PF or other load. Used for measurement of AC and DC, high frequency, line transients, and small differential pulse voltages.

VD-150-10-CBD-KC-AL
150KV PK OPERATE



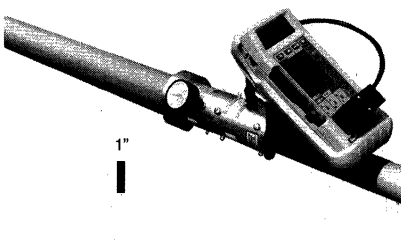
High Accuracy Analog Systems

FIBER OPTICS FOR HV ISOLATION WIDE BAND FIBER OPTIC TRANSMISSION DC-I MHz

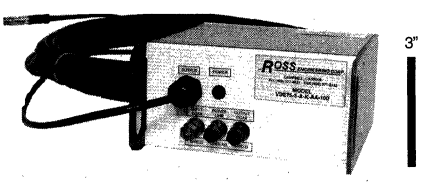
AC or rechargeable battery/AC operated. DC to 1MHz System has a maximum output of 10V PK (20V PK to PK) and maximum input of 1V to 1,000V PK direct from signal source. Useful from 0.01V and to over 900KV when used with Ross HV wide band dividers. Single or multiple ranges.

HV DIGITAL VOLTMETERS

HV DC, AC, & Wideband DC-1MHz Safety Probes for any scope or digital display or VTVM. Also available complete with large 4 1/2-digit display 0.1% to 5% AC/DC accuracy, safety handle digital voltmeter. Battery/AC with charger. Removable Digital Display or Multimeter. 0.0001 volt to 400KV.



VDMP200-7.6Y-J-UA-CAG
200KV PK OPERATE



WIDEBAND HIGH INPUT IMPEDANCE MATCHING AMPLIFIER / COAXIAL CABLE DRIVER

DC-35MHz. 12V to 240VPK-PK input. 12VPK-PK output into 75 ohms. 500 Kohm signal to output isolation. Battery or AC powered.

*See our additional HV products in **Volume B,** Relays - Sect. 4500; and **Volume D,** Instruments, Test & Measuring - Sect. 2900; and Control Systems & Components - Sect. 2200*

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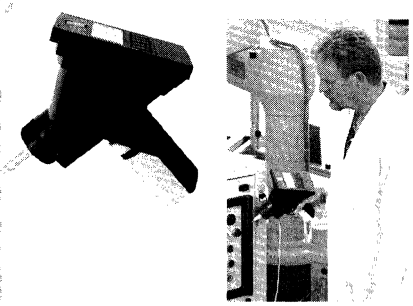
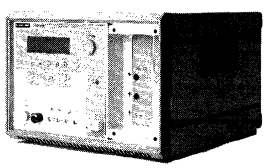
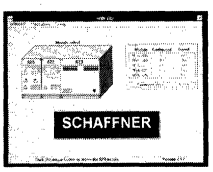
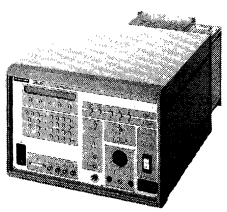
pre-compliance and compliance testing to IEC 1000-3, -4 and -5.

The largest range of **EMC** test instruments in the world









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Sensitive Research*
*A TRADEMARK OF EIS

ELECTRICAL INSTRUMENT SERVICE, INC.

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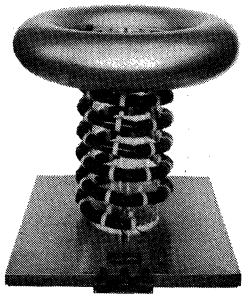
WESTON

HIGH VOLTAGE DIVIDER



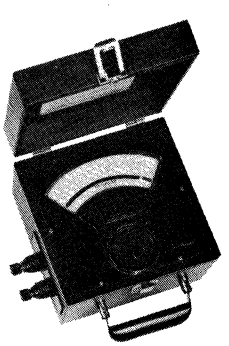
Model PARK Voltage Divider is constructed to a design by J. H. Park (Ref: "Journal of Research" of National Bureau of Standards, Engineering and Instrumentation Vol. 66C, No. 1, Jan. - Mar., 1962. Reprints available upon request.) It is similar to the NBS standard employed in their calibration of high voltage instruments. Each 100 kv divider consists of 100 individually shielded one-megohm resistors, matched to each other to achieve an approximate temperature coefficient of less than 1 ppm/°C, and connected in series to form a vertical helix between a ground plate and a high voltage electrode. Uniquely shielded, testing indicates that corona, heating and leakage errors are less than 10 ppm at less than 10 ppm at 50 kv and 50 ppm at 100 kv.

The divider's special "hat" is designed to give uniform gradients from the high voltage electrode to ground and allows stacking of additional 100 kv units for higher voltage measurements. Each unit is only 22 1/4" high! DC Ratio Accuracy: .05%, 100 kv to 1 v: .5%, 100 kv to 1 kv. AC Ratio Accuracy: ±.5%, 50 kv (max.) to 500 v. (60 cps only). Recommended readout instrument at 1 v output tap is a precision DC potentiometer, at 1 kv tap (.5 kv on AC) recommended instrument is a .5% accurate electrostatic voltmeter (Sensitive Research Model ESD described below).

ELECTROSTATIC VOLTMETER (high voltage)

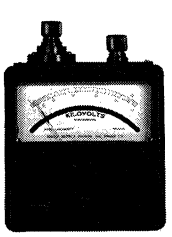
Model ESH AC/DC electrostatic voltmeter is available as a single range instrument up to 100 kv fs (140 kv DC only), or with as many as 4 switch-controlled ranges from 5 to 50 kv fs. DC input resistances to 5 x 10^{15} ohms. Capacitance varies from approx. 30 mmfd on 5 kv range to 10 mmfd on 50-100 kv ranges. Reads true RMS. Accuracy is ±1% fs (±.5% up to 50 kv) 6" scale length. Transit lock and brackets for panel mounting available.

ELECTROSTATIC VOLTMETER (portable)



Model ESD portable AC/DC electrostatic voltmeter is available as a singer or multirange instrument to measure from 120 to 6 kv fs. Insulation resistance is 1 x 10^{15} ohms. Capacitance varies from approx. 225 mmfd for a 120 v range to 20 mmfd for a 6 kv range. Multirange instruments are designed for AC/DC measurements on first range. AC only on higher ranges. ±.5% to 1% fs accuracy (±1.5% for ranges of 150 v and less). 5.2" scale length. Size: 7 3/4" x 7 1/2" x 6 1/16". Available as edgewise panel instrument with the same performance characteristics except insulation resistance approx. 1 x10^{13} ohms.

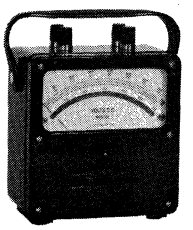
ELECTROSTATIC VOLTMETER (small portable)



University Model is a smaller, more economical version of the portable Model ESD. Single and multirange instruments available from 300 v to 5 kv fs. ±1% fs accuracy. 4" scale length. Molded bakelite case. Size 5 1/4" x 5" x 4 3/8".

SERIES 931 DC PORTABLES

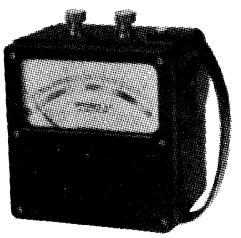
0.5% Accuracy



Scale length: 4.04" (103mm) Self-shielded permanent-magnet moving-coil mechanism — a magnetic field created by a conductor carrying 7000 amperes at a distance of three feet from the instrument would cause a temporary error of less than 0.5%. Size: 5-1/4" x 5" x 3-1/4" (133 x 127 x 83mm). Approx. weight, 2 lbs. (0.9kg.).

SERIES 433 AC PORTABLES

0.75% Accuracy



Scale length: 4.04" (103mm) Iron-vane movement, shielded from external mag-netic fields. Well-compensated for temperature changes. Power consump-tion: 150V range at 115V, 60Hz, 2.5 watts, 2.5 voltamperes.

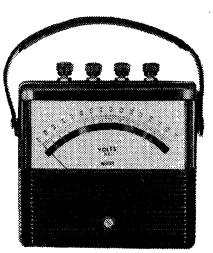
Self-contained ranges: single, double, and triple up to 750 volts. Higher ranges obtainable with multipliers, or by using Model 311 Potential Transformer in connection with 150-volt range. Size: 5-1/4" x 5" x 3-1/4" (133 x 127 x 83mm). Approx. weight: 2-1/2 lbs. (1.1kg.).

AC AMMETERS

Power Consumption 5 amps, 60 Hz, 0.50 watt, 0.52 VA. Single, double and triple ranges cover frequencies 25-500 Hz. Higher frequency coverage available. Triple range instruments have internal current transformer. All have two binding posts, double and triple range instruments have range selector switch. For ranges above 50 amps, Model 461 Current Transformer, Type 2 with 5 amps instrument is recommended.

SERIES 901/904 WIDE-SCALE MULTI-RANGE PORTABLES

0.25% /0.5% Accuracy



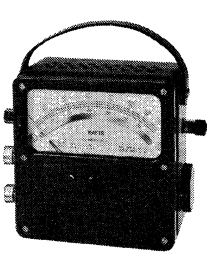
A matched group of high-precision portable instruments with 5-1/2" (140mm) hand-calibrated, mirror-backed scales; wide-angle, non-breakable windows; high magnetic shielding against external fields. Size: 7-1/2" x 7-1/4" x 3-5/8" (190 x 184 x 92mm). Approx. weight: DC models, 3-3/4 lbs. (1.7 kg.); AC models, 4-3/4 - 7-1/3 lbs. (2.1 - 3.3 kg.).

Series 901 DC Instruments. Self-shielded, permanent-magnet moving-coil operation. Rated accuracy: 0.25 - .5% F.S.

Series 904 AC Instruments. Iron-vane move-ment, designed to withstand large overloads and abuse without damage or change in accuracy. Rated accuracy: 0.5% F.S.

SERIES 432 DC AND SINGLE-PHASE AC WATTMETERS

0.5% Accuracy

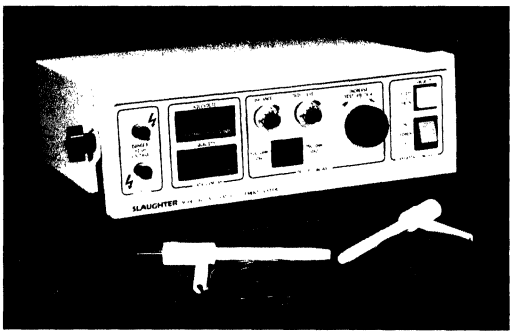


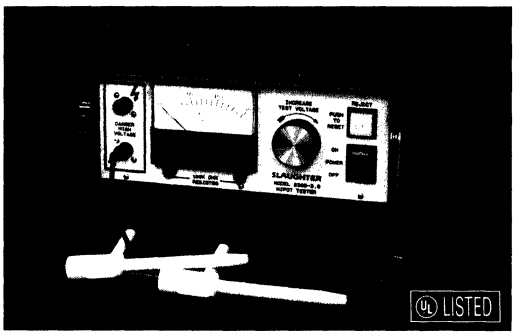
Electrodynamometer types, accurate within ±0.5% at 60 Hz; true-RMS indication. Power consumption: Potential circuit at 115V, 60Hz, 1.2 watts, 1.2 volt-amperes. Current circuit at 5 amperes, 60 Hz, 0.65 watt, 0.68 volt-amperes. Scale length: 4.04" (103mm); scale divisions: 75 unless otherwise noted. Size: 5 1/4" x 5" x 3 1/4" (133 x 127 x 83mm). Approx. weight: 3 1/4 lbs. (1.5 kg.).

MasterCard WE ACCEPT MASTER CHARGE AND VISA VISA

For repetitive production/inspection applications

Go, No-Go Masterless Operations Do Not Depend on Operator Judgement





Battery Element Testers

Models Available For Both Moist and Dry Charged Cells

Briefly, these testers subject the battery elements to a high voltage which appears between all plates and across all separators. If everything is normal — that is, if there are no defects in the separators, no runs, no trees, etc. — the battery element will withstand the test voltage and only a normal amount of leakage current will be registered by the test instrument.

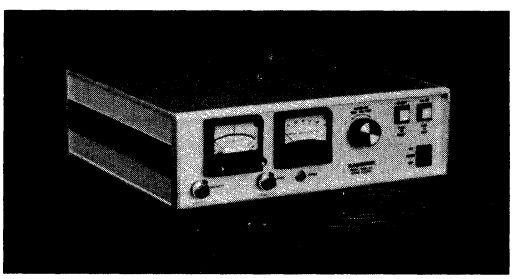
Proper test voltage for any particular battery element must be established by the user. Generally this will be in the range of 1,000 to 1,500 volts for elements with separators of less than .045", unless some marginal defects can be tolerated. For separators in the range of .045" to .065", a voltage in the range of 2,000 to 3,000 is normally required.

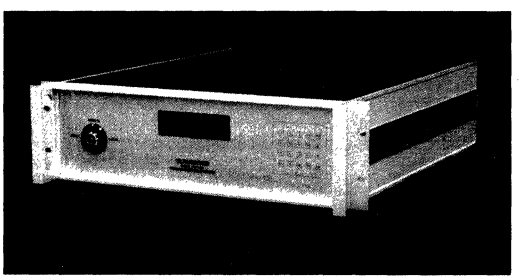
Low-Cost UL Listed Insulation Testers

In addition to the price advantage of our Series 2300 Insulation Leakage testers, their UL Listing assures compliance with OSHA workplace requirements.

Both the stand-alone Model 2306-3.0 and the combination stand-alone/remote-interface Model 2307-3.0 are designed for electrical product safety conformance testing as prescribed by UL and other NRTL (Nationally Recognized Testing Laboratories).

Test voltage is variable to 3 KVAC while leakage current reject sensitivity is adjustable from 1-5 mA. Reject indications are both audible and visual and must be reset before resumption of testing in accordance with NRTL requirements. A special "Fail-Safe" feature disables the tester if its fundamental fault detection circuits should fail thus minimizing the risk of shipping untested products.





Wound Products Surge Tester

- Tests Solenoids, Chokes, Transformers, Stators, Armatures, Etc.
- Exposes Shorted Turns as Well as Opens and Grounds

The surge test is without question the most comprehensive single test used to check coils and windings. In addition to shorts, opens, and grounds, the surge test can also expose latent defects such as shorted turns which will not show up on other types of tests. From simple solenoids through chokes, transformers, stators, and armatures, the surge test is a necessary step in the manufacture of all high quality wound products.

Though the instantaneous energy is high, average energy levels are low. Therefore, the high voltage stresses required to conduct a good test are produced without damaging good parts.

Programmable Family for High Voltage Testing

- AC INSULATION TESTER
- DC INSULATION TESTER
- MEGOHMMETER
- SWITCHING MATRIX

IEEE-488

The basic purpose of the Series 1727 testers is to provide a fully programmable high voltage source with current sensing capabilities for use in a computer controlled system. Additionally, they are easily programmable from the front panel.

- PROGRAMMABLE FOR
  - Voltage Amplitude
  - Voltage Rate Rise/Fall
  - Reject Threshold
  - Dwell Time
  - Real/Total Current
  - Charge Time

801 HAILEY STREET
ARDMORE
OKLAHOMA 73401
USA

SLAUGHTER
The ProTesters

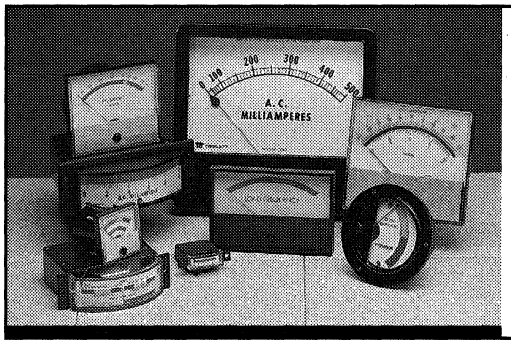
TEL: 580-223-4773 or 800-421-1921
FAX: 580-226-5757
E-MAIL: hello@hipot.com
WEB-SITE: http://www.hipot.com

• INSULATION TESTERS • ARMATURE/STATOR TESTERS • VIRTUAL HIPOTS • BATTERY ELEMENT TESTERS •

TRIPLETT

Triplett Corporation One Triplett Drive Bluffton, OH 45817

PANEL INSTRUMENTATION



Analog Panel Meters . . . Any Way you Want It!

Made in the USA

Triplett can meet the requirements for virtually any meter application. We can supply meters with special resistance, accuracy and tracking. We can also brighten them up with customized, colored scales. Give us a call for our Instrumentation Catalog.

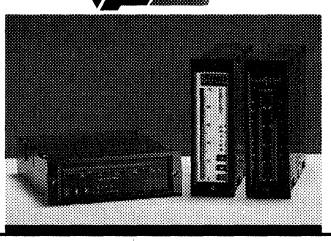
- ▲ CASE SIZES: From 1 1/2" to 8 1/2"
- ▲ CASE STYLES: Square, Round, Rectangular, Edgewise, Ruggedized
- ▲ MOVEMENTS: Pivot & Jewel, Taut Band, AC Iron Vane, Core Mag
- ▲ OPTIONS: Mirrored Scales, Custom Scales & Pointers
- ▲ ANOTHER OPTION: You supply the case, we'll supply the movement

Triplett Bargraphs

The TB Series

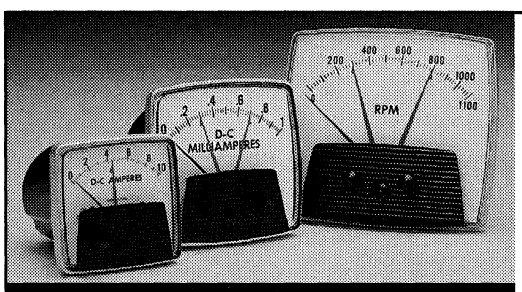
- ▲ Various shapes, sizes including compact, single, dual and square
- ▲ Optional Relays and Digital Displays
- ▲ Choice of LED bar and display colors including Tri-Color bars.
- ▲ Non-Volatile Memory
- ▲ Optional Custom Scales
- ▲ 88,000 Hour Life Expectancy
- ▲ Two Year Warranty

Made in the USA



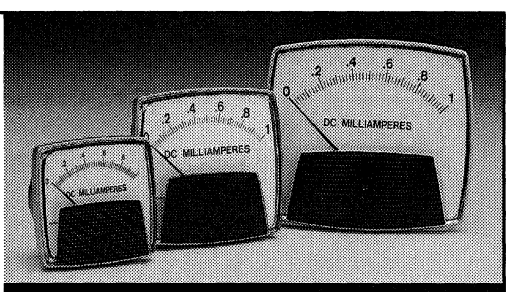
Universal Bargraph Series

- ▲ Front panel programmable
- ▲ Modular construction
- ▲ Single or dual channels
- ▲ 4 - 5A form C (SPDT) relays per channel(optional)
- ▲ Interchangeable with most 6" edgewise meters
- ▲ Optional RS-232 Serial Interface Board
- ▲ AC & DC voltages from 100mV to 300V
- ▲ AC & DC current from 100µA to 5A
- ▲ J, K, T and E type Thermocouples
- ▲ Three Year Warranty



LFE api by TRIPLETT

Made in the USA



195 Series Optical Meter-Relays

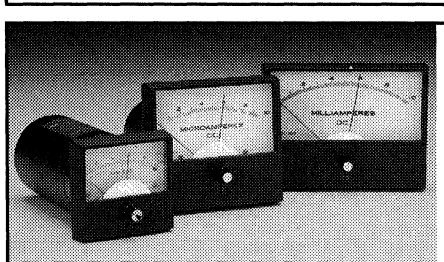
Models: 1952 (2½"), 1953 (3½"), 1954 (4½")

- ▲ Plug-in control module
- ▲ Long life lamp operation
- ▲ Plastic front and base
- ▲ Proven optical setpoints
- ▲ On/Off or alarm control
- ▲ Contain an exclusive light sensitive transistor switch
- ▲ ultimate in control simplicity and reliability
- ▲ no pointer contacts or mechanical interference
- ▲ supplied with plug-in control module that mounts directly on the rear of the Meter-Relay or remotely mounted w/ accessory cable.

195 Series Panel Meters

Models: 1952 (2½"), 1953 (3½"), 1954 (4½")

- ▲ Low Cost
- ▲ UL Recognized
- ▲ Interchangeable with other manufacturers
- ▲ Wide selection of Ranges
- ▲ Frequency models available



LFE api by TRIPLETT

Made in the USA

K Series (Compack I & II)

Models: 303-K (3½"), 503-K (4½"), 603-K (5½"), 371-K (Edgewise)

- ▲ UL Recognized with suffix "KU" (except Model 371-K)
- ▲ Temperature & non-temperature models
- ▲ Continuous indication
- ▲ Infinite noise rejection
- ▲ Easy installation - all connections at rear terminals
- ▲ Solid-state circuitry
- ▲ Single and double setpoints
- ▲ Rectangular & stackable edgewise models
- ▲ Customized Scales available

X Series (Compack IV)

Models: 303-X (3½"), 503-X (4½"), 603-X (5½"), 371-X (Edgewise)

- ▲ UL Recognized with suffix "XU" (except Model 371-X)
- ▲ 1% accuracy in most ranges
- ▲ Control independent of meter indication
- ▲ Single and double setpoints
- ▲ High input impedance
- ▲ Fast response
- ▲ Narrow temperature spans
- ▲ Rectangular & stackable edgewise models
- ▲ Customized Scales available
- ▲ On/Off, Alarm, Limit or Time Proportioning Output available

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MULTIMETERS AND TESTERS

TRIPLETT

Triplett Corporation One Triplett Drive Bluffton, OH 45817

Triplett's NEW Line of Affordable DMM's

All 5 Models come with a Red Rubber Boot and a 3 Year Warranty!!

Model 9000

- 3 1/2 LCD with max. rdg. of 1999
- 5 DC Voltage Ranges to 1000V
- 5 AC Voltage Ranges to 750V
- 6 DC Current Ranges to 10A
- 5 AC Current Ranges to 10A
- 6 Resistance Ranges to 20MΩ
- Wrong Input / Switch Position Detector
- Diode Test
- Continuity & Battery Test
- Temperature Test (w/ optional probe)
- Auto Power Off
- Auto Polarity

Cat. No. 9000 . . . . . $49

Model 9010

- 3 3/4 LCD with max. rdg. of 3200
- 33 Segment Bargraph
- Autoranging
- 5 DC Voltage Ranges to 1000V
- 4 AC Voltage Ranges to 750V
- 5 DC Current Ranges to 10A
- 5 AC Current Ranges to 10A
- 6 Resistance Ranges to 30MΩ
- Diode & Transistor Test
- Continuity & Battery Test
- Auto Power Off
- Data & Range Hold
- Auto Polarity

Cat. No. 9010 . . . . . $59

Model 9020

- 3 3/4 LCD with max. rdg. of 3200
- 33 Segment Bargraph
- Autoranging
- Auto AC/DC Voltage Measurement
- 5 DC Voltage Ranges to 1000V
- 4 AC Voltage Ranges to 750V
- 5 DC Current Ranges to 10A
- 5 AC Current Ranges to 10A
- 6 Resistance Ranges to 30MΩ
- Diode Test
- Continuity & Battery Test
- Capacitance Test
- Frequency Counter
- Auto Power Off
- Data & Range Hold
- Auto Polarity

Cat. No. 9020 . . . . . $69

Model 9030

- Dual Display
- 3 1/2 LCD with max. rdg. of 1999
- 4 1/2 w/ max. rdg. of 19999 on Freq.
- 41 Segment Bargraph
- 5 DC Voltage Ranges to 1000V
- 5 AC Voltage Ranges to 750V
- 6 DC Current Ranges to 10A
- 5 AC Current Ranges to 10A
- 6 Resistance Ranges to 20MΩ
- Wrong Input / Switch Position Detector
- Diode & Transistor Test
- Continuity & Battery Test
- Capacitance Test
- Frequency Counter
- Relative Mode
- Auto Power Off
- Stop Watch Function
- Data Hold
- Min/Max Hold
- Auto Polarity

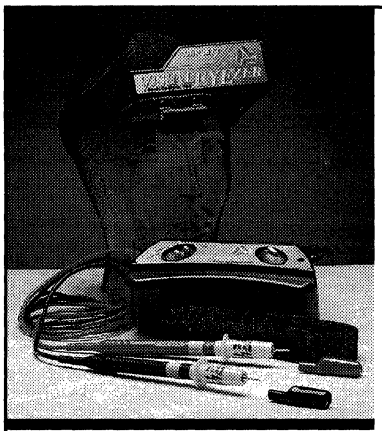
Cat. No. 9030 . . . . . $79

Model 9040 True RMS DMM

- 3 3/4 LCD with maximum reading of 3999
- 41 Segment Bargraph
- Autoranging
- 5 DC Voltage Ranges to 1000V
- 4 AC Voltage Ranges to 750V
- 6 DC Current Ranges to 10A
- 6 AC Current Ranges to 10A
- 6 Resistance Ranges to 40MΩ
- Safety Shutter on Current Terminals
- Sleep Mode to preserve battery life
- Splash Proof / Dust Proof Case
- Red Rubber Boot w/ Stand
- Diode & Continuity Test
- Capacitance Test
- Frequency Counter
- Automatic Reading Hold
- Data Hold
- Auto Polarity
- 3 Year Warranty

Cat. No. 9040 . . . . . 139.00

All Prices are Suggested U.S. List Price.
Prices and Specifications subject to change without notice.



VISUALEYEZER

Heads-up Digital VOM

21st Century Safety Concept

- View measuring points and reading SIMULTANEOUSLY!
- Reduces chance of accidental probe slippage
- High Energy Fuse in each probe tip
- See INSTANTLY when the reading changes
- No need for data hold - reading is always in direct view

Extended Ranges Suitable for the Residential & Industrial Electrician

- 600 Volt AC/DC Ranges
- ALL Ranges & Functions protected to 600VAC RMS
- 4 DCV Ranges to 600V, Autopolarity
- 3 ACV Ranges to 600VRMS (True RMS, 20Hz to 20KHz)
- 5 Resistance Ranges to 4000KΩ
- "True" Continuity Beeper w/ Loudness Control
- True Diode Test
- Decibel (dB) Function (True RMS, 20Hz to 20KHz)
- Relative Mode including Relative dB
- Auto & Manual Range Selection

Rugged, Industrial Eyepiece

- New, hinged Eye Piece for easier viewing adjustment
- 20% larger surface area for optimum viewing

Hands-Free Use

- Designed for the Electrician on the Move!
- No more trying to find a place to set your multimeter

The VISUALEYEZER Heads-Up Digital VOM, the meter of the future, is now even better! We've listened and reacted to the demands of the industry by extending the Voltage ranges to 600V AC/DC to meet the requirements of the industrial electrician. The VISUALEYEZER also has a new rugged Eyepiece and larger viewing area.

Utilizing "Heads-Up" technology developed for the military, this radically new test set projects the VOM display in front of the user's right eye, always in direct view, improving user convenience and safety while leaving both hands free to probe.

Cat. No. 3250 . . . . . $369

Model 310 Analog Multimeter

Made in the USA

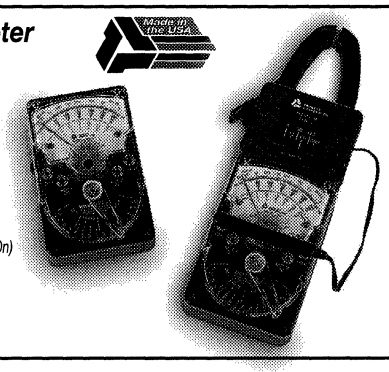
- Hand-held, high-impact thermoplastic case
- Enclosed single range selector switch
- 18 Ranges: 5 AC and DC Volt, 4 DC Current, 4 Resistance to 20MΩ
- Accuracy: ±3% DC, ±4% AC
- Diode overload protection w/ fused ohm range
- Includes 42" leads, alligator clips, batteries & manual

Cat No. 3018 . . . . . $86

Model 310-C *(Shown w/ optional Clamp-On)*

- Same features as Model 310 except:
- 18 Ranges to 600VAC
- DC Polarity Reversing Switch

Cat No. 3022 . . . . . $112



Model 60

- High-impact case guaranteed to withstand a 5' drop
- 28 Ranges: 6 AC Volt, 8 DC Volt, 4 DC Current, 5 Resistance to 10MΩ, 5 Decibel
- Accuracy: ±1.5% DC, ±3% AC
- Mirrored scale
- Polarity Reversing Switch
- 3-fuse arrangement overload protection
- Includes 48" leads, alligator clips, batteries & manual.

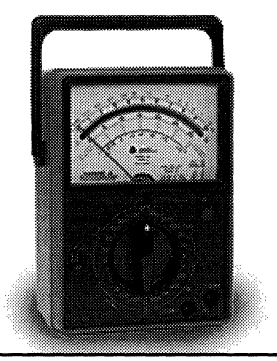
Made in the USA

Cat No. 3145 . . . . . $199

Model 60-NA

- All the great features of the Model 60 PLUS:
- 58 Ranges
- Range Doubling Switch

Cat No. 3151 . . . . . $295



Model 2202

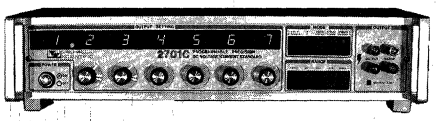
- Hand-Sized DMM
- 3 1/2 Digit, High Contrast LCD
- 0.87" Digits w/ max reading of 1999
- 26 Ranges
  5 AC and DC Volts, 5 AC and DC Current, 6 Resistance
- Diode, Continuity, Transistor and Battery Test
- Overload protected to 500 volts on all Resistance Ranges
- Built-in Stand
- Includes battery, leads, spare fuse, carrying case & manual
- 1 Year Warranty

Cat No. 2202 . . . . . $49

1-800-TRIPLETT FAX: 419-358-7956 www.triplett.com

VALHALLA SCIENTIFIC Instrument Short Form Catalog

DCV, ACV, RESISTANCE CALIBRATION STANDARDS CURRENT CALIB.



2707A Precision DC Voltage and Current Standard

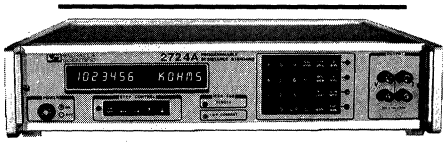
The Valhalla 2707A DC Voltage Standard is ideally suited for 7½ digit DMM calibration, thermocouple simulation, A/D converter linearity tests and a variety of DCV tests.

This Programmable DC Voltage/Current Standard may be operated manually or remotely via IEEE-488. Light weight, rugged and portable, with 15 second warm- up time. It provides DC voltages accurate to 3 ppm and DC currents accurate to 50 ppm over a 30 day period. Six voltage ranges are featured, from 200mV (100 nV res.) to 1200 Volts, with a precision current range of 120mA (100 nA resolution). **The stability of the DCV output is 0.5 ppm (24Hr).**

The 2707A features 2- or 4- wire remote sensing at the touch of a button for automatic sense correction of lead and wiring contact resistances. Ultra-low noise sensitive applications (i.e. A/D converters) work great with the 2707A.

Features:
✔- Automatic Bi-Polar Output
✔- 0.5 ppm Resolution
✔- 120mA Option Current Calibrator
✔- Two/Four Terminal Output
✔- "Covers-on" Automatic Calibration

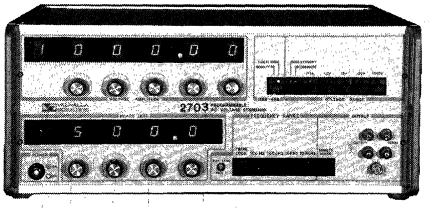
Abbreviated Specifications -
Ranges: 200mV, 2V, 20V, 120V,1200VDC
Accuracy: (23°C ± 5°C) 3 ppm ± 20 µV (20V rg)



2724A Resistance Standard

Provides over 10 million resistance values ranging from 100 µΩ to 11 GΩ. For 10 ppm per yr. stability it uses precision aged oil filled reference resistors.

Features and options include:
✔- Basic Accuracy to 7 ppm
✔- Short Term Stability - 2 ppm (10 ppm/yr.)
✔- IEEE-488 Compatible
✔- Variable from 100µΩ to 11 GΩ
✔- Calibrates 7½ digit DMMs
✔- Two/Four Terminal Operation
✔- RTD Simulation (fully variable)



2703 AC Voltage Standard

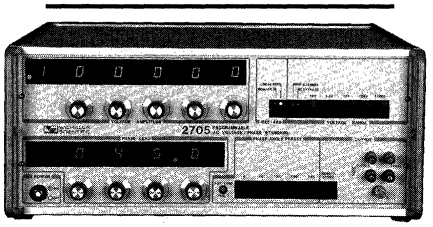
The Valhalla 2703 AC Voltage Standard is an AC voltage source whose frequency and amplitude can be varied, either manually or remotely, to produce precision sinewaves for demanding calibration situations. User benefits include rock-solid amplitude stability, low waveform distortion, crystal controlled frequency accuracy and front panel or GPIB "Covers-on" calibration. The 2703 is affordably priced at thousands less than other AC Voltage standards.

Features:

✔- Built-in Kilovolt Amplifier (1200VAC)
✔- IEEE-488 GPIB Compatible
✔- Remote (4 Terminal) Sensing
✔- Crystal Controlled Freq. (100KHz)
✔- Affordably Priced - Excellent Value
✔- Expandible to "Watts" Calibrator (2705)

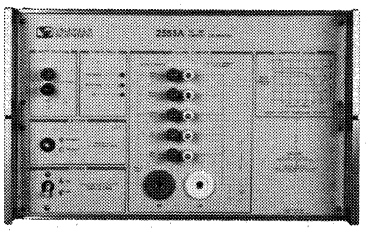
Abbreviated Specifications

Ranges: *1.2 mV, *12mV, 120mV, 1.2V, 12V, 120V, 1200V
Accuracy: 0.02% to 20 KHz, 0.05% to 0.1% to 100 KHz.
Stability: 15 ppm (0.0015%) low to mid-band to 50 ppm @100 KHz
Frequency Accuracy: 0.01%



2705 AC Voltage/Phase "Watts Calibration" Standard

The 2705 AC Voltage/Phase Std & a 2703 with a Valhalla current source (i.e. Valhalla 2555A 100 Amp AC-DC Current Calibrator) provides a phase controllable voltage & current system for wattmeter calibration. The microprocessor controlled 2705 allows 0.1° phase adjustments from 0.0° to 360°. A 2703/2705 purchased together pkg discount makes for a very affordable "Watts" calibration cluster.

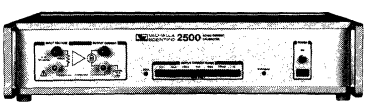


2555A - 100 Amp AC-DC Current Calibrator

Output from 1 mA to 100 Amps DC or RMS AC precise, constant current with 4 volts compliance to 1 KHz for direct calibration and test of Ammeters, Wattmeters, DMM's, Current Transformers, Current Sensors, Current Probes, Circuit Breakers and Hall Effect Devices. When used with a voltage std. (i.e. 2705) it's output is proportion in amplitude and identical in phase and freq. to the input reference.

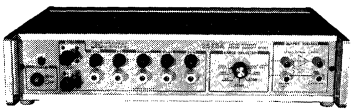
Features:
✔- Parallel Output Expandable to 1000 Amps
✔- Capable of driving a 10 turn coil to simulate 1000 Amps AC or DC.

Abbreviated Specifications
DC Accuracy: ± 0.02% of output
AC Accuracy: ± 0.15% of output
Ranges: 2mA, 20 mA, 200mA, 2A, 20A, 100A



2500 AC-DC Current Calib.

Abbreviated Specifications
Model Range
2500 7 Rngs upto2Amps -10KHz
2500EP 6 Rngs upto l0Amps-5KHz
DC Accuracy: ±02% approx.
AC Accuracy: ±0.1% approx.



2575A AC-DC Shunt

The 2575A Active Current Shunt is a 1° std. with 6 rngs of internal shunts covering from 2mA (10nA) thru 100 amperes. It also has a gain of 10 amplifier capable of driving thermal transfer standards.

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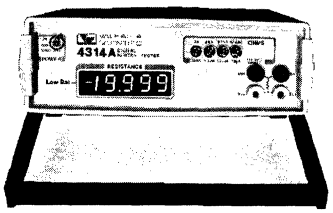
IGNITER TESTERS



4314 Series Digital Igniter Tester

These Valhalla Ohmmeters are battery powered , portable, **ultra-safe** for military and aerospace igniters and detonators. Using these igniter testers to test the continuity and integrity of firing circuits, absolute safety is assured. Dual redundant fail safe current limiting guarantees the resulting current flow into the igniter will not exceed a specified level. Accuracy is 0.04% to 20 KΩ increasing to 1% at 2MΩ.

Model	Ranges
4314A	20Ω, 200Ω, 2000Ω, 20000Ω
*F/SI	15mA,1.5mA, 150μA, 15μA
4314AN	20Ω, 200Ω, 2MΩ, 20MΩ
F/SI	15mA, 1.5mA, 5μA, 5μA
4314UK	20Ω, 200Ω, 2000Ω, 20000Ω
F/SI	8mA, 1.5mA, 150 μA, 20 μA

* F/SI = Fail Safe Current limit

Ask about the 4650A System Igniter Tester

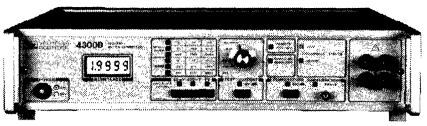
4150ATC Digital Micro-Ohmmeter

Combines all the features of the 4100ATC with a high gain preamp, to provide higher resolution (1μΩ) with 100 times less power dissipation in the test item. The 4150ATC is ideal for testing thermistors, RTD's, strain gauges, Balco sensors, and other transducers where minimizing self heating is critical during product calibration. Excellent for component testing, matching & sorting of resistors, chokes, coils, transformers, heating elements, plated thru holes, etc.

Features:

✔- Four Wire Kelvin Remote Sensing
✔- 1 μΩ resolution on the 20 mΩ range
✔- 4 ½ Digit Resolution (19,999 counts)
✔- 0.03% Accuracy
✔- 20 mV fullscale provides 1 μV sensitivity
✔- Optional Talker IEEE-488 Interface
✔- Optional RS232C or Centronics printout
✔- Automatic. Temp. Comp. (CU & AL)
✔- Optional High-Low BCD Limit Comparator.

DIGITAL OHMMETERS



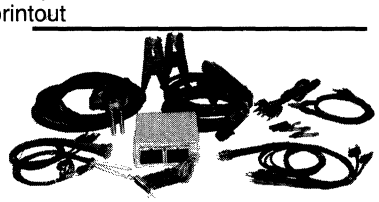
4300B Digital Micro-Ohmmeter

Valhalla's best micro-ohmmeter, the 4300B has 6 selectable current levels (0.1 mA to 10 Amps). The lowest range is 2 mΩ with 0.1 μΩ resolution. The 4300B is ideal for testing low bonding resistance, winding resistance, heat rise determinations, and any low resistance characteristics related to motors, KVA transformers, fuses, circuit breakers, generators,ballasts, weld joints, utility switchgear and more.

When measuring winding resistance on large inductors, the 4300B has a charging inductor boost mode & safety status disconnect LEDs for user convenience.

Features:

✔- Four Wire Kelvin Remote Sensing
✔- Auto. Temp. Comp. (CU & AL)
✔- 0.03% Accuracy
✔- User Selectable Test Current to 10 A
✔- Test Current On/Off Switch
✔- Boosted compliance for Rapid Charging large inductors & Safety Disconnect
✔- Optional Talk/Listen IEEE-488 Interface
✔- Optional RS232C I/O or Centronics printout

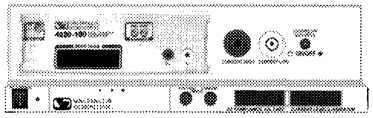


Ohmmeter Options/Accessories

There are 7 different four wire Kelvin cable sets available for all Valhalla Ohmmeters. Copper and Aluminum Temp. Compensators are available for the ATC models and the 4300B. GPIB, RS232C and Centronics parallel resistance printout capabilities are optionally available on most Valhalla Ohmmeters (*except 4314 & 4020*).

✔Option "K" Gold 4-Wire Kelvin Leads
✔"MP-1" Kelvin micro & "MP-2" miniprobe
✔"KL" (JAWS) Heavy Duty Kelvin Leads
✔"MP-4 & 5" Kelvin Surface Probes
✔"CU" Copper (ATC) Compensator
✔1248 Hi-Low Limit Comparator (BCD)
✔"BCD" Ohmmeter outputs

DIGITAL OHMMETERS



Valhalla 4020-100

The 4020 is Valhalla's 100 Ampere High Current micro-ohmmeter. The 4020 is built around a low noise, high resolution analog to digital converter. the 2 mΩ full scale measurement is displayed on a high intensity 4 1/2 digit, L.E.D. readout. the 4020-100 includes separate 100 amp current supply module. The 100 ampere constant current mode may operate continuously (not a pulsed waveform). The 4020-100 also has a 20 mΩ range with 1.0 μΩ resolution when in 10 amp output mode.

Ideal for Circuit Breaker Testing

The 100 amp capacity makes the 4020-100 ideal for testing the **resistance of circuit breakers** and buss bar connection resistances under high current conditions.

Specifications

Ranges: 2mΩ fullscale @ 100 Amps with 1.0μΩ resolution
20mΩ fullscale @ Amps with 0.1μΩ resolution
Accuracy: (180 days 25°C ± 1°C) ±0.25% of reading ± 3 count.
Voltage Sensitivity: 200mV full scale, both ranges
CMR Ratio: 60db at DC, 50Hz & 60Hz
Display: 4 1/2 digit (19999) L.E.D. - 20,000 counts
Terminal Configuration: 4-wire Kelvin
Overload Indication: Display flashes.
Operating Temperature Range: 0°C to 50°C
Power: 115/230 VAC ± 10% 50-60Hz or Battery (Option "HDB") - 100 amp module 115 VAC 15 amp

4014 Wide Range Ohmmeter

The 4014 Wide Range Digital Ohmmeter spans nine decades of resistance from 100μΩ resolution on the 2Ω range to 200MΩ full scale. A dual range preamp provides stable readings in noisy environments.

Features:

✔ - Four Wire Kelvin Remote Sensing
✔ - Optional Hi-Low BCD Comparator
✔ - 4 1/2 Digit Resolution (19,999 cts)
✔ - 0.02% Accuracy to 200 KΩ
✔ - 9 Resistance Ranges from 2Ω to 200MΩ
✔ - 100μΩ resolution on the 2Ω Range

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ENERGY ANALYZER BENCHTOP WATTMETERS POLYPHASE WATTMETERS

Handheld Power Analyzer
Watts, TRMS Volts & Amps, P.F., **% THD,** & **Harmonics**

Portable Demand Analyzer
Energy Costs, Frequency, Datalogging storage

Disturbance Analyzer
Transient Analysis, Upload waveforms to PC

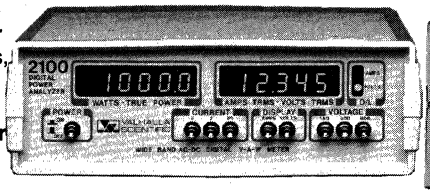
3030A 1Ø-3Ø Energy Analyzer

The Valhalla 3030A is the handiest and most cost effective instruments for the measurement and analysis of single or three phase power. It lets you analyze energy costs and power use. You can evaluate the quality of your power, trouble shoot wiring and equipment energy use and even perform **true 3 phase measurements** for less than the cost of a single phase meter.

Valhalla's PolyPower 3030A can measure 4 voltage inputs and 4 current inputs (A,B,C, & Neutral - 3 wire "delta" or 4 wire "Wye"). It can be used as a Demand/Disturbance Analyzer with 100 measurements/sec. The 3030A without options can directly measure True RMS Volts (600 VAC max.), True Rms Current, True Power, Apparent Power (True RMS VA), Total **Harmonic** Distortion, Transients, P.F., Freq., Duty Cycle, Energy, True & Est. Energy Costs and more.

Features Include:
✔- Adjust. Energy Rates -NOVRAM stored
✔- V or I max., min, avg. & present value for phases A, B, C, & Neutral
✔- 12 Power Factor measurements- for each phase
✔- Duty Cycle, Avg. "on" time/Hr.,/Dy,/wk
✔- Transient/Swell/Sag detection- Magnitude, Duration, Risetime, Time/Date of worst transient
✔- Ni-Cad powered includes battery charger
✔- Elapsed KWHr & True Cost, Estimated Energy and Cost per Hr./Mo.,Yr-Continuous
✔- Optional Serial Comm. Port - PC link
✔- Harmonic Option (1-15th & beyond)
✔- Data Logging Option - 10 days
✔- PC Control Analysis Option -Upload waveforms,harmonic analysis to the 50th

Abbreviated Specifications:
Accuracy: Volts, Amps, Frequency - 1% nom.
Power, Energy, Cost - 2% of nominal
Transients: 32 µsec minimum, 2000 Vpk, up to 999 events
Weight : 2lbs. **Dimensions:** 4"x1¾"x8"



2100 & 2101 Power Analyzers

Both units boast twin high resolution digital displays, DC to 50 KHz frequency response, **true power measurement, true RMS voltage and current** and **built-in peak overload indicators**. The only difference between the two units are their respective voltage ranges.

Power Supplies **SCR Devices** **Ballasts**

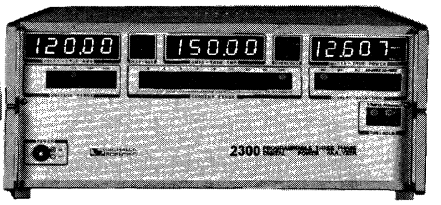
The wideband DC coupled design permits them to make accurate power measurements in the most difficult applications. Switching mode power supplies, SCR controlled circuits and **pulsed DC devices** are just a few of the applications requiring the true power measurement capability of Valhalla's 2100 and 2110A series power analyzers. The analyzer's watts circuitry uses Valhalla's proven four quadrant multiplier design.The displayed result is **true power, accurate regardless of waveform** from DC to 50 KHz.

2110A & 2111A Digital Power Analyzers/ Power Factor Meters

Model	Volts	Amps	Watts
2100	150-600	0.2,2,20	30.00 to 12,000
2101	30-300	0.2,2,20	6.000 to 6000
2110A	150-600	0.2-20	30.00 to 12,000
2111A	30-300	0.2-20	6.000 to 6000

Features:
✔- Twin Easy Read Displays (20,000 cts)
✔- True Power, TRMS Volts and Amps
✔- 0.1 % accuracy to 5KHz,
✔- Bandwidth to 50 KHz
✔- Low Cost, Excellent Value (<$1000)
✔- Power Factor Response- zero to 1.0
✔- Optional I/O - **GPIB, & RS232C**
✔- Optional 150 A and 1000 A C.T.'s

The Valhalla 2110 series (twin displays) directly measures and display **Power Factor** or True Watts,and TRMS Voltage, or True RMS Current regardless of non-sinusoidal waveshape.



2300 Series Single and Three Phase Digital Power Analyzers

Three simultaneous displays of True Watts, True RMS voltage, and True RMS current with large easy to read LED displays for each individual phase. Each phase contains 3 wide band current shunts 100A, 10A, and 1A with 3 preamp gains to provide nine current ranges from 10 µA resolution to **100 amps** fullscale.

A single phase model 2301 provides the same V-A-W range capacity (i.e. 100 amps) as the 2300 at a reduced cost. Low voltage versions (2300L) are also available.

The 2300 measures 3Ø 3-wire delta, 3Ø 4-wire Wye, or 3 simultaneous channels of 1Ø power. The freeze display (run/hold) feature allows the 2300 user to lock onto measurements. An optional High Speed IEEE-488 interface provides full talk-listen remote readings of V-A-W values and also includes a built-in KWHr integrator.

Features include:
✔- Up to 100 Amps/phase
✔- 0.1% direct self contained shunts
✔- Expandible to 150 to 1000 amps
✔- Very economical 3Ø power analyzer
✔- Voltage & Current Peak Overload Indicators
✔- Optional talk-listen GPIB capability
✔- Isolated V-A-W 11 channel analog output

Power Analyzer Accessories

The following accessories are compatible with the 2100, 2110, 2300, and 2330A Digital Power Analyzers:
✔- Current transformers with a 1000:1 step down ratio (1% accuracy) option "I-1000" (1000 amps) and option "I-150" (150 amp)
✔- Rack Mount Adapters -For 19" Racks
✔- Load Extension Cord option "X-21" for easy 120 VAC load connections

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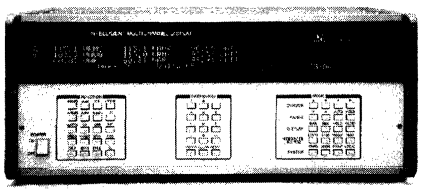
MULTIPARAMETER AND SPECTRAL POWER ANALYZERS HIPOT & HV VOLTMETERS



2330A Series Multi-Parameter Digital Power Analyzers

The Valhalla 2330A's intelligent 12 parameter display allows the user to track Amps RMS, Volts RMS, **Vavg.**, **Aavg.**,VA, VARs, P.F, Hz, Watts, KWHrs, AHrs, Phase Angle (degrees), % Total Harmonic Distortion, Harmonics (2nd-50th), |Z|, "In-Rush", C.F., and more.

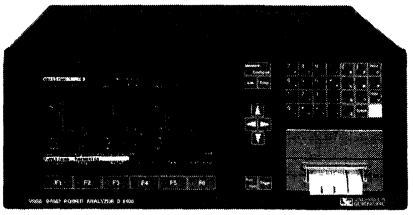
The 2330A has manual or autoranging voltage or current. High resolution (20 bit) analog to digital convertion provides user selectable resolution (4½, 5 ½, or 6 digit - 999,999 counts) optimized to the application.

The 1Ø, model 2330A -01, provides the same V-A-W range capacity (i.e. 100 amps) as the 2330A at a reduced cost. The 2330A-03 will accommodate 3Ø 3-wire delta, 3Ø 4-wire Wye, or 3 simultaneous channels of 1Ø power measurements. "Freeze Display" allows the 2330A user to lock onto all displayed parameters (12). An optional highspeed IEEE-488.2 interface provides full talk-listen remote readings of V-A-W values and includes the National Instrument's "LabVIEW"tm 2330A driver.

Features include:

✔- View Actual Levels (PT & CT Ratios)
✔- User selectable 12 Parameter Display
✔- **%THD and Harmonics (n - 50th)**
✔- Adjustable # of rdgs per integration
✔- Optional GPIB, RS232C or Centronics parallel multi-parameter printout capability
✔- Isolated V-A-W 11 channel **analog output** (option "IOX") 0 to 5 VDC scaled to display
✔-**4½, 5½ or 6 digit (999,999 count) resolution**
✔- Also 1Ø phase (2330A-01) version

Abbreviated Specifications:
Voltage Rngs: 50V,150V,300V, 600V
Current Rngs: 0.2, 0.5,1.0, 2.0, 5.0, 10.0, 20.0 ,50.0,100 Amps
Bandwidth: DC, 20Hz to 100 KHz
Accuracy: 0.05% DC to 5 KHz
Power:(EIcosØ) single phase has 36 Watt ranges from 10.000W to 60.00 KW, 3Ø-3 wire has 64 ranges from 20.00W to 120.00KW, & the 3Ø-4 wire has 100 ranges from 30.00W to 300.0KW.



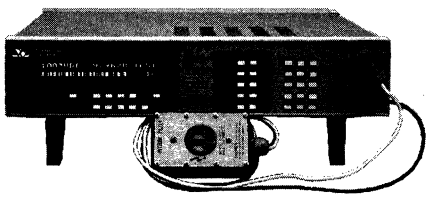
D6100 Series Wideband Spectral Power Analyzer

The D 6100 series Wideband Spectral Power Analyzer offers the ultimate in bandwidth (**DC to 2 MHz**), **Accuracy (0.035%)**, and configuration flexibility (plug-in shunts with self contained NOVRAM cal data). Optimized harmonic voltages and current analysis measurement (2nd thru 99th) and automatic **IEC** compliance interpretation with no external computer required. For IEC 1000-3-2 & -3 and ANCI transformer test and related requirements it measures harmonics, **"Flicker"**, and telephone harmonic influence factor. The D6100's **excellent common mode rejection** means it can easily find DC, or AC+DC components that keep most other powe analyzers quessing. Valhalla's proprietary **plug-in tri-axial shunts provide true power signal acquisition** without the inductive & noise signal losses foun with other meters.

It's configurable as a single phase, dual channel (3Ø 3-wire), 3 channel, or up to 6 channel (i.e. simultaneous 3 Ø invertor power in/out measurements) unit. For motor analysis the D6100 accepts motor torque and speed inputs. It can then display motor slippage, Inrush current (**displays actual waveform**), Crest Factor, VA, Watts, Hz, KWHrs, Impedance, THD, Harmonics, Freq.,P.F., VARs, Phase Angle and more. **For low power factor** (<0.1) **transformer testing** the D6100 is **10 to 20 times more accurate** than most other wattmeters.

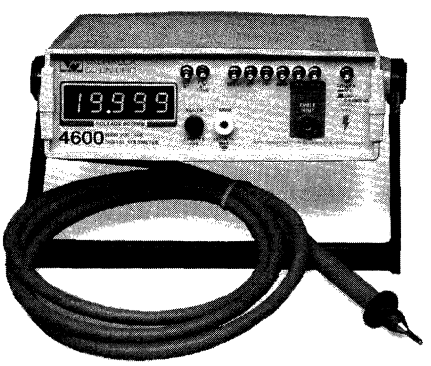
Features include:

✔- Automatic "IEC" Flicker and "Harmonic" compliance testing
✔- View and store actual waveforms
✔- View actual levels (PT & CT Ratios)
✔- Built-in printer (records)
✔- **%THD and Individual Harmonics (n - 50th),** & displays harmonic histogram
✔- up to 1000 amps (shunt) @ 100 KHz
✔- National Instrument's "LabVIEW"tm software driver module
✔- multiple display formats (i.e. user selectable tabular or graphic screens)
✔- accepts motor torque & speed inputs



5880A Automated AC-DC HIPOT

The Valhalla 5880A combines AC Dielectric Strength Testing (AC Hipot) with DC Dielectric Strength Testing(DC Hipot), Insulation Resistance(to 65 Gigohms), and Earth Continuity measurement all in one feature rich automated instrument. Measure four safety test parameters from a single test connection pressing one button. Easy setup test format accepts user determined leakage current limits, HV dwell times, rampup rates, and even arc detection levels. Multiple product compliance tests (999 steps) can be stored in non-volatile memory and retrieved for immediate use. Following completion of a test, a Pass-Fail report may be printed for (i.e. ISO 9000) compliance records.



4600 High Voltage Voltmeter

The 4600 High Voltage DVM is 40 times more accurate than the common 2-3% accurate 40KV HV probe. Direct measurement of high voltages with the Valhalla 4600 avoids the attenuation and accuracy losses associated with a 40 KV probe. This makes the 4600 highly useful for testing and calibrating High Voltage Power Supplies, CRTs, Transformers, Hipot Testers, electrostatic discharge voltages and more.

Features Include:

✔- Includes High Voltage Test Lead Set
✔- Safety Input Terminal for 20 KV
✔- Fully Floating (Battery Isolation)
✔- Includes re-chargable batteries
✔- also 30 KV (DC) DVM version
✔- Peak Hold Feature for V max

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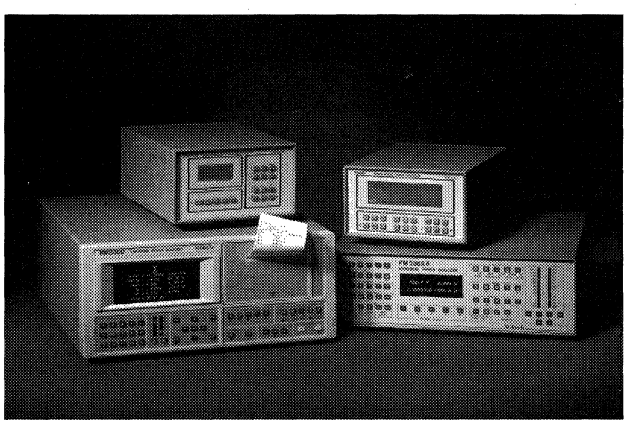
Voltech™ AC Power Analyzers Wound Component Testers

Voltech offers a complete line of single and three phase Power Analyzers and ATE Transformer Testers. These highly versatile precision products provide unique solutions to the measurement problems of power electronic and electrical engineers

PM Series Single and Three Phase Power Analyzers

Accurate even on distorted waveforms, all the PM Series of Universal Power Analyzers measure:

- Watts, Volts, Amps
- VA, VAr, Power Factor, Cosø
- Vpk, Apk, Crest Factors
- Harmonics of V, A (incl. Phase), W and THD
- Integrator for W-Hr, VA-hr, A-hr...
- Inrush current
- Electronic lighting ballast / ultrasonics models
- More than 60 functions and features in all



Call for FREE Application handbooks and demo software.

PM3000ACE and PM3300CE

- All new design with improved specifications
- Cycle-by-Cycle Analysis of start-up and other transient conditions
- PWM/Motor Test Mode including Torque and Speed
- Power Transformer Test Mode
- IEC61000-3 Harmonics and Flicker Testing
- 0.05% Basic Accuracy, 1Mhz bandwidth
- VPAS Windows software for PC control and results

PM100 (Single Phase) and PM300 (Three Phase)

- 0.1% Basic Accuracy, 250kHz bandwidth
- Graphics display
- Optional IEEE488, RS232 & Chart Recorder Interfaces

AT Series Coil and Transformer Testers

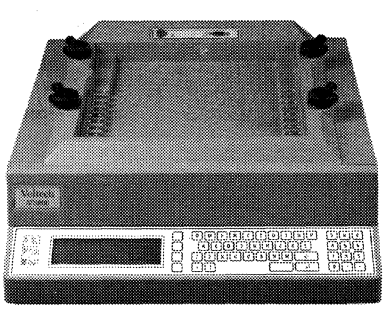
Designed to maximise your productivity, Voltech's automatic transformer testers allows you to **100% test** ALL the parameters you need in typically less than **two seconds per component**. By including a connection node matrix, signal sources and measurement system within one stand alone instrument, the AT Series can be configured to meet almost any transformer test application.

Tests

- HIPOT AC and DC
- R, L, C, Q, Z, Turns Ratio, Insulation Resistance
- Magnetising Current and Open Circuit Voltage
- Surge stress testing, Watts Loss
- Insertion Loss, Return Loss and Longitudinal Balance ++
- *Pay only for the tests you need now and upgrade later!*

Features

- Intuitive Windows software for programming test sequences
- Simple PASS/FAIL operation
- Powerful test results handling abilities
- Easy to use test fixture system
- Manual or robotic use
- Bar-code scanning option
- Safety Interlocks
- More than 30 tests available



http://www.voltech.com

Voltech Instruments Inc, 1100 Perimeter Park Drive, Morrisville, NC 27560 USA
Tel: +1 919 461 1701 Fax: +1 919 461 1709 Email: sales@voltech.com

Voltech™

FOR ALL YOUR MAGNETIC INSTRUMENTATION NEEDS

Advancing the Science of Magnetics

RESUMÉ: Walker Scientific, Inc. is part of the Walker Magnetics Group which has been in magnetics since the late 1800's. Our long dedication to the science of magnetics has enabled us to develop a broad and comprehensive product line designed to support the discipline of magnetics. This product line has set an industry standard for quality and accuracy throughout the world and has been used to support much of the advancement in the science of magnetics.

MAGNETIC MEASURING AND ANALYSIS INSTRUMENTATION
- ❑ GAUSSMETERS
- ❑ FLUXMETERS
- ❑ MAGNETOMETERS
- ❑ FIELD MONITORS
- ❑ HYSTERESISGRAPHS
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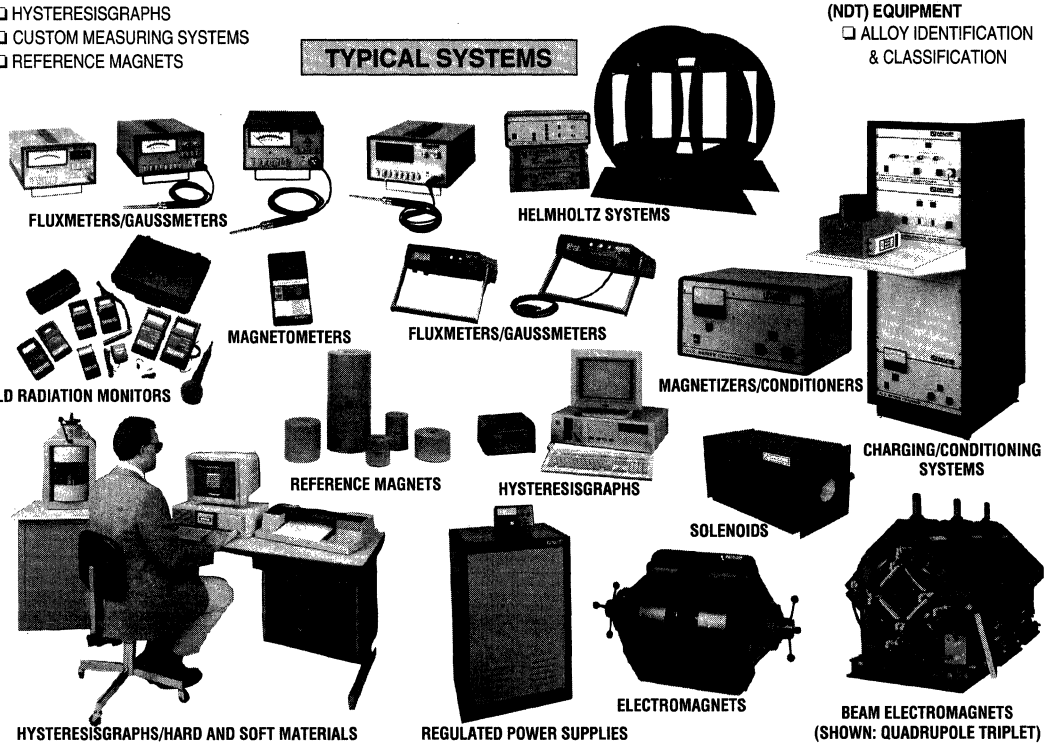
- ❑ CAPACITIVE DISCHARGE
- ❑ HALF CYCLE
- ❑ DC

NONDESTRUCTIVE TEST (NDT) EQUIPMENT
- ❑ ALLOY IDENTIFICATION & CLASSIFICATION

TYPICAL SYSTEMS



WALKER MAGNETICS **WALKER SCIENTIFIC INC.**

WALKER – SINCE 1896 – OVER A CENTURY OF QUALITY

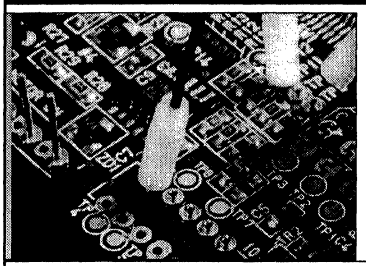
Rockdale Street, Worcester, Massachusetts 01606 U.S.A.
Telephone (508) 852-3674 / 853-3232
Toll Free: (800) 962-4638
FAX: (508) 856-9931
Email: walkrsci@world.std.com
Website: www.walkerscientific.com

TEST ACCESSORIES

Manufacturer	Starting EEM Page No.	Test Leads	Meter Probes	Oscilloscope Probes	Adapter Plugs	IC Test Clips	Test Lead Kits
Oxley, Inc.	D•1271	√				√	

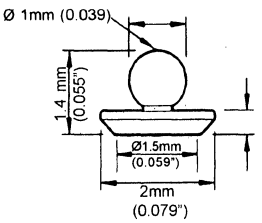
Test Points

SMOX® Surface Mount Test Points

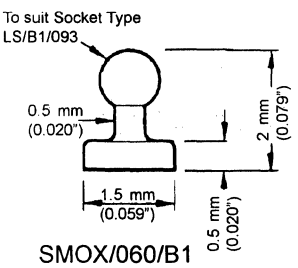


Features

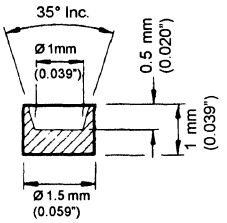
- Unique retention mechanism enhances reliability through low stress connections
- Minimum contact resistance (less than 2mΩ) through 8 points of contact
- Chamfer design allows excellent solder fillets to be formed
- Available loose or taped and reeled
- Award winning kinematic design allows rapid connection/disconnection
- Proven application through snaplox range of test points
- Hand or automatic assembly



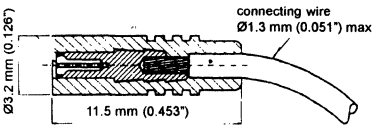
SMOX/060/B1/LP



SMOX/060/B1



SMOX/060/TP
Contact Test-Point



LS/B1/093
Smox Socket

Specifications

Materials

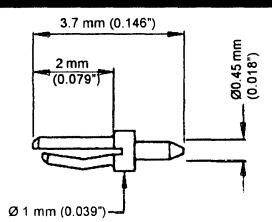
Test Point:	Copper alloy
Socket Body:	Copper alloy
Socket Insulation:	High dispersion grade PTFE standard colors white, black, red, blue, green, other colors available on request
Test-point Finish:	Standard: gold or tin lead Options: Palladium, silver, nickel
Socket Finish:	Silver

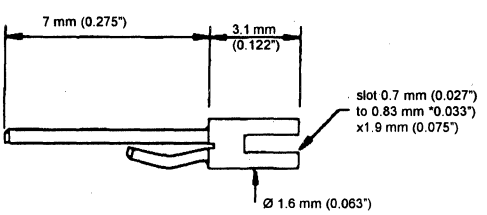
Characteristics

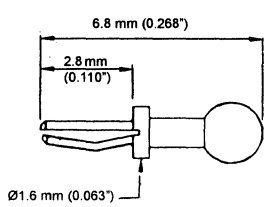
•Maximum contact resistance (with socket):	2 mOhms,
•Maximum angular movement before disconnection:	±30°
•Socket insulation resistance:	10,000 MOhms minimum
•Typical retention force (angles less than 30°):	2 kgs
•Typical retention torque (angles greater than 30°):	200 gcm
•Current for 10°C rise above ambient:	3A
•Climatic category:	-55 to 125°C, 56 days damp heat(IEC 68:55/125/56)

Tape and Reeling
Tape: 4 mm pitch, 8 mm wide
Reel size: 7" (3000 components)

Kinky Pin® Plated Through Hole Connectors







Features

- Unique kinked retention mechanism retains pin in PCB plated through hole (PTH) prior to soldering
- Low insertion force avoids damage to plating of PTH during assembly
- Slotted design enhances solderability and reliability
- Family optimised for a wide range of PTH diameters 0.508 mm (0.020") - 1.524 mm (0.060")
- Capable of hand and semi-automatic machine insertion
- Available in a wide range of styles and finished for alternative applications

Specifications

Materials

•Pins:	Copper alloy
•Sockets:Contact:	Brass,
Insulation:	High dispersion grade PTFE
•Finishes-Pins:	Tin lead, Gold
•Sockets:	Silver, (Optional Gold)

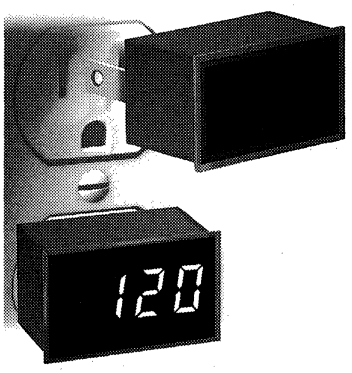
Characteristics

•Contact resistance (with socket):	less than 5 milliohm
•Current for 10°C rise above ambient:	7A
•Climatic category:	-55°C to + 125°C

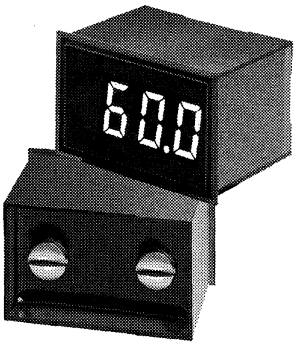
Oxley Inc. 25 Business Park Drive, PO Box 814,
Branford, CT 06405, USA
Tel: (203) 488-1033 Fax: (203) 481-6971 e-mail oxleyus@aol.com

ISO 9002

2-Wire Digital Panel Meters

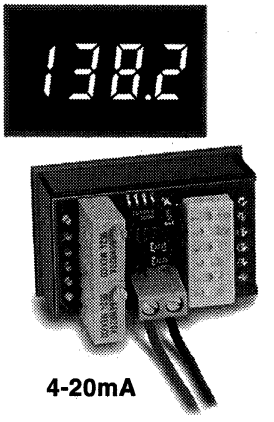


AC Volts



AC Frequency

DC Volts



4-20mA

Low-cost, incredibly easy solutions for everyday measurements!

These low-cost meters are amazingly simple, pre-calibrated, 2-wire devices that are powered by the measured signal.

When you need to monitor something as routine as 3.3Vdc, 12Vdc, 120Vac or 60Hz, you no longer have to buy a general-purpose DPM and configure it yourself. DATEL has done it all for you!

Call now for our new catalog!

- **Low prices! Stock delivery!**
- **Two connections – no external power supplies required**
- **Monitor ac Volts, ac frequency, dc Volts, 4-20mA and more**
- **Large, easy-to-read, LED/LCD displays**
- **Small rugged packages with reliable screw connectors**
- **Great replacements for analog meters**

Parameter	Input Ranges	Display	Package (Inches) ①	Display Height	DATEL Base Part Number	Price ②
AC Volts	120/220/480Vac @ 60Hz 120Vac @ 400Hz	3-digit LED	1.38 x 0.88 x 1.00	0.37"/9.4mm	DMS-20PC-X-LM (5 models)	$34
AC Frequency	50/60Hz @ 120/220Vac 400Hz @ 120Vac	3-digit LED	1.38 x 0.88 x 1.00	0.4"/10.2mm	DMS-20PC-X-FM (4 models)	$49
DC Volts	3.3/9/12/24/28/48-264Vdc 9/12/24/28-40Vdc	3-digit LED 3½-digit LCD	1.38 x 0.88 x 1.00 1.38 x 0.88 x 0.66	0.37"/9.4mm	DMS-20PC-X-DCM (8 models) DMS-20LCD-X-DCM (2 models)	$34 $19
4-20mA	4-20mA 4-20mA	3½-digit LED 3½-digit LCD	1.38 x 0.88 x 1.00 2.17 x 0.92 x 0.99	0.37"/9.4mm 0.4"/10.2mm	DMS-20PC-4/20S DMS-XXLCD-4/20S (3 models)	$58 $43

① All ac and dc meters have screw terminals on the rear of their packages. The DMS-20PC-1-LM-F and DMS-20PC-1-FM-F have "blade" terminals that plug directly into USA-style outlets. 4-20mA meters have screw-type terminal blocks.
② Prices are for USA, 500 quantity.

ISO 9001 Registered

See page D•1279 for details

DATEL, Inc. 11 Cabot Boulevard, Mansfield, MA 02048
Tel: (508) 339-3000 (800) 233-2765 Fax: (508) 339-6356
Email: sales@datel.com Data sheet fax back: (508) 261-2857
Visit us on the Internet: **www.datel.com**

DATEL®
INNOVATION and EXCELLENCE

DIGITAL PANEL METERS

Manufacturer	Starting EEM Page No.	Model/Series	Number of Digits (Number of Counts)						Function							Type of Display	Power Requirements			Other
			3 (999)	3½ (1999)	3¾ (3999-5999)	4 (9999)	4½ (19999)	4¾ (39999-59999)	Gen. Purpose	Temp	Pressure	Weight	RPM	Process Control	Other		AC Line	+5 VDC	BCD Output	
Datel, Inc.	D•1279	DMS-20PC		√					√					√		LED, 7 colors		√		
		DMS-20LCD		√					√					√		LCD, Opt. Backlight		√		
		DMS-30PC		√					√	√			√	√	√	LED, 11 colors	√	√		
		DMS-30LCD		√					√	√			√	√	√	LCD, Opt. Backlight	√	√		
		DMS-40PC					√		√							LED, 5 colors		√	√	
		DMS-40LCD					√		√							LCD, Opt. Backlight		√		
		DMS-20PC-LM	√												√	LED, Red	√			√
		DMS-20PC-FM	√												√	LED, Red	√			√
		DMS -20PC-DCM	√	√											√	LED, Red				√
		DMS-20LCD-DCM	√	√										√		LCD				√
		DMS-20PC-4/20S		√										√		LED, Red				√
		DMS-30PC-4/20S		√										√		LED, 4 colors				√
		DMS-30LCD-4/20S		√										√		LCD				√
		DMS-20PC-0/5		√											√	LED, 4 colors				√
		DSD-40-BCD					√								√	LED, 3 colors				
		DMS-3019X		√					√							LCD		√		
DCI Inc.	D•1286			√			√	√	√	√	√	√	√	√		LED & LCD	√	√	√	RS232
Electro-Numerics, Inc.	D•1289	Micro Series		√			√	√	√	√	√	√	√	√		LED	√		√	√
		DIN Series		√			√		√					√		LED	√			
		Large Digit				√	√	√	√	√	√	√	√	√		Electromagnetic	√			
Extech Instruments Corp.	D•1290	390 Series		√					√	√						LCD, LED		√		√
		V3050 Series			√										√	LED	√			
		M1050AS/M3050AS			√				√							LED	√			
		M1000AS/M3000AS		√					√							LED	√			
		M8000AS		√									√		√					
		39035 Series		√					√	√						LCD		√		√
		397 Series						6 dig.					√		√	LED	√			
		VTR Series				√				√				√		LED	√			
		580200		√						√							√			√
Fox Meter Inc.	D•1292	F100		√			√		√	√	√	√		√	√	LED	√	√		√
		F300						6 dig.	√				√		√	LED	√	√	√	√
		F500						6 dig.	√	√	√	√		√	√	LED	√	√	√	√
		FC100				√			√	√	√	√		√	√	LED	√	√		√
		FC300				√			√				√		√	LED	√	√		√
		FM100						5 dig.	√	√	√	√		√	√	LED		√		√
		FM200						5 dig.	√				√		√	LED		√		√
		FM500					√		√					√	√	LED		√	√	√
		FA						6 dig.	√	√	√	√	√	√	√	1"LED Tricolor	√			√
		FB				√			√	√	√	√	√	√	√	3"LED Tricolor	√			√
		FG						6 dig.	√	√	√	√	√	√	√	3"LED Tricolor	√			√
		FH				√			√	√	√	√	√	√	√	5"LED Tricolor	√			√
		FJ						6 dig.	√	√	√	√	√	√	√	5"LED Tricolor	√			√
Laurel Electronics	D•1297	Laureate				√	√	√	√	√	√	√	√	√	√	LED	√		√	√
Newport Electronics	D•1299	205/305		√						√	√	√		√		LED Red/Green	√	√		
		269				√				√						LED Red	√			
		L2Q		√		√			√	√	√	√	√	√	√	2 1/4" LED Red/Green	√			
		L4Q		√		√			√	√	√	√	√	√	√	4" LED Red/Green	√			
		NCT				√				√				√		LED Dual Red/Green	√			
		NM						8 dig.					√		Totalize	LCD				
		81 PID				√				√						LED Green	√			
		Infinity						6 dig.	√	√	√	√		√	√	LED Red	√		√	
		INFC				√			√	√	√	√		√	√	LED Red	√			
		INFPT						6 dig.						√	Timer	LED Red	√		√	
		INF7						6 dig.			√		√	√	√	LED Red	√		√	
		Q2000/Q3000		√					√	√	√	√	√	√		LED/LCD	√	√	√	
		Q9000/Q8000				√			√	√	√	√	√	√	√	LED	√	√	√	
		P6000/P5000						6 dig.			√		√	√		LED Red/Green	√		√	
Omega Engineering	D•1302	DP Series	√	√	√	√	√	√	√	√	√	√	√	√	√	LCD, LED, Flourescent	√	√	√	√
		CN Series	√	√	√	√	√	√	√	√	√	√	√	√	√	LCD, LED, Flourescent	√	√	√	√
SELCO Products Company	D•1304			√	√	√	√		√	√	√			√	√			√	√	
Texmate, Inc.	D•1306	LEOPARD				√			√	√					√	LED	√			√
		LYNX		√			√		√	√	√	√			√	LED	√			√
		TIGER		√	√	√	√	√	√	√	√	√	√		√	LED	√			√
		SuperTIGER		√	√	√	√	√	√	√	√	√	√		√	LED	√			√
		DU Series		√			√		√	√	√	√	√		√	LED	√			√
		MU Series		√			√		√	√	√	√	√		√	LED				√
		UM Series		√		√	√		√	√	√	√	√		√	LED	√			√
		BN Series		√			√		√	√	√	√	√		√	LED	√			√
		PM Series		√			√		√							LED/LCD		√		
		SM Series		√					√							LED/LCD		√		
		TM Series		√						√						LED/LCD				√
		CM Series		√					√							LCD		√		
		VT Series				√				√						LED	√			
		OVM Series		√					√							LED		√		
		RIP Series		√			√		√							LED	√		√	

DIGITAL PANEL METERS (cont'd.)

Manufacturer	Starting EEM Page No.	Model/Series	Number of Digits (Number of Counts)						Function							Type of Display	Power Requirements			Other
			3 (999)	3½ (1999)	3¾ (3999-5999)	4 (9999)	4½ (19999)	4¾ (39999-59999)	Gen. Purpose	Temp	Pressure	Weight	RPM	Process Control	Other		AC Line	+5 VDC	BCD Output	
VAS Engineering	D•1287	Doric 5000				√				√						4 digit, 14 segment LED	√			
Weschler Instruments	D•1308	Slimline		√	√	√	√	√	√	√		√	√	√	√		√	√		

ANALOG PANEL METERS

Manufacturer	Starting EEM Page No.	Model/Series	Type			Size (Inches)								Edge-wise	Illuminated	Custom
			Moving Coil	Moving Iron	Taut Band	<1½	2	2½	3	3½	4	4½	5	>5			
Beede Electrical Instrument Company, Inc.	D•1278	Edgewise	√		√	√		√		√					√	√	√
		QA	√		√	√	√	√	√	√	√	√					
		Designer	√		√			√	√	√	√	√	√	√			
		Centurion	√		√					√		√					
		250°	√	√	√			√		√				√			
		Traditional						√		√		√					
		Clearview				√		√		√		√					
		Panorama						√		√				√			
		Universal												√			
Hoyt Electrical Inst. Works, Inc.	D•1296	2000, 2100, 3100, 4000, 5000	√	√		√		√		√		√		√§			√
Omega Engineering	D•1302	7000	√					√		√		√		√			
SELCO Products Company	D•1304		√		√	√	√		√	√	√		√			√	√
Texmate, Inc.	D•1306	GN Series	√	√	√		√	√	√	√	√	√	√	√	√	√	√
Weschler Instruments	D•1308	20/20	√					√		√		√					√
		Conventional	√							√		√					√
		Power/Airpack	√			√		√	√	√	√				√		√

BARGRAPH PANEL METERS

Manufacturer	Starting EEM Page No.	Model/Series	Number of Digits for a Digital Display	Function						Outputs			Type of Display	Power Requirements
				General Purpose	Freq.	Temp.	Process	Power (Watts/VARs)	Other	Analog	BCD	Other		
Ametek/Dixson	D•1276	Pro Series	4	√		√	√	√				√	LED	Various
Fox Meter, Inc.	D•1292	FS100	4	√		√	√		√			√	21 Segment	5-12 VDC, 10-30VDC, 120VAC, 240VAC
		FV100	4	√		√	√		√			√	31 Segment Vertical	5-12VDC, 10-30VDC, 120VAC, 240VAC
		FL100	4	√		√	√		√			√	31 Segment Horizontal	5-12VDC, 10-30VDC, 120VAC, 240VAC
Texmate, Inc.	D•1306	LEOPARD	4,5	√	√	√			√	√			61/101 LED	AC Line, 12/24 VDC, 125 VDC
		SuperTIGER	4,5	√	√	√			√	√			61/101 LED	AC Line, 12/24 VDC, 125 VDC
		F Series	4,5	√					√				61/101 LED	AC Line
		AM Series	4,5	√					√				30 LED	5 VDC, 12/24 VDC
Weschler Instruments	D•1308	BG	4 1/2, 5	√	√	√	√	√	√	√	√	√	LED	120/240 VAC, 5, 12, 24, 28, 48, 125 VAC

MINIGLOSSARY ENCAPSULATION

MATERIALS/HANDLING

Catalyst: A substance which changes the *rate* of chemical reaction. Very small quantities can cause fast change.

Conformal coating Sprayed or dipped. A thin conformal jacket which protects an assembly from moisture or other degrading environments.

Curing agent: See catalyst.

Hardener: See catalyst.

Hermetic: A permanent gas-tight seal.

RTV: Room Temperature Vulcanizing. Associated with silicone rubber sealants which vulcanize at room temperature.

Thermoplastic: Plastic materials which can be made to flow *repeatedly* with the application of heat.

Thermosetting: Plastics which once cured cannot be made to flow again.

Thixotropy: The property of a coating compound which has low viscosity when agitated, but which thickens when the agitation ceases.

Viscosity: Measured in units of *poise* or *centipoise*. The property of a liquid which resists internal flow. Low viscosity equates with thin and vice-versa.

PROCESSING

Casting: Parts or assemblies are placed in a mold. Encapsulating material is added and cured. Part is then removed from the mold.

Dip coating: Part or assembly is dipped into the encapsulating material. Final thickness is determined by number of dips, viscosity, rate of withdrawal, and temperature.

Embedding: Wherein an encapsulant substantially fills all voids in and about an assembly.

Impregnation: A process of encapsulation involving evacuating all air and then allowing the encapsulating material to flow in and fill all voids.

Molding: Similar to casting except this process usually implies multicavity molds and costly machines.

Potting: Wherein the part or assembly is immersed in an encapsulating material contained in a shell which becomes a permanent outer surface after curing.

DIELECTRIC

Arc resistance: An encapsulant's resistance to the formation of a conductive path or track. Measured in time.

Breakdown voltage: The voltage at which an encapsulant fails electrically.

Capacitance: The property of conductors and dielectrics which allows the storage of an electrical charge when the voltage is applied.

Corona: A luminous discharge of electricity due to air ionization when a certain voltage is reached. Can be internal or external. The formation of ozone can cause rapid deterioration of certain materials.

Dielectric: Insulator (Nonconductor.)

Dielectric constant: The property of a material that determines its ability to store electrostatic energy.

Dielectric strength: The ratio of dielectric breakdown to the thickness of insulating material.

Dissipation factor: The ratio of a dielectric material's energy losses.

Flashover: Point at which an electric discharge occurs around an edge or across a surface. Can result in a carbon track and permanent degradation.

Insulation resistance: (IR) An insulating material's total DC leakage.

Surface resistivity: The resistance of the surface of an insulating material to the flow of direct current.

Voltage endurance: Sometimes called corona resistance. The ability of a material to withstand the application of sustained high voltage.

Volume resistivity: The resistance of a material to direct current flow as a measure of volume. Expressed as ohm-centimeters.

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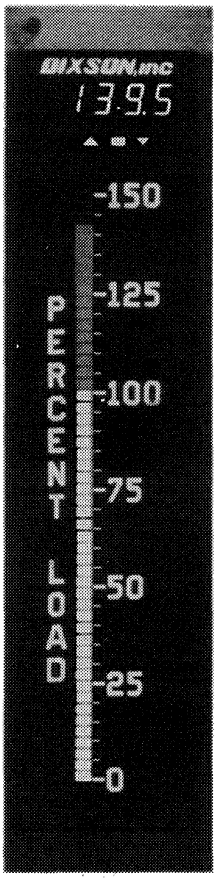
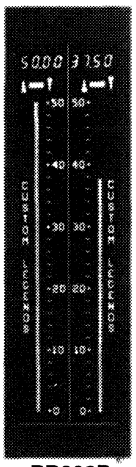
DIXSON

Programmable Bargraph Panel Meters for Retrofit and New Applications

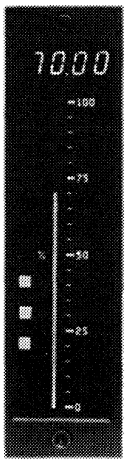
...world class quality for the global marketplace!



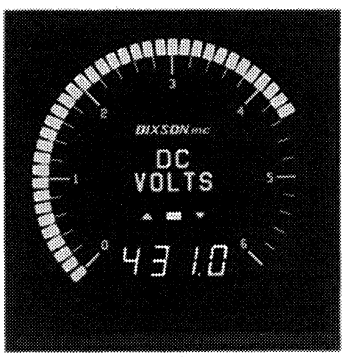
BK051P
2.88" x 11/25"



BB202P
1.74" x 6.00"



BB101P
1.74" x 6.00"



BW051P
6.25" square

Features:

- Brilliant red LED display
- Optional green, amber displays (some models)
- Digital reading to ±10% in underrange/overrange
- Programmable via front panel switches
- Auxiliary transducer power supply
- Programmable via RS-232 input
- Minimum 88,000 hour MTBF
- On/off control via 3 setpoint relays
- Vertical, horizontal, wide-sweep orientation
- Front panel mounting (most models)
- True minus-sign indication
- Auto-calibration algorithm
- Direct temperature measurement
- Two-wire, isolated retransmission
- RS-422 serial communication
- Input signal linearization
- Input ranges switch-selectable
- Min/max signal memory
- 72 x 144mm DIN form available

RETROFIT MODELS FOR

- D'Arsonval meters
- Digital meters
- Bourdon tube indicators
- Sightglass indicators
- Manometers
- Pneumatic indicators

TWO-YEAR WARRANTY
ISO 9001 CERTIFIED

AMETEK Dixson "PRO" (PROgrammable) Series bargraphs are the preferred choice for new applications, or for replacement of switchboard meters, other common size indicators, and setpoint controllers. The "PRO" Series is feature-enhanced, and options are available to solve most common application problems. They are easily configurable for maximum flexibility. Models shown at left are representative. Custom-designed and nuclear-rated models are also available. **Visit our website for complete information and specifications on all models.**

Nuclear-Rated Models:

- Class I (1E) or Class II qualifications
- Mild-environment qualification to IEEE-323-1983 and IEEE-344-1987
- QA programs include 10CFR, Appendix B, audited by a member of NUPIC
- Software Verification and Validation (V&V) to IEEE-7.4.3.2, 1993
- EMI/RFI testing performed to current Nuclear Utility requirements

Off-the-shelf replacements available for:

- Bailey RY Single and Dual
- Crompton 6"
- GE/Yokagawa 180, AB/DB40
- Hays-Republic Models 216, 3600
- Prime/Sigma/International Instruments 1151/1251, 9223, 9264, 9270 DIN
- Versatile VMI Series 2000
- Westinghouse Weschler VX252, K231/241

NEMA-4 rated front panels!
Tri-color bar displays!
Screw terminal connections!

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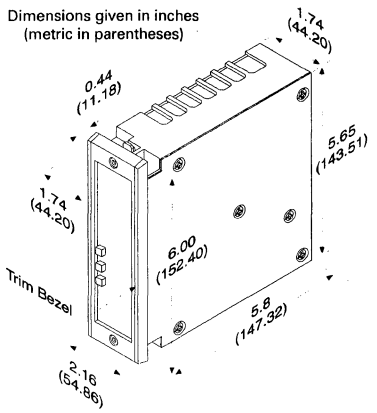
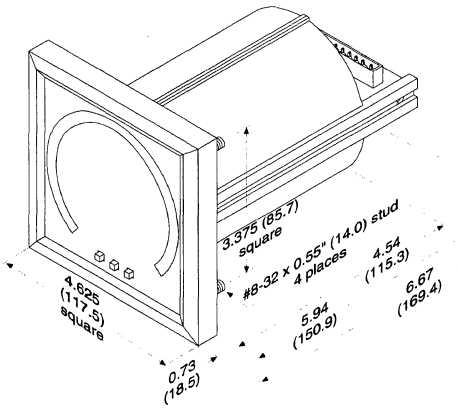
AMETEK®/DIXSON Programmable Bargraph Panel Meters

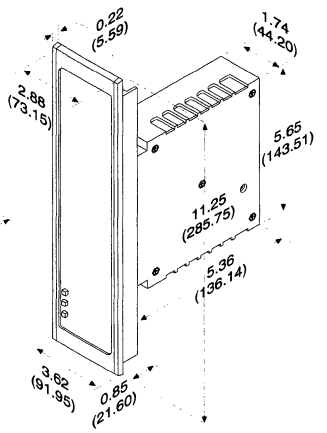
Dimensions given in inches
(metric in parentheses)



BB101P/BB202P
Panel cutout:
1.77" x 5.7"



BB101P/BB202P
Panel cutout:
4" diameter



BB101P/BB202P
Panel cutout:
2.94" x 10.52"

PRO-Series Specifications

Note: *For ISA S67.04 and RP67.04 Part II, consult factory for models and assistance.*

PHYSICAL CHARACTERISTICS

Number of bargraph segments	51 or 101
Resolution	1.0% (101 segments); 2.0% (51 segments)

ENCLOSURE MATERIAL — Non-glare black Noryl or ABS case complying with UL94 V-O or V-1

DIGITAL DISPLAY OPTION — (True minus sign) –9999 to 9999

Number of digits	4
Resolution	0.01% ±1 count*

ENVIRONMENTAL CHARACTERISTICS

Operating temperature range (MIL-E16400G, Class 4)	0 to 60° C
Storage temperature range	–40° C to +85° C

POWER REQUIREMENTS — Either 115/230 VAC at 50, 60, 400 Hz or 5, 12, 24, or 48 VDC

Line regulation (basic instrument)	±10%
Power consumption (typical, depends on options)	
BB101P	3.5 VA
BB202P	7.0 VA
BK051P	4.0 VA
BW051P	4.0 VA

SENSITIVITY RANGES (Reference ANSI C39.1 standard sensitivities)

STANDARD FULL SCALE INPUTS FROM ZERO	
DC currents (DIP-switch selectable)	500 µA to 50 mADC
DC voltages (DIP-switch selectable)	1 VDC to 250 VDC
OPTIONAL FULL SCALE INPUTS FROM ZERO	
DC currents (factory configured)	50 µA to 250 mA
Plug-in modules:	
RS 422	Serial Data Comm.
DC voltages	50 mV to <1000 mV
AC currents	1 mA to 1000 mA; 5 A
AC voltages	250 mV to 250 V
Thermocouple - Type E	–100° C to + 1000° C
Thermocouple - Type J	–18° C to + 760° C
Thermocouple - Type K	–18° C to + 1,370° C
Thermocouple - Type T	–160° C to + 400° C
RTD (100-ohm platinum)	–200° C to + 850° C

DC INPUT PARAMETERS

Linearity 0.02% of span ±1 count*	
Accuracy	0.04% of span ±1 count*
Zero stability	< 0.01% per ° C
Gain stability	0.02% per ° C
Input impedance:	
For voltage inputs	> 200,000 ohms
For 4 to 20 mADC current inputs	100-ohm compliance resistor
For 10 to 50 mADC current inputs	40-ohm compliance resistor
For all other current inputs	Consult factory
Response time (typical)	175 milliseconds
Overload (signal)	200% or 250 VDC maximum

AC INPUT PARAMETERS (true RMS reading)

Linearity 0.4% of span**	
Accuracy	0.5% of span**
Zero stability	< 0.04% per ° C
Gain stability	< 0.04% per ° C
Input impedance for voltage inputs	>200,000 ohms
Response time (typical)	325 milliseconds
Overload (signal)	200% or 250 VAC maximum

SETPOINT OPTION (internal module)

Standard setpoints	LO and HI
Configurable alarm	HI/HI (default) or LO/LO
Setability0.1%	
Hysteresis	1.0%
Relay response time (typical):	
For DC inputs:	350 milliseconds
For AC inputs:	650 milliseconds
Relay contact ratings (3 Form C):	0.4 amps @ 125 VAC
(BB101P/202P, BW051P, BK051P)	2.0 amps @ 30 VDC

RETRANSMISSION ACCURACY (4 to 20 mA) ± 0.1%

LINEARIZATION
Eighth order polynomial (nine terms) — Refer to "PRO" Series Interface Kit.

*1 count defined as a ± unit value change of the right-most digit
**Except for first 5% of span

Software - AMETEK/Dixson's Pro-Series bargraphs can be easily programmed using a DOS-compatible PC and *Dixpro* programming and calibration software. Forty individual selections assist and guide the user through the programming process. Functions are logically grouped and extensive help screens are available.

The design allows the user to calibrate and configure most software-controlled options. Configurations can be saved, reloaded, edited, and printed. This allows record-keeping on various units during the calibration/configuration process. Software-adjustable features include signal linearization, pre-stored thermocouple coefficient data sets, and incrementally adjustable signal averaging.

Artwork - AMETEK/Dixson's standard library of artwork consists of over 3000 of the most commonly used captions in the industry. In addition to this extensive library, logos and custom scales can readily be designed to your specifications.

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made in the U • S • A

Beede

CONTROL METER RELAYS

Beede Optemp™ Series...the high performance meter relay pyrometer line designed to meet your needs

The high performance is due in part to the built-in, solid-state operational amplifier.
There's a rugged, high-torque pivot-and-jewel movement with non-contacting optical switching for fast response, inherent noise rejection and continuous indication.
Cold junction compensation accuracy for +25°F to +145°F (ambient).
Types J and K: ±1% of full scale.
Others: accuracy spec. depends on application.
Upscale thermocouple-break protection is standard.
Recorder output is available.
High impedance input allows small gauge thermocouple runs up to 100 ohms without adjustment.
Add in the multitude of available options and you can get one to do anything you want to do, even if you never thought you were going to be able to do it before.
That's what Beede's for.

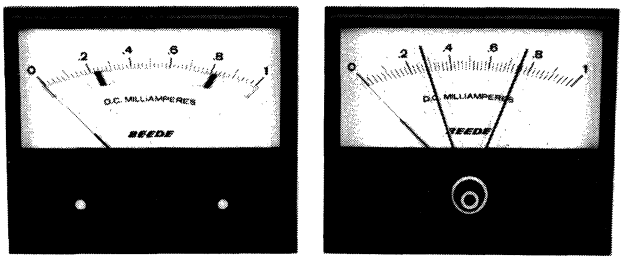
Beede Optronic Series...the answer to those very special measurement and control applications

For special measurement and control applications:
Resistance. AC Volts. Millivolts. Microamperes.
Feature signal conditioning circuits using accurate, highly stable amplifiers designed to accommodate nearly any electrical signal source.

Beede Direct Drive Series...the basic meter relay

Signal source drives the meter directly.
No terminal amplifiers.
Totally isolated signal circuit.
Optional DC power input.

Standard Electrical Connections



Performance Specifications

Accuracy:
Coincidence...within 1% of full scale over operating span.
Indication...±2% of full scale
±1% optional

Deadband: 0.5%

Ambient Temp. Range: -20°F to +165°F

Relays: Contacts are silver cadmium oxide, gold finished rated at 5 Amps A.C. resistive @ 115 to 230 VAC.

Isolation Voltage: 1500 VRMS, rear terminals to panel.

Power Requirements: 115/230 VAC @ 47 to 63 hz. 12 to 24 VDC optional

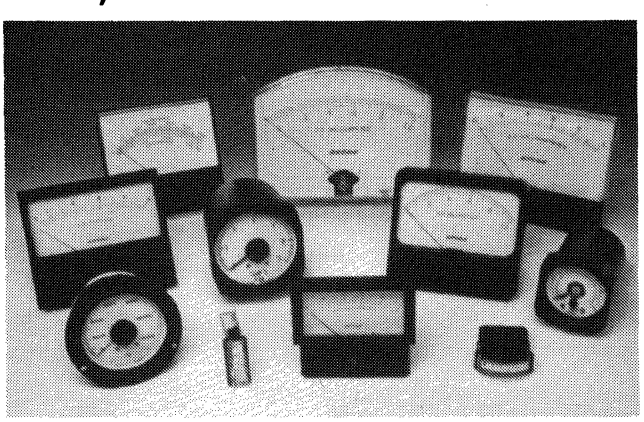
Power Consumption: 5 watts max.

Features

- Optical, non-contacting setpoints with continuous indication.
- Solid state optics are completely immune to ambient light.
- Available as a complete unit with integral power supply and relays, or, as a meter with setpoints and optical switching elements only.
- Long-life, solid state, IRLED light sources.

EXPANDED LINE OF PANEL METERS INCLUDES BEZEL, WINDOW AND SURFACE MOUNT STYLES

PANEL METERS
Edgewise .....
QA .....
Designer .....
Centurion .....
Traditional .....
Clearview .....
Panorama .....
Universal .....
250°C .....



ISO 9001
ANSI / ASQC Q9001

Beede panel meters combine the high reliability you need with the sophisticated appearance you want. The expanded line now features a new bezel mount plus window and surface mount styles. Select from a variety of meter sizes, case colors, meter movements and options.

Case sizes are 1½", 2½", 3½" and 4½". Meter movements include shielded-bar taut band, mab B taut band or pivot-and-jewel. Multi-colored scales, special resistant, tracking accuracies to ±1/2% and many other options are also available.

As with all Beede meters, these ruggedly built precision instruments are hand-assembled by experienced craftspersons working in modern facilities.

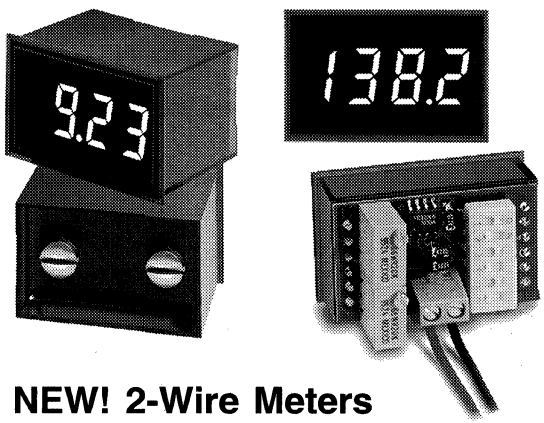
OEM quantities available from the factory in 6 to 8 weeks. Smaller quantities from Beede Meter Modification/Distribu-Centers nationwide.

* Certified accuracy and tracking of ±1% or 0.5% is available, as are other special characteristics. Consult the factory.

Digital Panel Meters

The Smallest, Most Reliable, Fully Functional DPM's in the World!

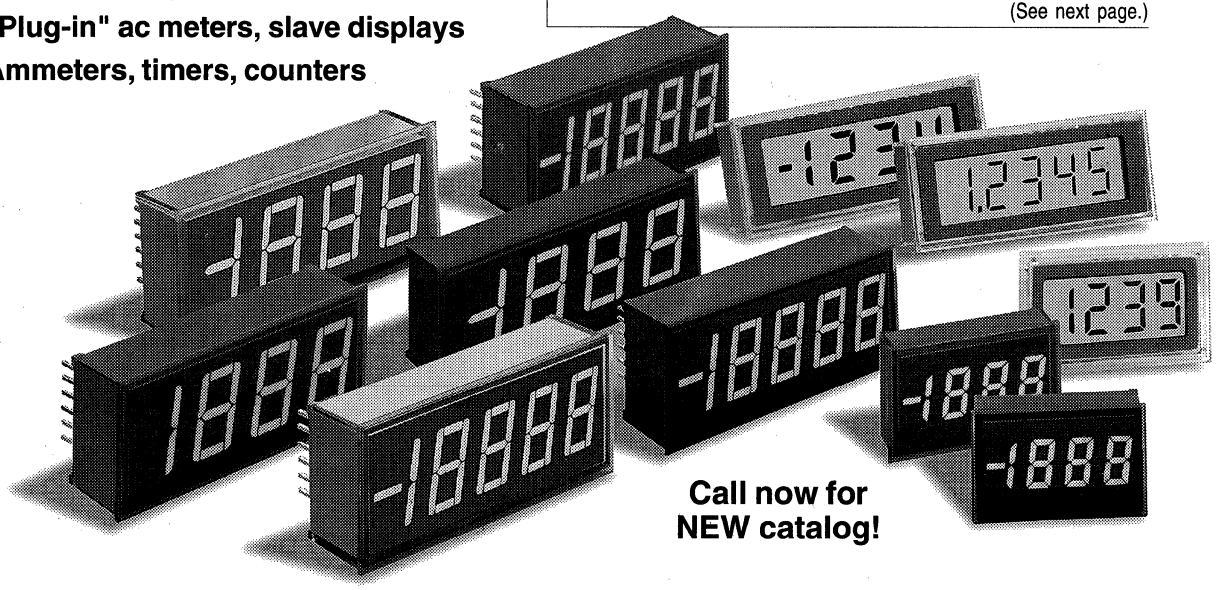
- **Low cost! Prices starting at $15!**
- **3½ digit or 4½ digit resolutions**
  Auto-calibration, ±1 count accuracy
- **12-pin, DIP-style, plug-in packages**
  Panel or pc-card mountable
  Moisture and vibration proof
- **Ultra-small packages**
  1.38" x 0.88" x 0.43" (3½ digit, LCD)
  2.17" x 0.92" x 0.43" (4½ digit, LCD)
- **Exceptionally large displays:**
  0.56" LED's or 0.40" LCD's
- **Numerous display options:**
  7 LED colors, low-power LED's
  High-intensity LED's, backlit LCD's
- **Operation from +5V or +9V supplies**
- **Low-cost "application boards"**
- **"Plug-in" ac meters, slave displays**
- **Ammeters, timers, counters**



NEW! 2-Wire Meters

- Two connections - no external power supplies required
- Monitor ac volts, ac frequency, dc volts, 4-20mA and more
- Great replacements for analog meters

(See next page.)



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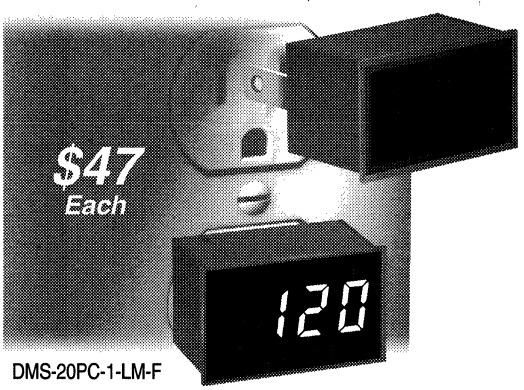
DIGITAL PANEL METERS

Dedicated, 2-Wire "Self-Powered" Meters

Low Prices! Stock Delivery!
Two connections - no external power required
Large, LED or LCD displays with great readability
Small, rugged packages with reliable screw-terminal inputs



DMS-20PC-1-LM-F

AC Voltmeters

- The easiest-to-use products of their type
- 120V model plugs directly into wall outlets
- Screw-terminal inputs simplify panel mounting
- Large, easy-to-read, red LED displays
- Monitor voltages up to 600Vac @50/60Hz
- 3-digit readouts; ±1V accuracies
- Rugged, epoxy-encapsulated construction
- UL, CSA, IEC1010-1 certified

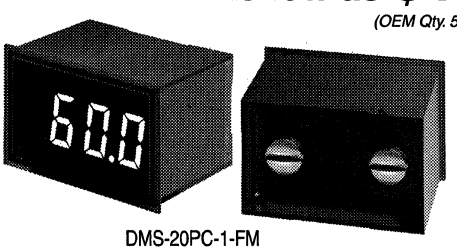
Display Type	Input Range	Resolution	Accuracy	Maximum Current Drain	Package Size (Inches) ① ②	DATEL Part Number	Price (USA, 100's)	Fax Code
LED ③	85-264Vac @ 47-63Hz	1V	±1V	50mArms	1.38 x 0.88 x 1.00	DMS-20PC-1-LM	$40	34210
	85-264Vac @ 47-63Hz	1V	±1V	50mArms	1.38 x 0.88 x 1.00	DMS-20PC-1-LM-F ②	$37	
	85-140Vac @ 350-450Hz 240-310Vac @ 47-63Hz	1V	±1V	50mArms	1.38 x 0.88 x 1.00	DMS-20PC-2-LM	$45	34211
	350-600Vac @ 47-63Hz	1V	±1V	50mArms	1.38 x 0.88 x 1.00	DMS-20PC-3-LM	$45	34212

① Panel-mount front bezels, with or without sealing gaskets, may be ordered separately.
② All ac voltmeters have screw terminals on the back of their packages. The DMS-20PC-1-LM-F has "blade " terminals that plug directly into USA-style wall outlets.
③ All LED displays are red and have a digit height of 0.37"/9.4mm.

AC Frequency Meters

As low as $49
(OEM Qty. 500)

- Ideal for emergency power-generating equipment
- Available in 50/60Hz or 400Hz versions; 120/220Vac inputs
- 3-digit readouts accurate to ±0.1 Hertz (60Hz model)
- Easy-to-read, large (0.4"/10.2mm), red LED displays
- Screw terminals for easy panel mounting
- Rugged, epoxy-encapsulated construction



DMS-20PC-1-FM

Display Type	Input Range	Resolution	Accuracy	Maximum Current Drain	Package Size (Inches) ①②	DATEL Part Number	Price (USA, 100's)	Fax Code
LED ③	47.0-99.0Hz @ 85-140Vac	0.1Hz	±0.1Hz	50mArms	1.38 x 0.88 x 1.00	DMS-20PC-1-FM	$54	34410
	47.0-99.0Hz @ 85-140Vac	0.1Hz	±0.1Hz	50mArms	1.38 x 0.88 x 1.00	DMS-20PC-1-FM-F	$54	
	350-450Hz @ 85-140Vac	1Hz	±1Hz	50mArms	1.38 x 0.88 x 1.00	DMS-20PC-2-FM	$54	
	47.0-99.0Hz @170-264Vac	0.1Hz	±0.1Hz	50mArms	1.38 x 0.88 x 1.00	DMS-20PC-3-FM	$54	

① Panel-mount front bezels, with or without sealing gaskets, may be ordered separately. ② All ac frequency meters have screw terminals on the back of their packages. The DMS-20PC-1-FM-F has "blade " terminals that plug directly into USA-style wall outlets. ③ All LED displays are red and have a digit height of 0.4"/10.2mm.

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INNOVATION and EXCELLENCE

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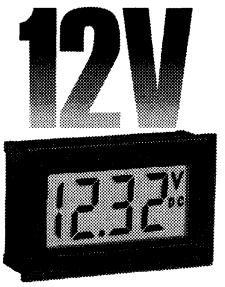
2-Wire DC Voltmeters

12V and 24V Battery Monitoring

- Ideal replacements for analog panel meters
- Monitor 9/12/24/28/36V batteries or power supplies
- ±0.01V accuracy (12V model); 2.5mA max. current (24V model)
- Reverse polarity protected; Built-in "VDC" annunciator



As low as $15
(OEM Qty.)

DMS-20LCD-0-DCM

DMS-20PC-7-DCM

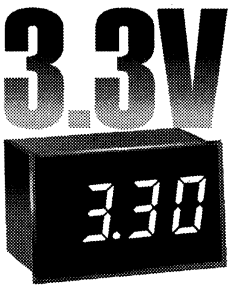
-48V for Distributed Power Systems

- Precision readout for –48Vdc power buses in telecom, datacom and computer/networking equipment
- –36.0 to –75.0Vdc input range
- 0.1V resolution; ±0.1V accuracy
- Negligible power consumption (13mA, max.)

As low as $34
(OEM Qty. 500)

3.3V for Low-Voltage Systems

- Ideal for low-voltage power-supply monitoring
- +2.00 to +6.00Vdc input range
- ±0.01V accuracy; 80mA current drain at 3.3V
- 0.37"/9.4mm high, bright red, LED display



DMS-20PC-3-DCM

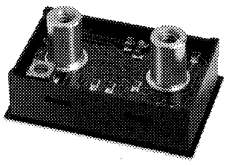
Display Type ①	Input Range	Resolution	Accuracy	Maximum Current Drain	Package Size (Inches) ②	DATEL Part Number	Price (USA, 100's)	Fax Code
LED	+2.00 to +6.00Vdc	0.01V	±0.01V	80mA	1.38 x 0.88 x 1.00	DMS-20PC-3-DCM	$37	34020
	+4.50 to +19.99Vdc	0.01V	±0.01V	13mA	1.38 x 0.88 x 1.00	DMS-20PC-0-DCM	$37	34010
	+8.0 to +40.0Vdc	0.1V	±0.1V	13mA	1.38 x 0.88 x 1.00	DMS-20PC-1-DCM		
	+30 to +264Vdc	1V	±1V	7mA	1.38 x 0.88 x 1.00	DMS-20PC-2-DCM		
	–4.50 to –19.99Vdc	0.01V	±0.01V	13mA	1.38 x 0.88 x 1.00	DMS-20PC-4-DCM	$37	34030
	–18.0 to –50.0Vdc	0.1V	±0.1V	13mA	1.38 x 0.88 x 1.00	DMS-20PC-5-DCM		
	–30 to –264Vdc	1V	±1V	7mA	1.38 x 0.88 x 1.00	DMS-20PC-6-DCM		
	–36.0 to –75.0Vdc	0.1V	±0.1V	13mA	1.38 x 0.88 x 1.00	DMS-20PC-7-DCM		
LCD	+6.50 to +18.00Vdc	0.01V	±0.01V	3mA	1.38 x 0.88 x 0.66	DMS-20LCD-0-DCM	$21	34110
	+8.0 to +40.0Vdc	0.1V	±0.1V	2.5mA	1.38 x 0.88 x 0.66	DMS-20LCD-1-DCM		

① All LED displays are red. Both LED and LCD displays have a digit height of 0.37"/9.4mm.
② Panel-mount front bezels, with or without sealing gaskets, may be ordered separately.

Custom Designs

Lowest Possible Cost!

For high-volume OEM applications, DATEL can quickly and easily modify any of our ac or dc monitors to accommodate your specific needs. For a modest incremental cost, you can have an LCD or LED meter, requiring no external components or trimpots, that displays exactly the readings you want for the input signal levels you are monitoring. Your unique requirement deserves a unique solution! ***Contact our Applications Engineering Group for details.***



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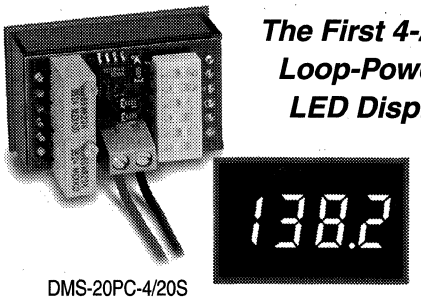
DIGITAL PANEL METERS

Process Control Monitors

4-20mA Local Readouts

- Loop-powered meters with low-power LCD or LED displays
- Externally powered (+5-32V) devices with full-size LED displays
- 3½ digit readouts with ±0.05%FS accuracy
- DIP-switch selectable range and decimal points
- Hundreds of different input/readout combinations
- On-board gain/span and offset/zero adjustments
- Vibration-resistant packages; Reliable screw connectors

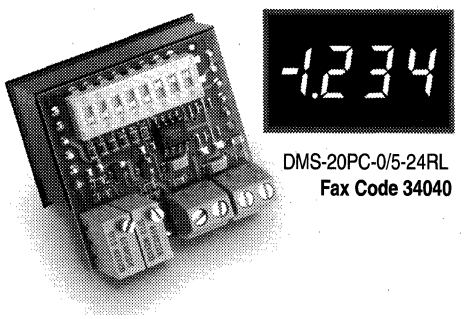


DMS-20PC-4/20S

The First 4-20mA Loop-Powered LED Display!

Display Type	Input Range	Digit Height	Display Color	Power Supply	Package Size (Inches) ① ②	DATEL Part Number	Price (USA, 100's)	Fax Code
LED	4-20mA	0.37"/9.4mm	Low-Power Red	Loop Powered	1.38 x 0.88 x 1.00	DMS-20PC-4/20S	$60	34620
	4-20mA	0.56"/14.2mm	Standard Red ③	Single +5V	2.17 x 0.92 x 1.12	DMS-30PC-4/20S-5RS	$60	34630
	4-20mA	0.56"/14.2mm	Low-Power Red	Single +7.5-32V	2.17 x 0.92 x 1.12	DMS-30PC-4/20S-24RL	$60	
	4-20mA	0.56"/14.2mm	Standard Red ③	Single +5V	2.17 x 0.92 x 1.12	DMS-40PC-4/20S-5RS	$60	34640
	4-20mA	0.56"/14.2mm	Low-Power Red	Single +7.5-28V	2.17 x 0.92 x 1.12	DMS-40PC-4/20S-24RL	$88	
LCD	4-20mA	0.37"/9.4mm	LCD	Loop Powered	1.38 x 0.88 x 1.00	DMS-20LCD-4/20S	$45	34605
	4-20mA	0.4"/10.2mm	LCD	Loop Powered	2.17 x 0.92 x 0.99	DMS-30LCD-4/20S	$60	34610
	4-20mA	0.4"/10.2mm	LCD	Loop Powered	2.17 x 0.92 x 0.99	DMS-40LCD-4/20S	$88	34615

① Panel-mount front bezels, with or without sealing gaskets, may be ordered separately.
② Loop-powered meters require 2 connections. All others require 4 connections . . . 2 for the loop, 2 for the power supply.
③ These models also come in the following display colors: Standard Green (GS), Low-Powered Red (RL) and High-Intensity Red(RH).



DMS-20PC-0/5-24RL
Fax Code 34040

0-5V, 10V Process Monitors

- 4 connections . . . 2 for power, 2 for signal
- +5V or +5-40V supply (10mA current drain @ 24V)
- On-board gain/span and zero/offset adjustments
- Offset adjustable for 1-5V applications
- DIP-switch selectable range and decimal points
- 3½ digit LED display with 0.37"/9.4mm high digits
- 4 LED options: red, green, low-power red, high-intensity red

Digital Panel Voltmeter Accessories

DMS-20 Series

DMS-EB2	Multipurpose application board (4-20mA, gain/offset adjust, etc.)
DMS-20-CP	Panel cutout punch
DMS-BZL3	DMS-20 bezel assembly
DMS-BZL4	DMS-20 bezel with sealing gasket

DMS-40 Series

DMS-EB	Multipurpose application board
DMS-30-CP	Panel cutout punch
DMS-BZL1	DMS-40 bezel assembly
DMS-BZL2	DMS-40 bezel with sealing gasket

DMS-30 Series

DMS-EB	Multipurpose application board (4-20mA, gain/offset adjust, etc.)
RN-DMS	Gain/offset potentiometer kit for DMS-EB
DMS-30-CP	Panel cutout punch
DMS-BZL1	DMS-30 bezel assembly
DMS-BZL2	DMS-30 bezel assembly with sealing gasket
DMS-EB-HTBC/F	Temperature sensor boards (°C or °F)
DMS-EB-DC/DC	Provides isolated +5V power
DMS-EB-TCJ	J-type thermocouple inputs for ±2V models
DMS-EB-TCK	K-type thermocouple inputs for ±2V models
DMS-EB-RMS	For true rms measurements of ac voltages
DMS-EB-AC/DC	For ac line-powered applications
DMS-EB-LP	For 4-20mA loop-powered applications

Also Available

- 0.75 Watt SIP-style dc/dc converters
- 2.5 Watt ac/dc power supplies
- Connectors, terminals and crimp tools
- Bare evaluation boards (DMS-EB, DMS-EB2)
- Three-terminal linear regulators (LM7805)
- See accessories section of DATEL's DPM Databook for detailed information

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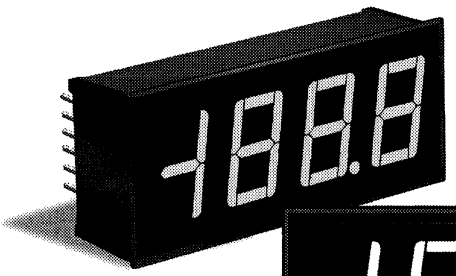
DIGITAL PANEL METERS

3½ Digit, Miniature LED/LCD Voltmeters

DMS-30 Series

- **Fax codes: 30020** (LED displays), **30120** (LCD displays)
- Large displays: 0.56"/14.2mm (LED), 0.40"/10.2mm (LCD)
- 12-pin DIP packages, panel or board mountable
- Low-power LED models (10mA)
- LED and LCD models are pin-compatible
- 4 input ranges: ±200mV, ±2V, ±20V, ±200V
- Built-in color filters and bezels (LED models)
- ±0.05% accuracy (±1 count)
- Moisture/vibration resistant encapsulated packages
- Numerous application boards available



Actual size

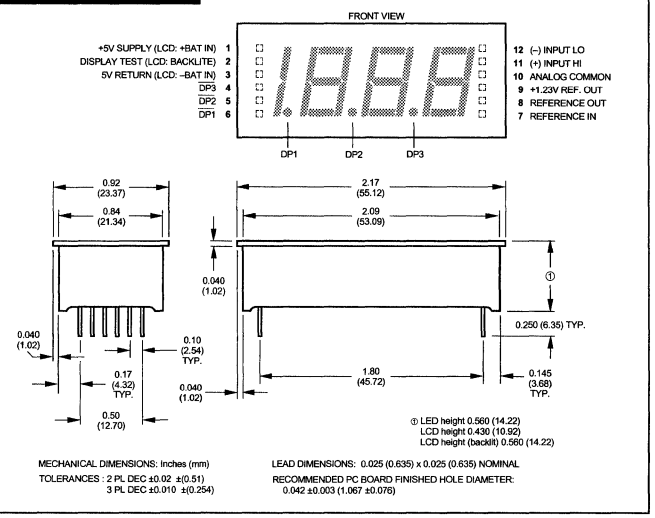
As low as
$28
(OEM Qty. 500)

ELECTRICAL

Typical @ +25°C and +5V supply unless noted

PERFORMANCE	
Accuracy:	
±200mV, ±2V Models	±1 Count
±20V, ±200V Models	±2 Counts
Zero Reading (V_{IN} = 0V)	000 ±1 Count
Polarity Indication	Autopolarity
INPUT	
Full Scale Input	See Ordering Guide
Input Impedance:	
±200mV, ±2V Models	1000MΩ
±20V, ±200V Models	1MΩ
Sampling Rate	2.5 Samples/second
PHYSICAL/ENVIRONMENTAL	
Digit Height	LED: 0.56", LCD: 0.40"
Operating Temperature	0 to +60°C
Storage Temperature	-40 to +75°C (LED)
	-20 to +75°C (LCD)
Humidity	0 to 95% non-condensing

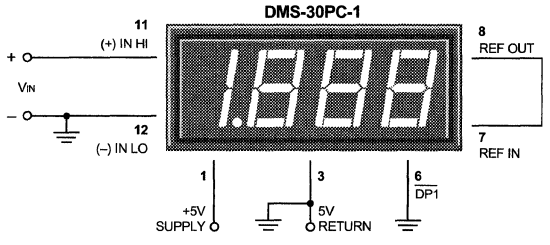
MECHANICAL



MECHANICAL DIMENSIONS: Inches (mm)
TOLERANCES : 2 PL DEC ±0.02 ±(0.51)
3 PL DEC ±0.010 ±(0.254)

LEAD DIMENSIONS: 0.025 (0.635) x 0.025 (0.635) NOMINAL
RECOMMENDED PC BOARD FINISHED HOLE DIAMETER:
0.042 ±0.003 (1.067 ±0.076)

Typical Single-Ended Input Connections (+5V-powered models)



For LED color selection, see DATEL's ad on the inside front cover of this EEM Volume

ORDERING GUIDE

DMS-30PC - 1 - R S

- LED Model
- **Input Range**
  - **0** ±200mV
  - **1** ±2V
  - **2** ±20V
  - **3** ±200V
- **LED Color**
  - **Y** Yellow
  - **O** Orange
  - **A** Amber
  - **R** Red
  - **G** Green
  - **B** Blue
  - **Q** Aqua
- **Intensity/Power (+5V supply)**
  - **S** Standard Brightness
  - **H** High Intensity (Red LED only)
  - **L** Low Power (Red, orange and green LED's only)

See page D•1282 of DATEL section for accessories

DMS-30LCD - 1 - 5 B

- LCD Model
- **Input Range**
  - **0** ±200mV
  - **1** ±2V
  - **2** ±20V
  - **3** ±200V
- **Power Supply**
  - **5** +5Vdc
  - **9** +7.5 to +14Vdc
- Add B for Backlight

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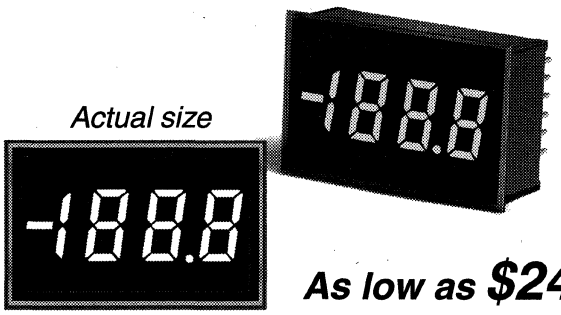
DIGITAL PANEL METERS

3½ Digit, Subminiature LED/LCD Voltmeters

DMS-20 Series

- **Fax codes: 30010** (LED displays), **30110** (LCD displays)
- Large (0.37"/9.4mm) LED or LCD displays
- 12-pin DIP packages, panel or board mountable
- Low-power LED models (7mA)
- Display HOLD function (LED models)
- 4 input ranges: ±200mV, ±2V, ±20V, ±200V
- Built-in color filters and bezels (LED models)
- ±0.05% accuracy (±1 count)
- Moisture/vibration resistant encapsulated package



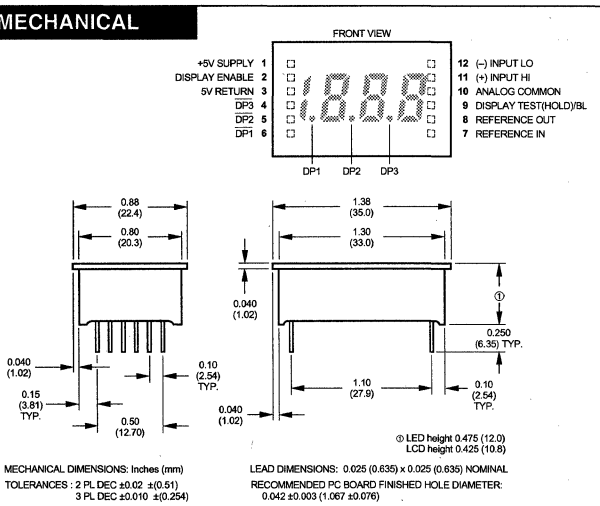
As low as $24
(OEM Qty. 500)

ELECTRICAL

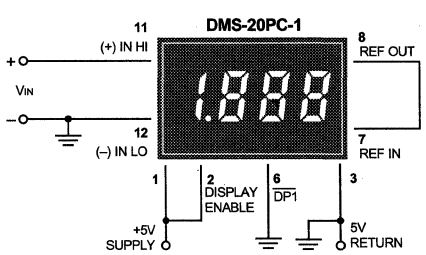
Typical @ +25°C and +5V supply unless noted

PERFORMANCE	
Accuracy:	
±200mV, ±2V Models	±1 Count
±20V, ±200V Models	±2 Counts
Zero Reading (V_{IN} = 0V)	000 ±1 Count
Polarity Indication	Autopolarity
INPUT	
Full Scale Input	See Ordering Guide
Input Impedance:	
±200mV, ±2V Models	1000MΩ
±20V, ±200V Models	1MΩ
Sampling Rate	2.5 Samples/second
PHYSICAL/ENVIRONMENTAL	
Digit Height	0.37"/9.4mm
Operating Temperature	0 to +60°C
Storage Temperature	–40 to +75°C (LED)
	–20 to +75°C (LCD)
Humidity	0 to 95% non-condensing

MECHANICAL



Typical Single-Ended Input Connections (+5V-powered models)



For LED color selection, see DATEL's ad on the inside front cover of this EEM Volume

ORDERING GUIDE

DMS-20PC - 1 - R S - H

- LED Model
- Input Range: **0** ±200mV, **1** ±2V, **2** ±20V, **3** ±200V
- LED Color: **Y** Yellow, **O** Orange, **A** Amber, **R** Red, **G** Green
- Intensity/Power (+5V supply): **S** Standard Brightness, **H** High Intensity (Red LED only), **L** Low Power (Red LED only)
- Hold Function (Red and green standard only)

See page D•1282 of DATEL section for accessories

DMS-20LCD - 1 - 5 B

- LCD Model
- Input Range: **0** ±200mV, **1** ±2V, **2** ±20V, **3** ±200V
- Power Supply: **5** +5Vdc, **9** +7.5 to +14Vdc
- Add B for Backlight

MasterCard VISA

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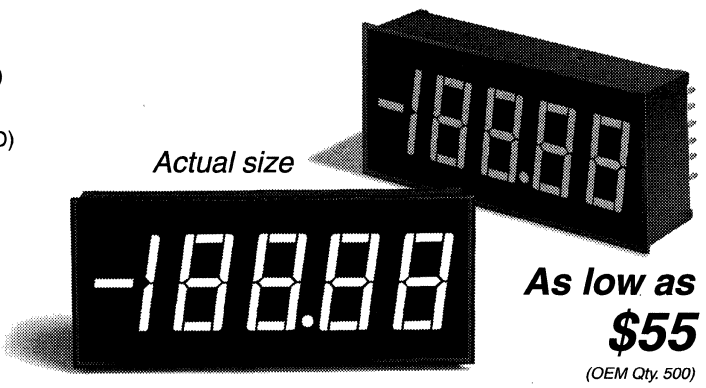
DIGITAL PANEL METERS

4½ Digit, Miniature LED/LCD Voltmeters

DMS-40 Series

- **Fax codes: 31010** (LED displays), **31110** (LCD displays)
- Scientific-grade accuracy, ±2 counts
- Large displays: 0.52"/13.2mm (LED), 0.40"/10.2mm (LCD)
- 12-pin DIP packages, panel or board mountable
- Low-power LED models (35mA)
- Display HOLD function standard
- 4 input ranges: ±200mV, ±2V, ±20V, ±200V
- LCD models have dual input ranges
- Built-in color filters and bezels (LED models)
- Moisture/vibration resistant encapsulated packages



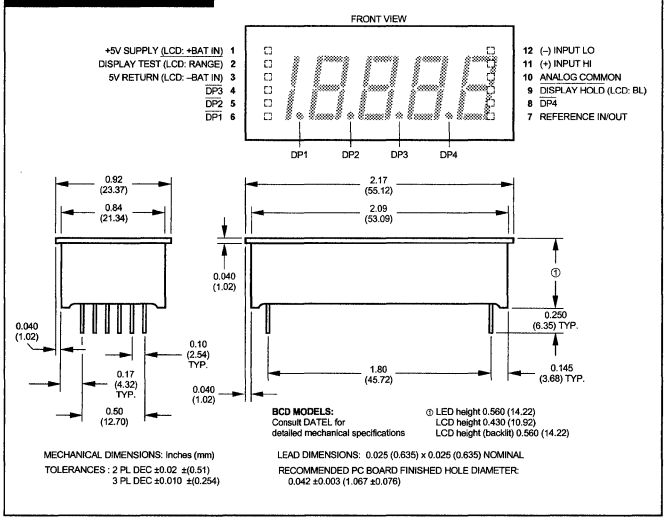
As low as $55
(OEM Qty. 500)

ELECTRICAL

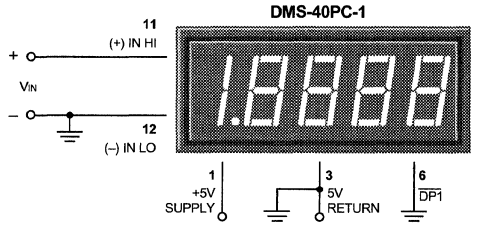
Typical @ +25°C and +5V supply unless noted

PERFORMANCE	
Accuracy:	
±200mV/±2V Models	±2 Counts
±2V/±20V Models	±3 Counts
±20V/±200V Models	±3 Counts
Zero Reading (V_{IN} = 0V)	0000 ±1 Count
Polarity Indication	Autopolarity
INPUT	
Full Scale Input	See Ordering Guide
Input Impedance:	
±200mV/±2V Models	1000MΩ
±2V/±20V Models	1MΩ
±20V/±200V Models	1MΩ
Sampling Rate	2.5 Samples/second
PHYSICAL/ENVIRONMENTAL	
Digit Height	LED: 0.52", LCD: 0.40"
Operating Temperature	0 to +50°C
Storage Temperature	–20 to +75°C
Humidity	0 to 95% non-condensing

MECHANICAL



Typical Single-Ended Input Connections (+5V-powered models)



For LED color selection, see DATEL's ad on the inside front cover of this EEM Volume

ORDERING GUIDE

DMS-40PC - 1 - R S - BCD

Optional BCD output (Red LED, standard and low-power models only)

LED Model

Intensity/Power (+5V supply)
- **S** Standard Brightness
- **H** High Intensity (Red LED only)
- **L** Low Power (Red LED only)

Input Range
- **1** ±2V
- **2** ±20V
- **3** ±200V

LED Color
- **Y** Yellow
- **R** Red
- **G** Green

See page D•1282 of DATEL section for accessories

DMS-40LCD - 0/1 - 5 B

LCD Model

Add B for Backlight

Input Range
- **0/1** ±200mV/±2V
- **1/2** ±2V/±20V
- **2/3** ±20V/±200V

Power Supply
- **5** +5Vdc
- **9** +7.5 to +14Vdc

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If you have a specific type of control meter need...call DCI, we can help you. For more information call DCI. PHONE 913-782-5672, or FAX if you like 913-782-5766
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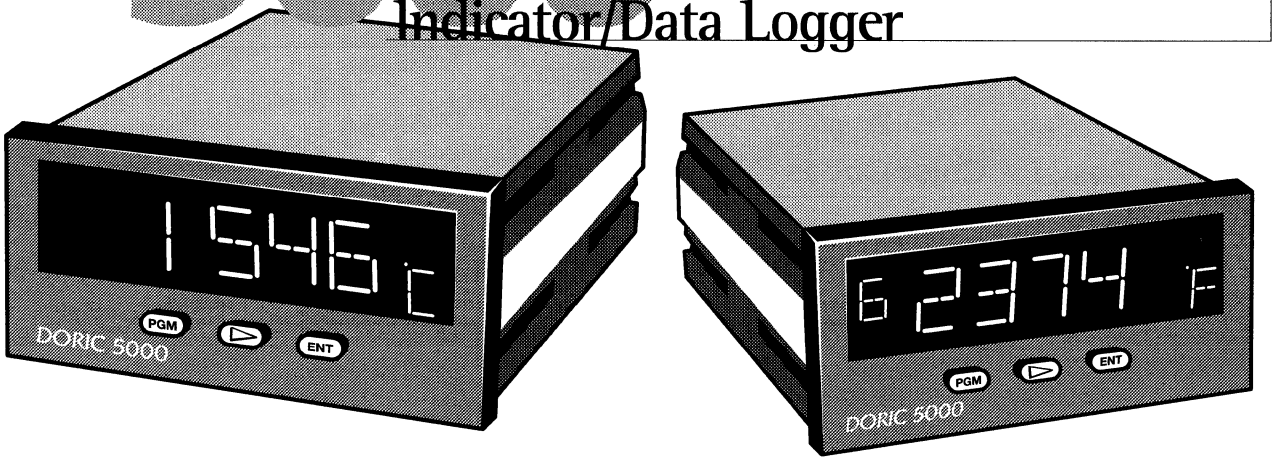
Doric 5000

NEW

DORIC

Programmable Digital Temperature Indicator/Data Logger



The new Doric 5000 Series of single and multiple channel digital temperature indicators sets the new standard for performance, features and value. With full front panel programmability, RS232 serial communications and powerful Windows-based software, the Doric 5000 is ideal for monitoring, testing and process control applications.

Specifications

- Thermocouple inputs (J, K, R, S, T, E)
- Platinum RTD inputs (.00385 and .00392)
- Resolution: 1° or 0.1°
- Repeatability: ±1 count
- Accuracy: 1°±0.03% of reading
- Stability: 0.8% per year
- 4-digit alpha-numeric display
- °F/°C indicator
- Built-in min/max
- Break detect: up scale @ 50nA
- Universal power supply (100-240VAC, 50-400 Hz)
- 1/8 DIN

Using the Doric 5000 Viewer™, powerful Windows-based software, you can:

- **Configure, program and download**
- **View all channel data, alarm status and min/max values simultaneously**
- **Log real-time data**
- **Create exportable data files**
- **Label each channel**

Options*

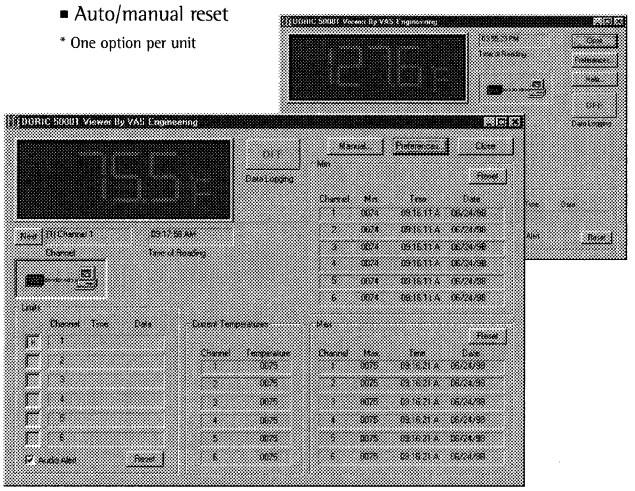
Multiple Inputs

- Up to 6 thermocouples or 3 RTDs
- Differential inputs
- Auto/manual scanning
- LCD channel indicator
- Individual programmable set points
- Relay (5A/120V, form-C) output

Analog Outputs/Dual Alarms

- Scalable 4-20mA/0-10V analog output
- Programmable hysteresis, delay and deviation
- Two relay (5A/120V, form-C) outputs
- Auto/manual reset

* One option per unit



Also available with 1 week delivery: popular Doric models 245, 400, 450, 500 and 600

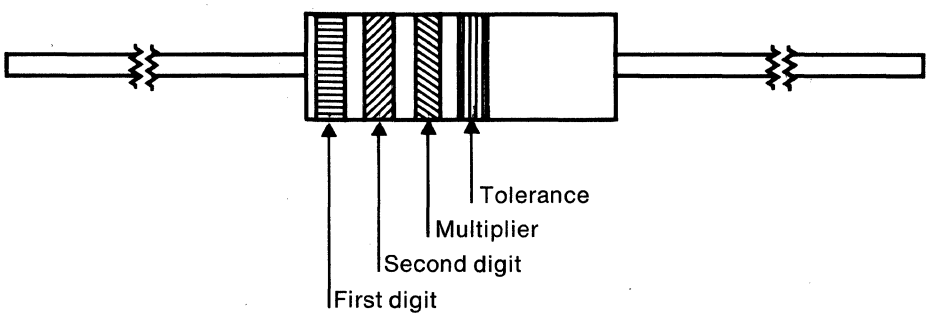
Doric Division, VAS Engineering, Inc.

4750 Viewridge Ave San Diego, CA 92123 (619) 569-1601 (619) 569-8474

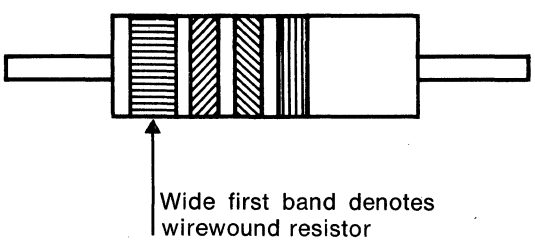
www.doric-vas.com

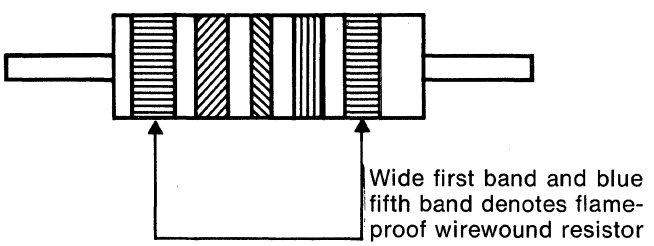
MINIGLOSSARY
RESISTOR COLOR CODES

EIA/MIL Resistor Color Codes



Color code for general-purpose industrial resistors

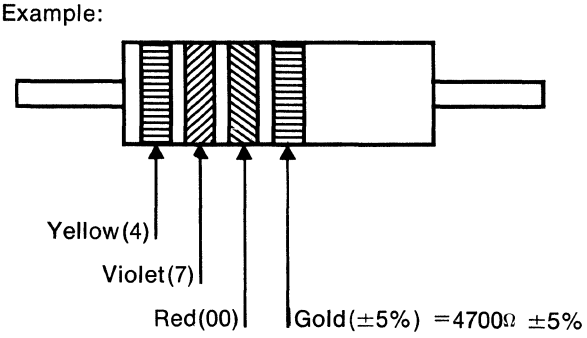




Color code for general-purpose wirewound resistors

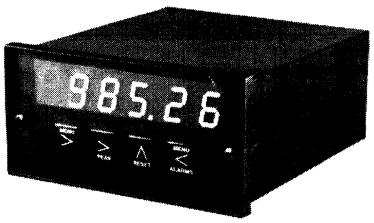
Color	Significant digit	Multiplier	Tolerance
Black	0	1	—
Brown	1	10	± 1%
Red	2	100	± 2%
Orange	3	1000	± 3%
Yellow	4	10,000	± 4%
Green	5	100,000	—
Blue	6	1,000,000	—
Violet	7	10,000,000	—
Gray	8	—	—
White	9	—	—
Gold	—	0.1	± 5%
Silver	—	0.01	±10%
No color	—	—	±20%

Example:



ELECTRO-NUMERICS, INC.
42213 Sarah Way, Temecula CA 92590
Tel: (909) 699-2437, Fax: (909) 695-7246
1-800-854-8530

DIGITAL INDICATORS



Micro Series
(1/8 DIN Case & 0.56" LED's)

Mighty Series
(1", 2 1/4" or 4" Tall LED's)

Micro-P & Mighty Series

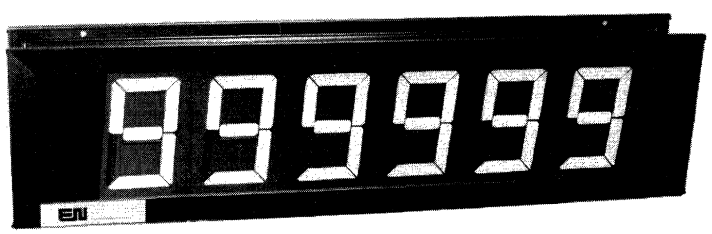
Process Indicators

- 5 Digit (99,999), Red or Green Display
- Scalable by Front Panel Pushbuttons
- 60 Conversions for Fast Control Response
- Peak Hold & Auto Tare
- Plug-in Signal Conditioners for:
  - DC or AC Voltage, Current & Process Loops
  - Thermocouple & RTD Temperature
  - 6-Wire Load Cells
  - Serial Input Remote Displays
- RS232 & RS485 Serial Communication
- Dual Setpoints and Analog Outputs
- 5, 10 or 24V Transducer Excitation Outputs
- AC & DC Worldwide Meter Power

Micro-C & MightyC Series

Counters & Timers

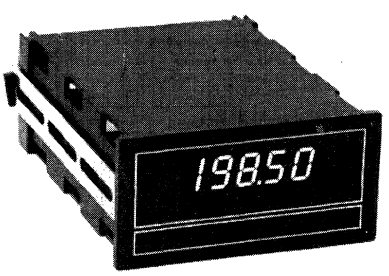
- 6 Digit (999,999), Red or Green Display
- Scalable by Front Panel Pushbuttons
- 2 Channel Input With Independent Scale & Offset For Each Channel.
- Plug-in Signal Conditioners For:
  - Voltage & Current (V/F Conversion)
  - Rate, Total, Frequency, Period & Phase
  - Time Interval, Stop Watch & Square Root
  - Quadrature, Position & Length
- RS232 & RS485 Serial Communication
- Dual Setpoints and Analog Outputs
- 5, 10 or 24V Transducer Excitation Outputs
- AC & DC Worldwide Meter Power



Large Digit Displays

For Outdoor or In-plant Use

- Bright Fluorescent "Flip Digits"
- 4 (9,999), 5 (99,999) or 6 (999,999) Digit Models
- 2 1/4", 4", 6" or 9" Tall Digits
  - Timers, Presettable Counters, "Scoreboards"
  - Weight Indicators, Time-of-Day Clocks,
  - Process Indicators (4/20mA, 0/10V)
- RS232 Serial Input Remote Displays
- Custom Designs and Configurations



Low Cost Meters

DIN Series DPM's

- High Quality with Bright LED Digits
- 3 1/2 (1,999) & 4 1/2 (19,999) Digit Displays
- Process Voltage & Current Loop Inputs
- DC Voltmeters & Ammeters
- Easy Scaling & Setup
- AC & DC Meter Power
- Standard 1/8 DIN Panel Mount

Web Site: http://www.electronumerics.com **Email:** Sales@electronumerics.com

EXTECH INSTRUMENTS

A complete selection of Panel Instruments for all your system needs

1/8 DIN Models

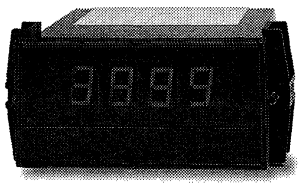
Temperature Indicators

- 390 SERIES (shown) with big 0.8" digits for J,K Thermocouples (**$79**) or RTD (**$59**) inputs
- AC powered, popular 4028 SERIES **$159**
- Miniature modules from **$19**

AC Power Monitors

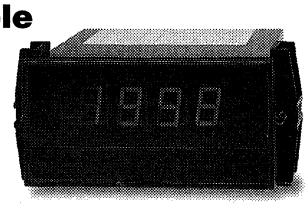
- V3050 SERIES (shown) of AC Watt and VAR meters accept direct or ratio inputs with 3999 display of active and reactive power **from $329**
- Power Factor Meter, Model V3060A1, measures single or three phase **$329**
- Programmable AC Indicator, Model M3000AS, displays AC voltage and current **$129**
- Model M8000AS, Triple Input Frequency Meter/Tachometer accepts inputs from AC power lines and TTL/CMOS **$149**

Programmable AC & DC Alarms



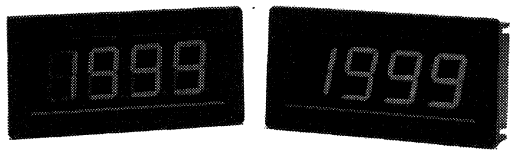
- Series (shown) of user programmable displays with setpoint and relay output
- M1050AS SERIES accepts wide variety of DC mA, voltage, and process signals. Available with 24VDC excitation voltage **$199**
- M3050AS SERIES accepts wide variety of AC mA, voltage, and 5A AC signals direct from PTs and CTs **$229**

Programmable AC and DC Indicators

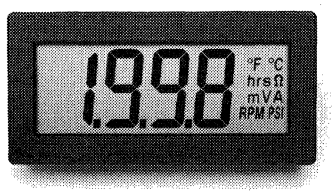


- Model M1001AS monitors DC voltage, current and 4-20mA process inputs **$99**
- Model M3000AS (shown) displays AC voltage and current **$129**
- V SERIES models with high resolution display current or voltage inputs in engineering units of choice from **$209**

Big Digit Panel Meters



- 3-1/2 digits with large digit height .98" LCD or 0.8" red or green LED displays
- New slimline design is only 1.37" (35mm) deep, ideal for applications with limited panel space
- Snap in panel mount design
- 5V DC and Loop Powered models
- DC, 4-20mA, Thermocouple, and RTD inputs
- 9 large user selected annunciators on Loop Powered LCD (shown below)



DC Input Models $59
Loop Powered Models $69

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Single unit prices shown, OEM discounts available

Call or fax for name of local distributor

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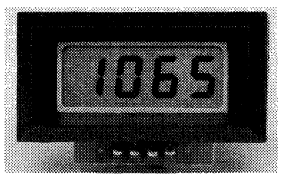
Calibrators, Controllers, Scanners and Panel Meters for all your Process needs

EXTECH INSTRUMENTS

1/8 DIN Panel Tachometers

- Model M8000AS (shown) Triple Input Frequency Meter/Tachometer accepts inputs from AC power lines and TTL/CMOS **$149**
- Model 461950 provides continuous and accurate readings from 5-99,990 RPM **$139**

Miniature LCD/LED Modules

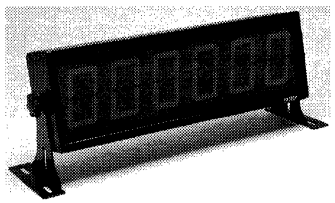


- 39035 SERIES display voltage, thermocouple, or 4 to 20 mA inputs in 3-1/2 or 4-1/2 digits LCD (0.5") is 9V or 5V powered from **$49**
- Miniature temperature indicators from **$19**
- G920 SERIES of multirange LED panel meters accept DC voltage and current inputs from **$79**

Calibrators for Current, Voltage & Temperature

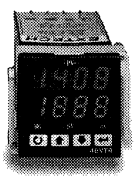
- Process Calibrator MultiMeters (shown) combine DC mA, Voltage and frequency (Model CMM-15) or DC mA and voltage (Model CMM-13)
- MicroCal precision multifunction calibrator, Model 423940, simultaneously sources and measures thermocouples, RTDs, mV, mA, and ohms with 0.03% accuracy.
- Unical Series are precision single function calibrators for current, voltage, thermocouples and mV, or RTD and Resistance. **From $499**

Big Digit Displays



- Single or dual display models with 4" and 2.3" high red LEDs with 4000 or 20000 counts for 4-20mA current, voltage, or temperature
- Counter (6 digit LED) or Tachometer/Surface speed (5 digit LED) models with 2.3" display
- From **$499**

Controllers



VTR Series

- VTR SERIES (1/4 or 1/16 DIN) models for programmable PID control with one touch autotune, dual alarms, dual control, and optional RS-232/485 **from $179**
- V4035 SERIES (1/8 DIN) alarm or control from measurements of DC current, DC voltage, thermocouple, or RTD inputs **$349**
- 1/4 DIN Model 583 (analog setpoint) and Model 584 (digital setpoint) provide ON/OFF or proportional control plus Limit Alarm **$179**
- 48pH (1/16 DIN) provides dual display of pH & temperature with High/Low setpoints **$229**

1/4 DIN Temperature Scanners

- Models 580200 (AC Powered shown) and 580255 (12VDC Powered) monitor six J or K thermocouples in automatic or manual mode; includes RS-232 interface **$399**
- 58010 SERIES monitor temperatures of up to ten J, K, or T thermocouples or 4-20mA process loops from **$179**

Single unit prices shown, OEM discounts available

Call or fax for name of local distributor

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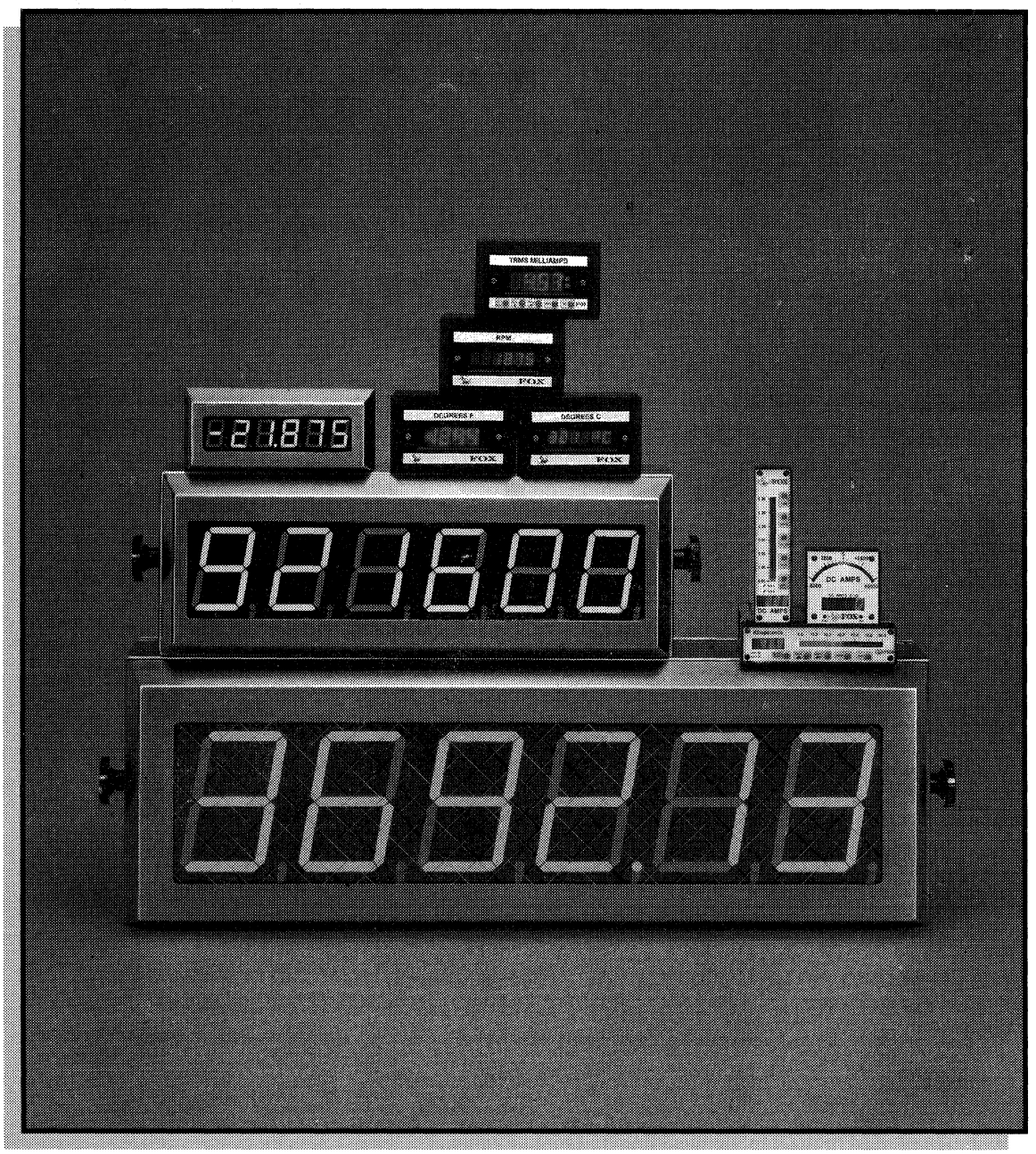

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Page 1

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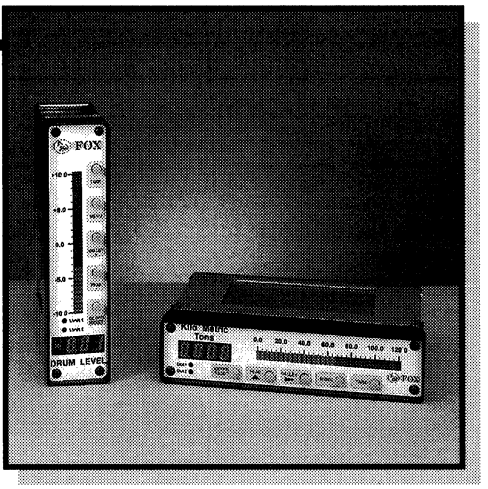
Bargraph Meters



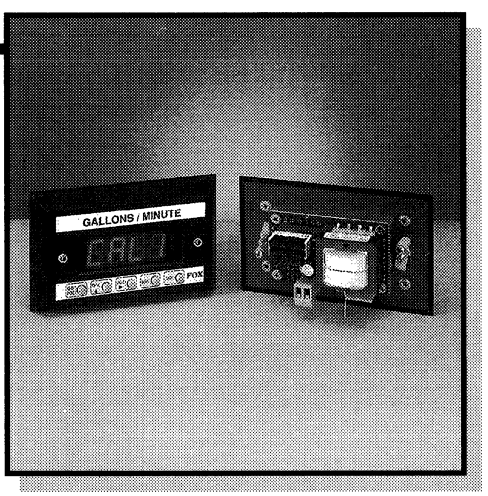
FV & FL100 Series Vertical & Horizontal Bargraphs

FS100 Series Square Face Bargraphs

- *All models accept a wide range of input signals: process signals, DC volts/amps, AC volts/amps, resistance, thermocouple, RTD, strain gauge*
- *NEMA 4X sealed bezels are available*
- *Front panel controls are standard*
- *Front panel controls can be eliminated for tamper proof units with the use of a F000-940 universal programming module*
- *Simple setup and display scaling*
- *User programmable bar modes - top down, bottom up or center zero - filled bar or moving dot*
- ***Low $249.00 starting price***

Series	No. of Digits	Bar Segments	Tri-Color Bar	120 VAC Power	240 VAC Power	5-12 VDC Power	10-30 VDC Power	Relay Outputs	Serial Output	Analog Output	Base Price
FV100	*4*	*31*	*NO*	*YES*	*YES*	*YES*	*YES*	*2*	*NO*	*NO*	*$ 249*
FL100	*4*	*31*	*NO*	*YES*	*YES*	*YES*	*YES*	*2*	*NO*	*NO*	*$ 249*
FS100	*4*	*21*	*NO*	*YES*	*YES*	*YES*	*YES*	*NO*	*NO*	*NO*	*$ 349*

FC Series 1/8th DIN Panel Meters



FC100 Series 4 Digit Processor-Based Panel Meter

- *All models accept a wide range of input signals: process signals, DC volts/amps, AC volts/amps, resistance, thermocouple, RTD, strain gauge*
- *NEMA 4X sealed bezels are standard on FC300 series units*
- *Front panel controls are standard on FC100 series units*
- *Rear mounted set-up controls are standard on FC300 units*
- *Simple front panel setup and display scaling*
- *Peak, valley and tare functions are standard*
- *Available with two optional 200 volt / 1 amp on board relays*
- *Socketed screw terminal connections*
- *Remote control input connector duplicates the front panel controls*
- *Optional 24 VDC @ 30 mA isolated loop excitation available*
- *Mounts directly in standard single gang electrical boxes*
- *Utilizes 16 bit delta-sigma A/D for unparalleled performance*
- ***Low $139.00 starting price (FC300 universal process input)***

Series	No. of Digits	Character Height	Set-Up Controls	120 VAC Power	240 VAC Power	5-12 VDC Power	10-30 VDC Power	Relay Outputs	Serial Output	Analog Output	Base Price
FC100	*4*	*0.6"*	*5 Front*	*YES*	*YES*	*YES*	*YES*	*2*	*NO*	*NO*	*$ 149*
FC300	*4*	*0.6"*	*3 Rear*	*YES*	*YES*	*YES*	*YES*	*2*	*NO*	*NO*	*$ 139*

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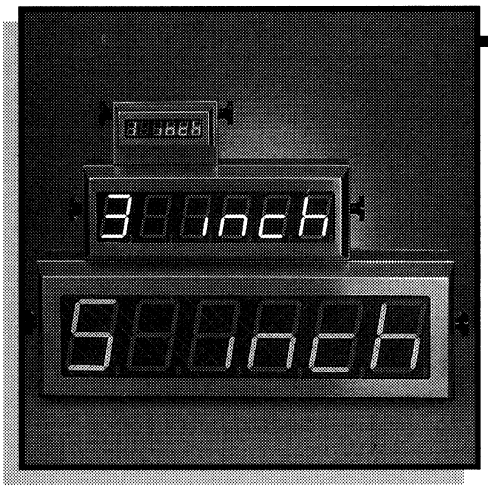


Large Displays

FA Series 1" Tall 6 Digit Tri-Color Panel Display

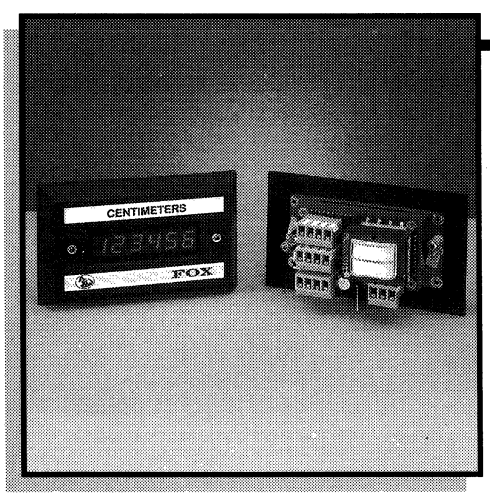
FB & FG Series 3" Tall 4 & 6 Digit Tri-Color Displays

FH & FJ Series 5" Tall 4 & 6 Digit Tri-Color Displays

FK Series 4" Tall 20 Character Text Only, Sunlight Viewable Displays

- *All models are NEMA 4 X standard*
- *All models have stainless steel bezels with glass windows*
- *All models accept a wide range of input signals: RS232, RS422/485, process signals, DC volts/amps, AC volts/amps, resistance, thermocouple, RTD, strain gauge, counts, rate, frequency and time*
- *Stand alone stainless steel enclosures are available*
- *User programmable color changes based on the display value*
- *FK Series (not pictured) alpha-numeric, 16,000 character buffer, scrolling and message control characters, 6 X 8 ultra bright dot pattern*

Series	No. of Digits	Character Height	Tri-Color Digits	120 VAC Power	240 VAC Power	5-12 VDC Power	10-30 VDC Power	Relay Outputs	Serial Output	Analog Output	Base Price
FA	6	1"	YES	YES	YES	NO	NO	2	YES	YES	$ 505
FB	4	3"	YES	YES	YES	NO	NO	2	YES	YES	$ 575
FG	6	3"	YES	YES	YES	NO	NO	2	YES	YES	$ 725
FH	4	5"	YES	YES	YES	NO	NO	2	YES	YES	$ 875
FJ	6	5"	YES	YES	YES	NO	NO	2	YES	YES	$ 1175
FK	20	4"	NO	YES	YES	NO	NO	0	YES	NO	$ 3150



Extended Capability 1/8th DIN

F300/400 Series 6 Digit Processor-Based Digital Input Panel Meters

F500/600 Series 6 Digit Processor-Based Analog Input Panel Meters

- *Models available for a wide range of input signals: RS232, RS422/485, process signals, DC volts/amps, AC volts/amps, resistance, thermocouple, RTD, strain gauge, counts, rate, frequency and time*
- *NEMA 4X Bezels are standard*
- *Simple push button setup, calibration and scaling*
- *Peak, valley and tare functions are standard on analog input meters*
- *Available with two optional 200 volt/1 amp on board relays or up to four external setpoint modules*
- *Socketed screw terminal connections*
- *Optional 24 VDC @ 30 mA isolated loop power supply available*

Series	No. of Digits	Character Height	Input Type	120 VAC Power	240 VAC Power	5-12 VDC Power	10-30 VDC Power	Relay Outputs	Serial Output	Analog Output	Base Price
F300	6	0.4"	Digital	YES	YES	YES	YES	NO	YES	YES	$ 280
F400	6	0.4"	Digital	YES	YES	YES	YES	2/4	YES	YES	$ 335
F500	6	0.4"	Analog	YES	YES	YES	YES	NO	YES	YES	$ 413
F600	6	0.4"	Analog	YES	YES	YES	YES	2/4	YES	YES	$ 448

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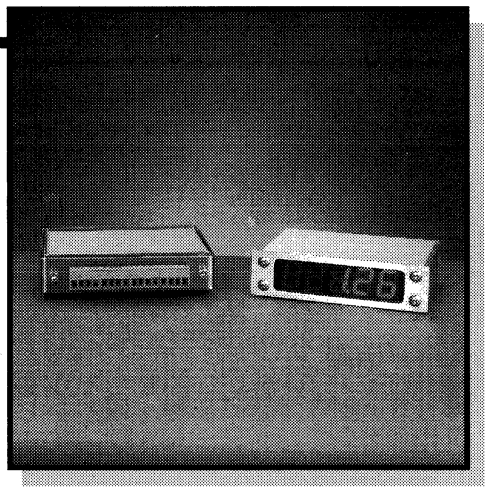
FM100/200/500 Series Panel Meters



FM100 Series Meters Accept Analog Signal Inputs

FM200 Series Meters Accept Digital Signal Inputs

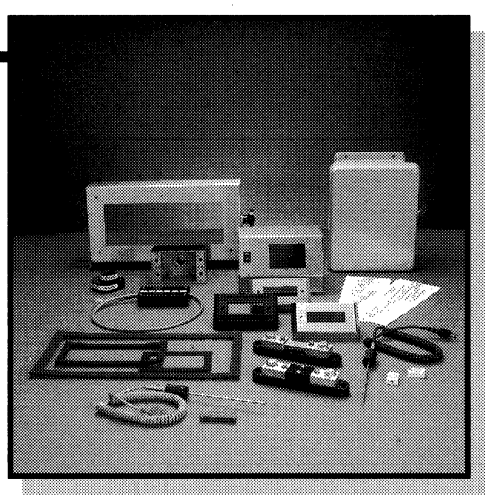
FM500 Series Meters Accept Analog Signal Inputs

- *FM100 models accept a wide range of input signals: process signals, DC volts/amps, AC volts/amps, resistance, thermocouple, RTD, strain gauge*
- *FM200 models accept RS232, RS422/485 serial data, counts, time, rate and frequency*
- *FM500 models accept DC volts and current and process signals*
- *Optional NEMA 4X sealed bezels are available*
- *Stainless steel bezel, enclosure and mounting bracket*
- *Large .6" tall 5 digit led display*
- *FM500 models provide scanned BCD data and associated control I/O*

Series	No. of Digits	Character Height	Input Type	120 VAC Power	240 VAC Power	5-12 VDC Power	10-30 VDC Power	Relay Outputs	Serial Output	Analog Output	Base Price
FM100	5	.6"	Analog	NO*	NO*	YES	YES	2	NO	NO	$ 149
FM200	5	.6"	Digital	NO*	NO*	YES	YES	2	YES	NO	$ 149
FM500	4 1/2	.6"	Analog	NO*	NO*	YES	NO	NO	Scan BCD	NO	$ 239

** To power FM series meters from 120 VAC use the F000-960 plug-in transformer, for 120/240 VAC power use the F000-961 panel mount transformer*

Accessories



Shunts - DC Current Measurement

Current Transformers - AC Current Measurement

Enclosures - NEMA, NEC, Custom Stand Alone

Temperature Probes - RTD, T/C (J,K,T,E)

Pickups - Proximity, Namur, Capacitive, Optical

1/8th DIN Bezels - Grey ABS, Black ABS, Stainless

Consult the factory for accessory details

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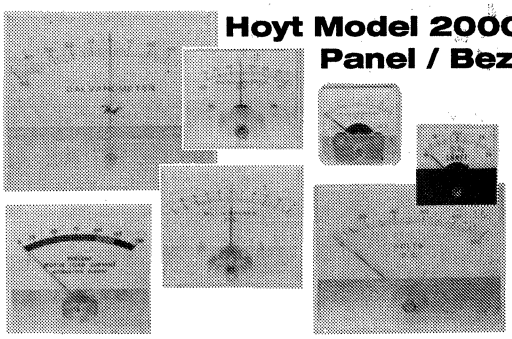
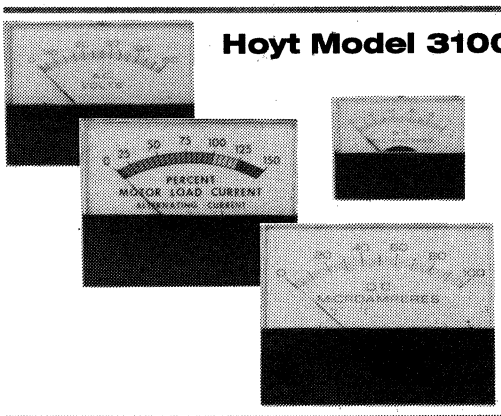
HOYT www.hoytelectric.com Panel Meters



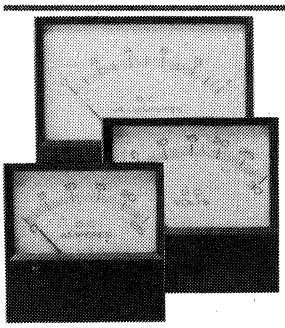
Hoyt Model 2000 Series Panel / Bezel Mount Meters

These attractively styled meters are produced in six sizes from 1-1/2" to 8". All models have long, flat arc scales and knife edge pointers for excellent readability. Most 2-1/2" to 8" metters are supplied with the self shielded Accuring movements. The standard AC repulsion movement is also available in 2-1/2" to 6" meter cases. Features for the 2000 series include matching AC and DC models, bezel or surface mounting, and choice of standard colors on the lower front cover at additonal cost. Standard ranges for this series of meters both AC and DC, are listed on the Hoyt price sheet and include DC Microamps, Milliamps, Millivolts, Volts, and Amps; AC Milliamps, Amps and Volts. Special dials are available at addtional cost with the following options: additional colors, special legends, logos and mirrors.



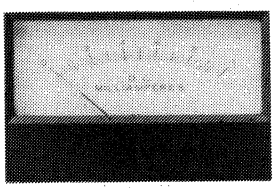
Hoyt Model 3100 Series

The 3100 Hoyt panel meter series consists of a popular industrial styled polystyrene case that is available for surface, window, or bezel mounting applications in four sizes: 1-1/2", 2-1/2", 3-1/2", and 4-1/2". This series of meters is directly equivalent in mounting and specifications to similar styled meters of other manufacturers.
SPECIFICATIONS: Accuracy: ±2% full scale value. **Resistance:** ±15% **Dials:** 100 degree arc, black lettering on white background. Special dial colors and artwork are available as an option. **Movement:** Spring loaded pivot and jewel movement that assures maximum torque and reliability. **D.C. Ranges:** Microammeters, Milliammeters, Ammeters, Millivoltmeters and Voltmeters. **A.C. Ranges:** Millimmeters, Ammeters, and Voltmeters. **Mounting:** Specifiy (HS) Surface mount, (HW) Window mount or (HB) Bezel mount. **Standard Options:** Optioal colors available on lower front cover, mirror dials, Hi-impact polycarbonate or acrylic case materials, suppressed zero ranges, VU meters. **UL Recognized meters available, add -UL** (Example 3135-UL, 0-1 MADC)



Hoyt 4000 Series phenolic and glass meters

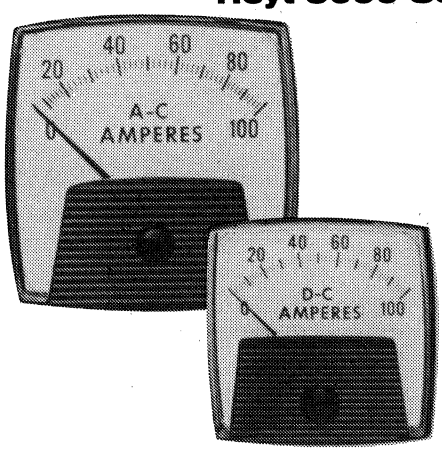
Handsomely styled ot meet the most demanding appearance requirements, this series conforms to the standards for 2-1/2", 3-1/2", 4-1/2" 4 hole mounting to provide for interchanging with other similar size meters. These are high quality instruemnts, available in AC and DC models including D'Arsonval 2% accuracy DC, AC repulsion and rectifier type movements.
Note: **UL RECOGNIZED** VERSION AVAILABLE. TO ORDER ADD **-UL** TO MODEL.



Hoyt 2100 Series low profile phenolic meters

The low profile series of non-static phenolic and glass meters is especially suited for applications where plastic meters are unsuitable or where low, rectangular styling is a must. This series features a clean, uncluttered scale for excellent readability, smooth satin finish front and fast, two stud mounting. While shielded Accuring movement is standard inmost ranges, these meters can be ordered with any Hoyt movement. Matching AC versions are available as are rectifier and VU models.

Hoyt 5000 Series



The **Hoyt 5000 series** is a popular style designed for the harsh environments of power generation and electrical panels. These **Dust resistant** meters feature a unique gasket between the cover and base to seal out air suspended damaging particles. An **Optional panel gasket** is available to seal between your panel and meter. The **UL94V Lexan case material** is ideal where impact resistance and strength is required. The **Mounting studs** on the 5000 series can be custom ordered to fit your existing panel cutouts. This feature enables the user to retrofit your current panels without expensive tool and die changes. **Sizes available** are 1-1/2", 2-1/2", 3-1/2" and can be ordered in most **90 deg. AC & DC ranges** of voltmeters, ammeters, frequency meters. *(1-1/2" available only on DC and AC rectifier).* Hoyt also offers **AC Elapsed Time Indicators** for panel enhancement in the 2-1/2" and 3-1/2" size. The Hoyt 5000 series can be ordered as **UL Recognized** by adding -UL to the model. example (5036-UL)

Hoyt Panel Meters Made In USA

Call Us Toll Free at: 1-800-258-3652

For a complete line catalog, quotation and dimensions, please contact the factory.

Our policy is one of continous development and we reserve the right to supply products different in design and appearance from those described. As development is continous, wer reserve the right to alter specifications without notice.

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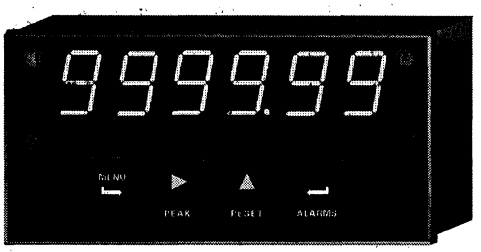


LAUREATE SERIES RATE/TOTALIZER

DPM INPUTS

- DC Volts and Millivolts
- DC Amps and Milliamps
- Process signal - Voltage and Current
- Thermocouples
- RTD's
- Strain Gauges
- Load Cells
- True RMS Volts
- True RMS Amps

COUNTER/TIMER FUNCTIONS

- Frequency
- Period
- Rate and Total
- Phase
- Up/Down Totalizer
- Integrating totalizer
- Square Root
- Time Interval
- Ratio
- A+B, A-B, A*B, A/B
- Draw
- Batching
- Quadrature
- Custom curves

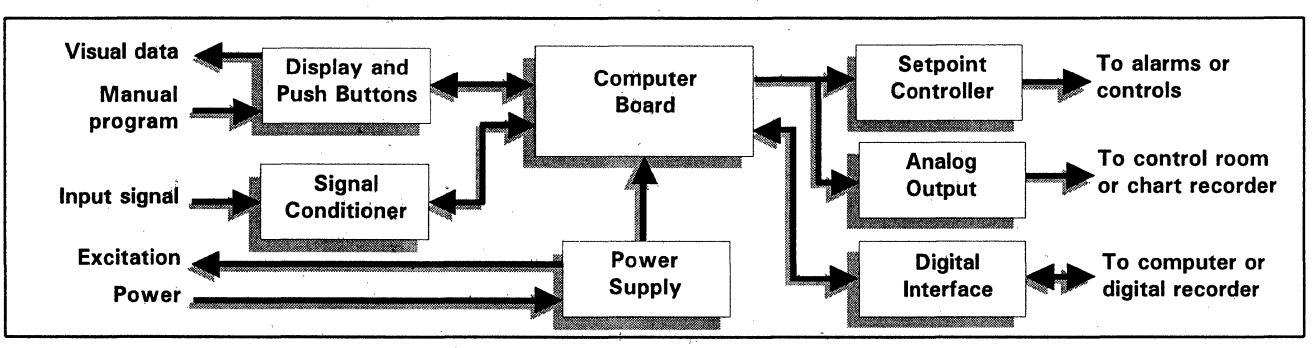
LAUREATE SERIES FEATURES

- Simple meter setup by push buttons or computer
- Multifunction, high resolution meter at single function price
- High read rate for fast control response and true peak value display
- Adaptive filter eliminates noise yet responds rapidly to changes in signal levels
- Isolated 5, 10 and 24 Vdc excitation eliminate the need for external supplies
- Wide range of input power for worldwide use: 85 to 264 Vac and 90 to 370 Vdc
- Designed to meet international safety standards
- Auto tare for zeroing in weighing applications
- 1/8 DIN case for easy replacement of existing meters
- Wash down with high pressure water when mounted in a panel
- Plug-in screw terminals for power and signal inputs

PLUG-IN OPTIONS

- Dual relay or isolated open collector output for alarms or control
- Isolated linearized analog outputs of 0 to 10 Vdc and 0 to 20mA
- Isolated multidrop RS-485, RS-232C, or parallel 3-state BCD
- Isolated low voltage input power: 9 to 37 Vdc and 8 to 28 Vac

LAUREATE CONFIGURATION



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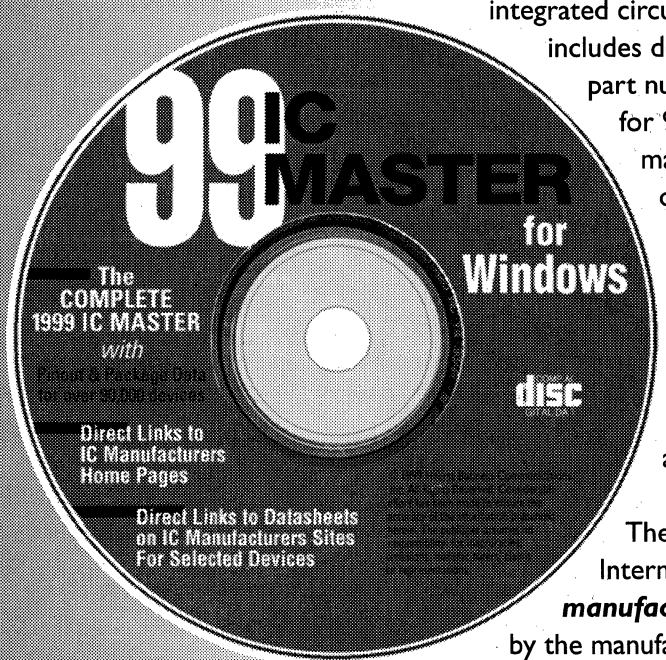

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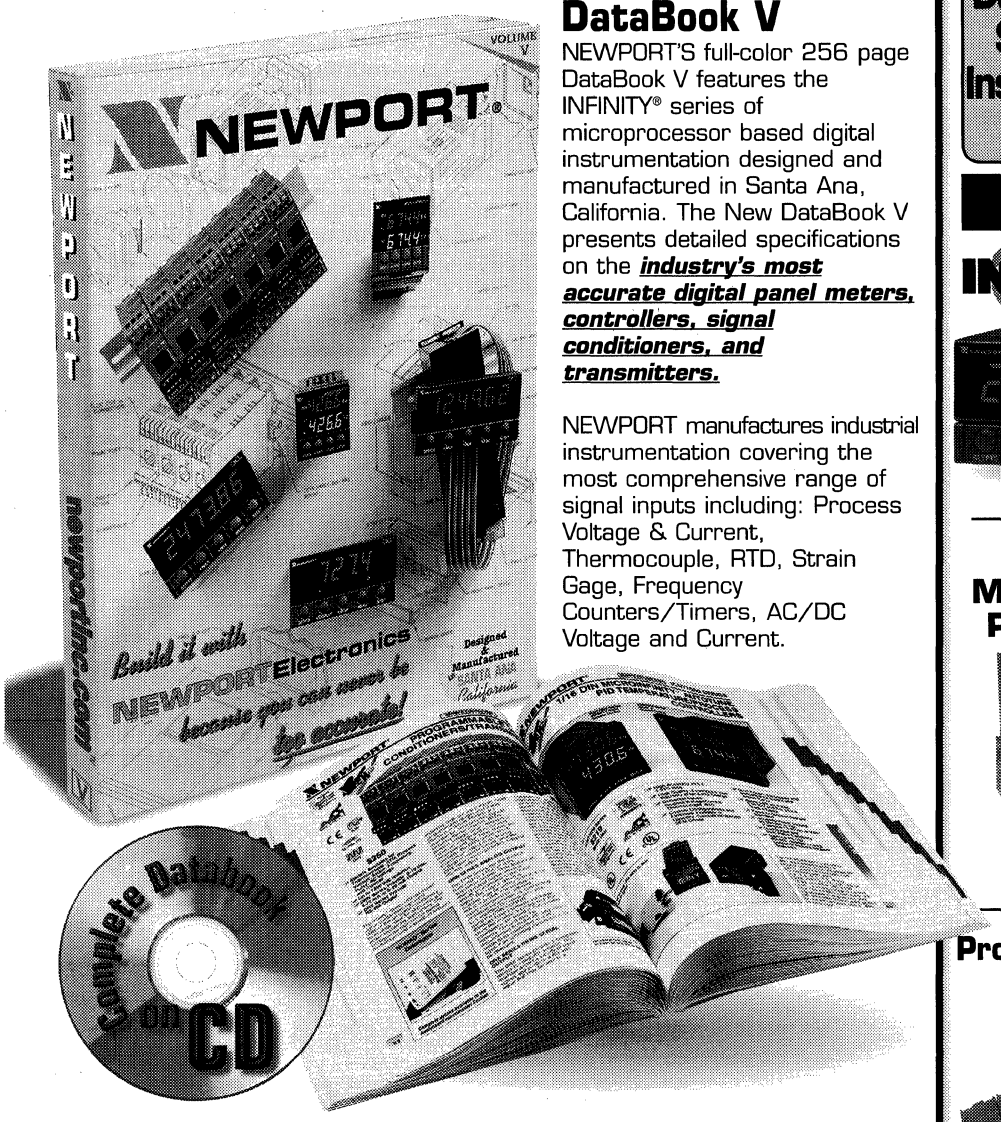
NEWPORT'S full-color 256 page DataBook V features the INFINITY® series of microprocessor based digital instrumentation designed and manufactured in Santa Ana, California. The New DataBook V presents detailed specifications on the ***industry's most accurate digital panel meters, controllers, signal conditioners, and transmitters.***

NEWPORT manufactures industrial instrumentation covering the most comprehensive range of signal inputs including: Process Voltage & Current, Thermocouple, RTD, Strain Gage, Frequency Counters/Timers, AC/DC Voltage and Current.



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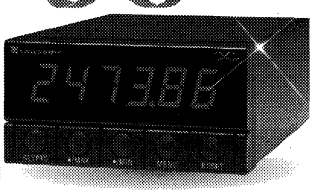
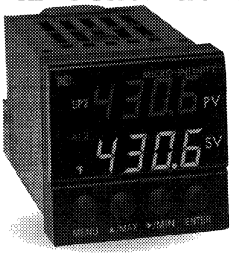
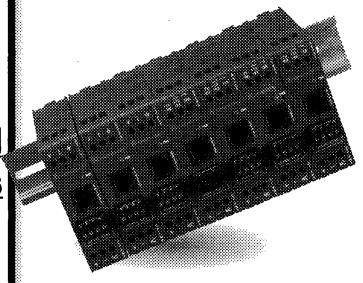


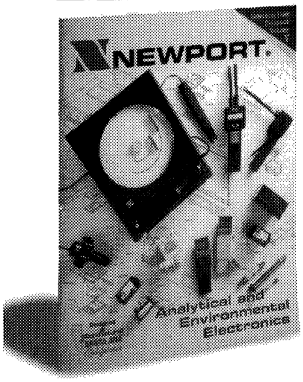
1/16 DIN MICRO-INFINITY® PID Controllers



Programmable Signal Conditioners

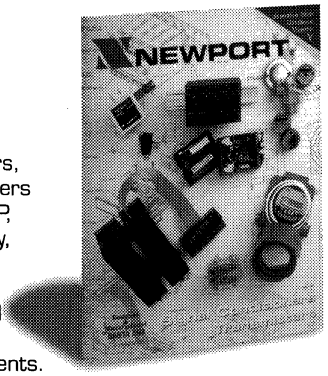


Analytical and Environmental Electronics



features handheld industrial meters, controllers, preamps, transmitters, and recorders for pH, ORP, Conductivity, Humidity, Dissolved Oxygen and related measurements.

Signal Conditioners and Transmitters



is a 32-page selection of instruments from the complete NEWPORT DataBook V. NEWPORT manufactures instruments with fully programmable analog, RS-232 or RS-485 outputs for mounting on DIN rail, in thermowell heads, or in explosion proof housings.

The booklet is a 32-page selection of instruments from the complete NEWPORT DataBook V

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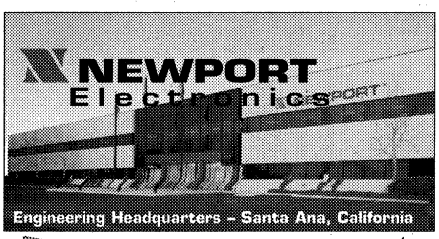

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NEWPORT began manufacturing electronic instrumentation in 1965 and quickly earned a reputation for designing and building the most accurate digital panel meters in the world. We've experienced three decades of consistent growth through our dedication to quality, technological innovation, customer service and support. Today, the NEWPORT line of signal conditioners, transmitters, controllers and meters offers the broadest selection of signal inputs, state of the art technology, and uncompromising accuracy and quality.

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NEWPORT application engineers will assist you today in choosing the right instruments for your needs, and will provide you with unlimited toll-free technical service and support for as long as necessary.

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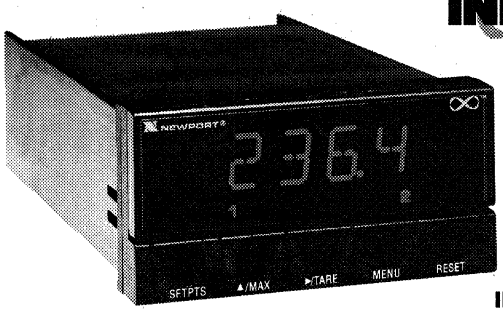
INFINITY® Meters/Controllers



INFCS
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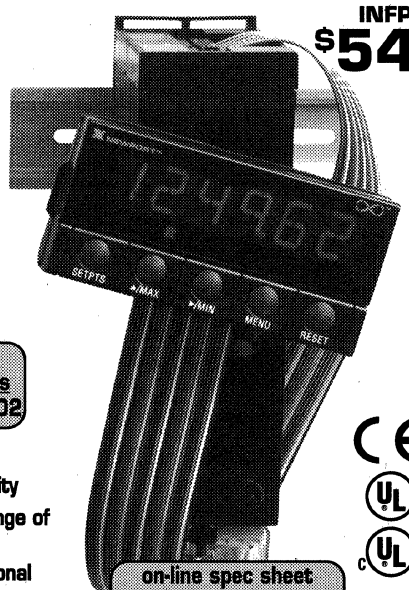
INFINITY® "C" Meters/Controllers

- 4-Digit Display
- Process (DC) Voltage and Current
- AC Voltage and Current (RMS)
- Strain Gage/Bridge/Ratiometric
- Thermocouple, RTD, Thermistor
- Frequency/Rate/Pulse/Totalizers
- Counters/Timers
- pH, ORP, Conductivity
- Scaling in Wide Range of Engineering Units
- Analog Output Optional
- Dual Relays Optional
- Peak Detection and Memory

on-line spec sheet
newportus.com/infcs
New Info Fax doc #202



INFP
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- Highest Accuracy
- Panel Mount or Split Display with DIN Rail Mount Electronics (shown)
- 6-Digit Display
- Four Isolated Open Collector Outputs
- Smart Filtering Detects the Difference Between a Spike or Process Change
- Peak and Valley Detection and Memory
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- 1.5 to 11 or 24 Vdc Sensor Excitation
- Optional RS-232 or RS-485 Serial Communications

on-line spec sheet
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New Info Fax doc #101

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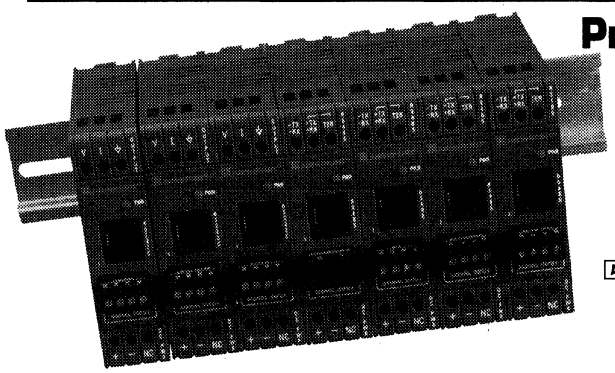


Programmable Signal Conditioners

INFINITY®

DRX-TC
$250

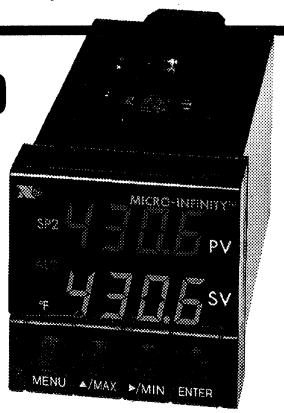
CE

on-line spec sheet
newportus.com/drxtc
New Info Fax doc #584

- Models Available for Thermocouple, RTD, Process Voltage, Strain, Frequency, Pulse, AC Voltage and Current
- 3-Way Isolation, Up to 1800 Vdc Isolation
- DRN Series Provide 0-10 Vdc, 4-20 mA or 0-20 mA Output
- DRX Series Provide RS-485 Output

1/16 DIN MICRO-INFINITY®
Autotune PID Temperature/Process Controllers

ICN77330
$219



- High Accuracy ±0.5°C; 0.03% Rdg. Process
- High Quality–Extended 5-Year Warranty at No Extra Charge
- Universal Inputs–Process Voltage/Current, Thermocouple, RTD
- Custom Configurations and Firmware Available in Quantity–Consult NEWPORT OEM Group
- Dual 4-Digit LED Display and Indicators for Output and Alarm Status
- Dual Output and Dual Alarm Capability
- Relay, SSR, dc Pulse, 0 to 10 V and 0 to 20 mA Output Types

CE UL cUL

on-line spec sheet
newportus.com/icn77330
New Info Fax doc #1582

- Ramp to Setpoint Feature Standard
- Universal Power Supply, 90-250 Vac or Vdc
- Optional RS-232, RS-485, Isolated Analog Output or Remote Setpoint Selection

Handheld Infrared Thermometers

OS520E
$495

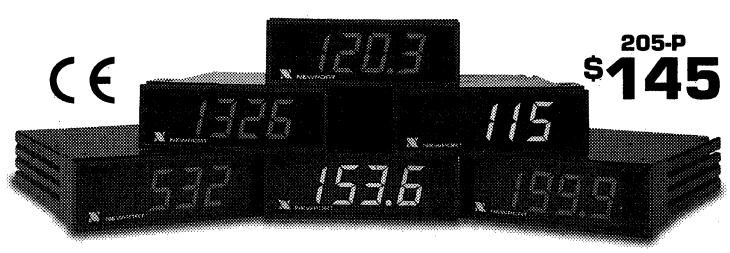
- Backlit LCD Display
- Emissivity Adjustable from 0.10 to 1.00 in 0.01 steps

on-line spec sheet
newportus.com/OS520E
New Info Fax doc #1538

"205" Series Compact Panel Meters

CE

205-P
$145



- DC, T/C, RTD or Process Signal Input
- Analog Output (Temperature Versions Only)
- Removable Screw-Clamp Cable Connector
- Isolated Excitation Output Available
- Display Hold Capability
- 3 $^{1}/_{2}$ Digit Display
- Choice of AC or DC Power
- Full-Size 0.56" (14.2 mm) Red or Green LED Display
- Miniaturized $^{3}/_{64}$ DIN Case with 24 X 72 mm Bezel

on-line spec sheet
newportus.com/205p
New Info Fax doc #702

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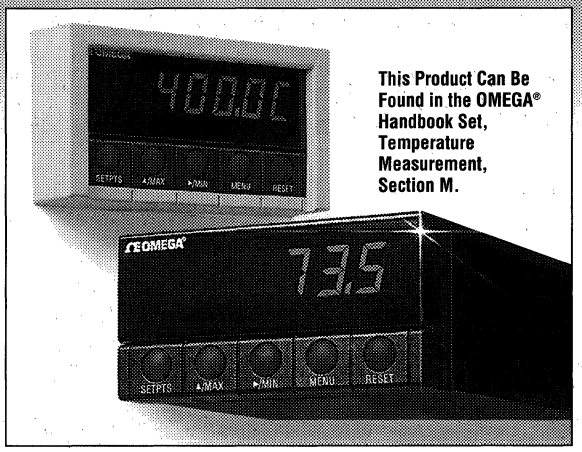
Where Do I Find Process Monitoring and Controlling Instrumentation? OMEGA... Of Course!

Digital Panel Meters, Controllers

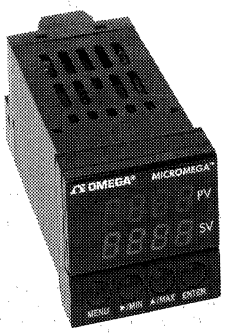
- Temperature
- Pressure and Strain
- Frequency/Rate/ Total/Batch Control
- pH
- ac/dc Voltage and Current
- True RMS Voltage and Current
- Timers
- RS-232 Output Available
- Large Display



This Product Can Be Found in the OMEGA® Handbook Set, Temperature Measurement, Section M.

Wide Selection of Panel Meter Designs

- Sizes from Miniature ¾4 DIN up to Large Displays with 4" High Digits
- Various Temperature, Process, Voltage, Current, Resistance, Potentiometer and Strain Models Available
- Green or Red LED Display
- NEMA-4X Mounting Available for Washdown Applications



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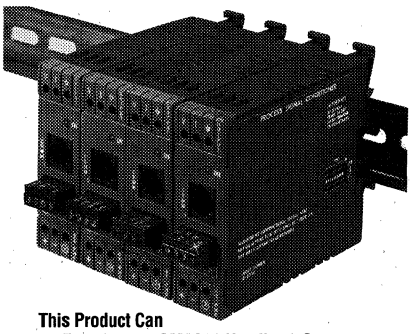


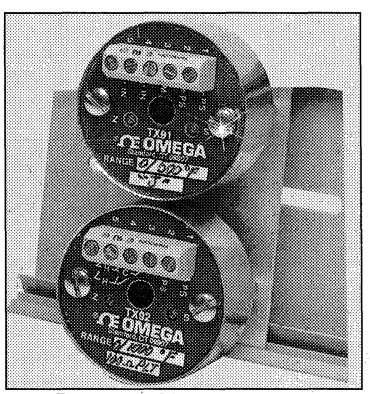
This Product Can Be Found in the OMEGA® Handbook Set, Temperature Measurement, Section N.

DIN Rail Instrumentation

- Transmitters
- Thermocouple Connectors
- Signal Conditioners
- Power Connector Blocks
- Signal Converters

Transmitters

- Thermocouple, RTD, Process Voltage and Current Inputs
- Thermocouple Input with Output Linearized to Temperature
- Compact Sizes to Fit Inside Industrial Protection Head
- "Smart" Transmitters with Available Digital Communications, Relays and Analog Output



This Product Can Be Found in the OMEGA® Handbook Set, Temperature Measurement, Section N page N-13 Vol. 29.

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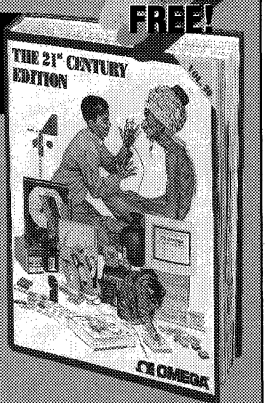

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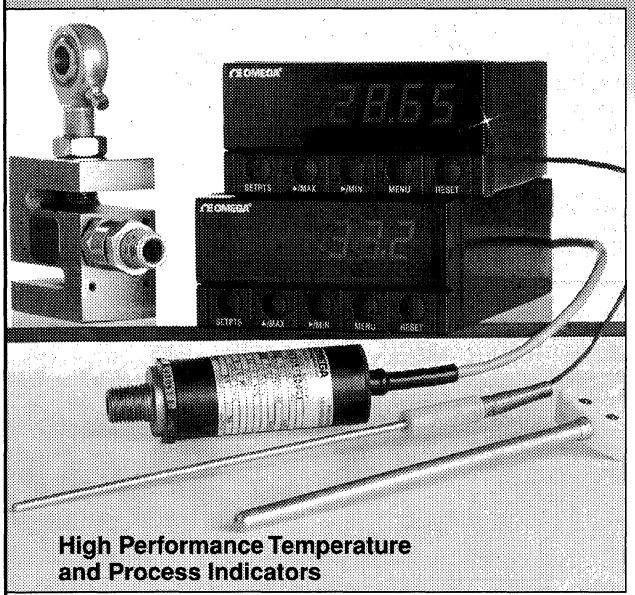
Where Do I Find Process Monitoring and Controlling Instrumentation? OMEGA... Of Course!

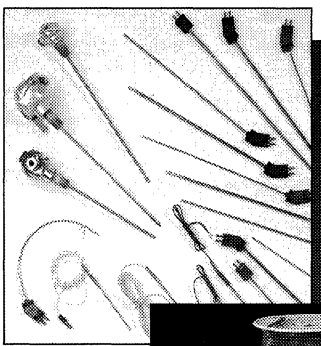


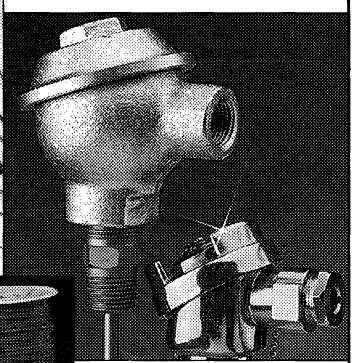
High Performance Temperature and Process Indicators

This Product Can Be Found in the OMEGA® Handbook Set, Temperature Measurement, Section M.

Temperature Probes and Assemblies

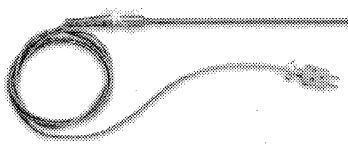
- Fine Gage Thermocouples to Industrial Head and Well Assemblies, Panel and Portable Instrumentation
- Custom Thermocouple Assemblies
- RTD Elements and Probes





This Product Can Be Found in the OMEGA® Handbook Set, Temperature Measurement, Section A.

This Product Can Be Found in the OMEGA® Handbook Set, Temperature Measurement, Section A.



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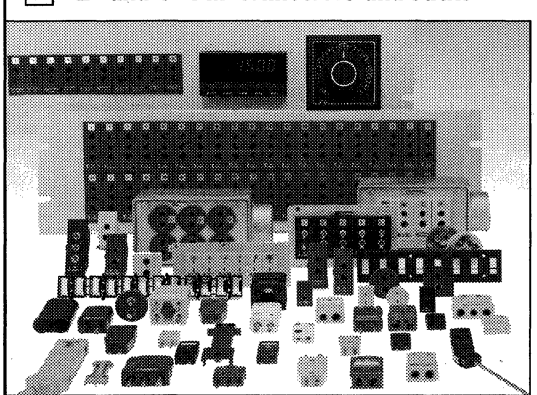
Thermocouple Wire and Accessories

- Variety of Calibrations and Insulation Materials
- Ceramic Insulators, Protection Tubes and Wire Strippers

Panels, Thermocouples, Connectors and Switches

- High-Temperature Liquid Crystal Polymer Connectors
- Standard 19" and Custom Panels
- Rotary Selector Switches with up to 40 Positions
- 2- and 3- Pin Connectors and Jacks



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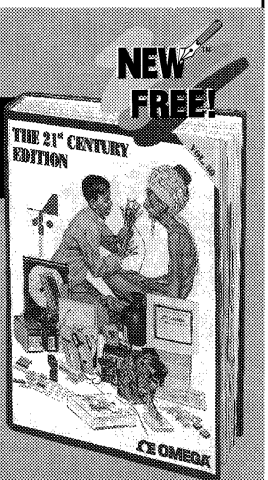

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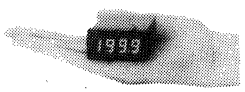
selco/ASAHI Digital Panel Meters

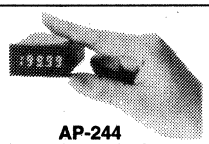
Typical Examples

AP-101
1/8 DIN Size – Low Cost

AP-141
1/8 DIN Size – Low Cost



AP-201A
1/32 DIN Size – Low Cost



AP-244
1/32 DIN Size – BCD Output

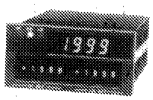
DC Voltage and Current Meters

Features
- All Standard DC Voltage and Current Ranges
- Power Supply: 5, 12, 24 VDC, 120, 240 VAC
- Display: 3½ & 4½ Digits, LED, LCD
- Sizes: 24mm x 48mm, 36mm x 72mm, 48mm x 96mm

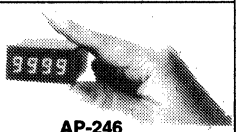
Additional Options
- BCD Output
- RS-232C
- GP-IB

AP-106
1/8 DIN Size – Average

AP-160
1/8 DIN Size – Line Monitor



AM-363
36(H) x 72(W)mm – Peak Hold, Average

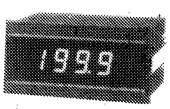


AP-246
1/32 DIN Size – Average

AC Voltage and Current Meters

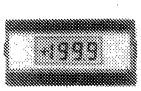
Features
- All Standard AC Voltage and Current Ranges
- Averaging and True RMS
- Power Supply: 24 VDC, 120, 240, VAC
- Display: 3½ & 3¾, 4 Digits LED
- Sizes: 24mm x 48mm, 48mm x 96mm

Additional Options
- BCD Output
- Analog Output

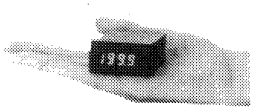


AS-103A
1/8 DIN Size – Zero, Fullscale adjustable

AS-144
1/8 DIN Size – Excitation Supply



AL-501
1/8 DIN Size – Self Powered

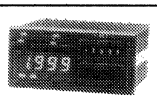


AS-203A
1/32 DIN Size – Zero, Fullscale adjustable

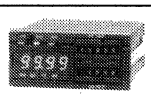
Process Monitors

Features
- All Standard DC Voltage and Current Ranges
- All Standard Process Inputs
- Offset and Full-scale (span) Adjustable
- Power Supply: 5, 24 VDC, 120, 240 VAC
- Display: 3½, 4½ Digits, LED, LCD
- Sizes: 24mm x 48mm, 48mm x 96mm
- Excitation Supply
- Loop Power
- Analog Trend Bar

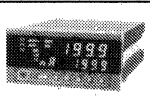
Additional Options
- BCD Output
- Analog Output



AM-112
1/8 DIN Size
One Setpoint

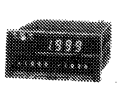


AM-136
1/8 DIN Size
RS-232C



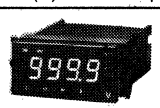
AMH-751
1/8 DIN Size
High Conversion Type

AM-122A
1/8 DIN Size – Analog Output



AM-322
36(H) x 72(W)mm – Two Setpoints

AM-749
1/8 DIN Size – Four Setpoints



AM-342
Setpoint Controller
Compact Size 36 x 72 x 118mm (DIN Size)

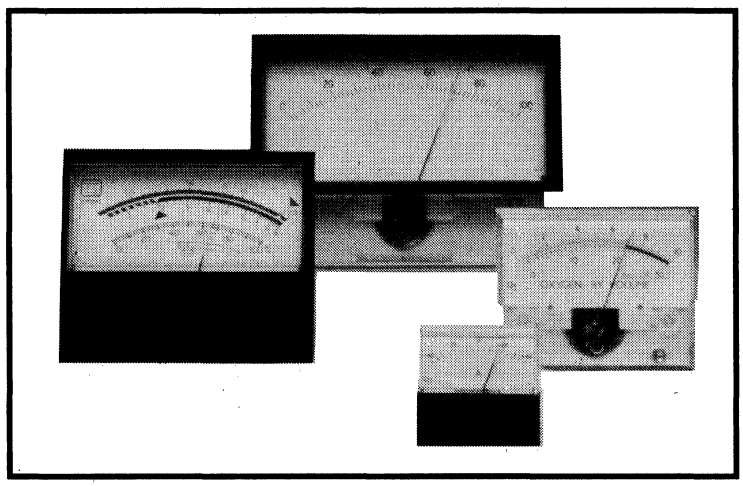
Setpoint Meters

Features
- All Standard DC and AC Voltage and Current Ranges
- All Standard Process Inputs
- Offset and Full-scale (span) Adjustable
- Up to 4 Setpoints
- Relay and Electronic Outputs
- Power Supply: 5, 9-30, 24 VDC, 120, 240 VAC
- Display: 3½, 3¾, 4, 4½ Digits LED
- Sizes: 24mm x 48mm, 36mm x 72mm, 48mm x 96mm
- Excitation Supply

Additional Options
- Peak, Valley, P-V Hold
- BCD Output
- Analog Output
- RS-232C
- RS-485

Selco Analog Panel Meters.

"The Presentor"



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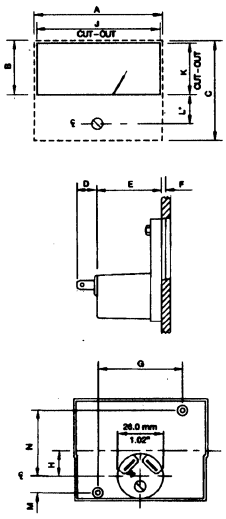
Product - general description

The Presentor range of analog moving coil instruments is available in four sizes each in four styles. The modern flexible styling meets today's stringent design and economic requirements.

Presentor Style W

For back of panel mounting with only the scale and pointer visible.

Types 19W, 29W, 39W, 49W

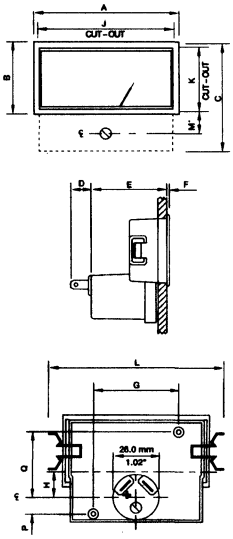


Dim	19W		29W		39W		49W	
	mm	inches	mm	inches	mm	inches	mm	inches
A	43.9	1.73	76.1	3.00	94.0	3.70	124.0	4.88
B	19.9	0.78	31.9	1.25	40.0	1.57	55.0	2.17
C	37.9	1.49	58.8	2.31	72.4	2.85	93.0	3.66
D	11.5	0.45	11.5	0.45	1.5	0.45	11.5	0.45
E	37.2	1.47	38.7	1.52	39.2	1.54	40.3	1.58
F	1.5	0.06	1.8	0.07	2.0	0.08	2.1	0.08
G	32.0	1.26	47.8	1.88	57.2	2.25	92.0	3.62
H	4.7	0.19	15.0	0.59	20.9	0.82	26.9	1.06
J	42.4	1.67	73.7	2.90	91.5	3.60	121.0	4.76
K	20.2	0.80	32.3	1.27	40.5	1.59	55.5	2.19
L	10.0	0.39	16.0	0.63	20.5	0.81	21.5	0.85
M	Fixing studs in same horizontal plane above ℄ 7.0mm/0.28"		9.7	0.38	8.6	0.34	Fixing studs in same horizontal plane above ℄ 7.0mm/0.28"	
N			38.0	1.5	48.5	1.91		

Presentor Style WF

For back of panel mounting with bezel and with only the scale and pointer visible.

Types 19WF, 29WF, 39WF, 49WF

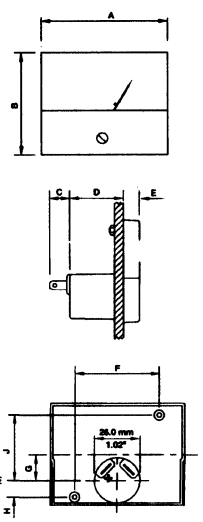


Dim	19WF		29WF		39WF		49WF	
	mm	inches	mm	inches	mm	inches	mm	inches
A	49.2	1.94	82.8	3.26	101.0	3.98	131.0	5.16
B	27.0	1.06	41.6	1.64	50.5	1.99	65.6	2.58
C	40.6	1.60	62.2	2.45	76.1	2.99	96.5	3.80
D	11.5	0.45	11.5	0.45	11.5	0.45	11.5	0.45
E	40.8	1.61	42.9	1.69	43.4	1.71	44.5	1.75
F	1.5	0.06	1.5	0.06	1.6	0.06	1.7	0.07
G	32.0	1.26	47.8	1.88	57.2	2.25	92.0	3.62
H	6.1	0.24	16.7	0.66	22.7	0.89	28.7	1.13
J	47.0	1.85	80.0	3.15	98.0	3.86	128.0	5.04
K	24.0	0.94	37.0	1.46	46.0	1.81	61.0	2.40
L	65.0	2.56	98.0	3.86	116.0	4.57	146.0	5.75
M	8.0	0.31	13.7	0.54	17.7	0.70	18.8	0.74
P	Fixing studs in same horizontal plane above ℄ 7.0mm/0.28"		9.7	0.38	8.6	0.34	Fixing studs in same horizontal plane above ℄ 7.0mm/0.28"	
Q			38.0	1.5	48.5	1.91		

Presentor Style M

For front of panel mounting with mask.

Types 19M, 29M, 39M, 49M

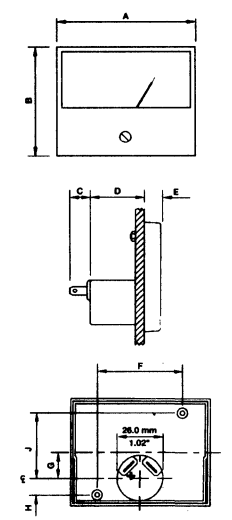


Dim	19M		29M		39M		49M	
	mm	inches	mm	inches	mm	inches	mm	inches
A	43.9	1.73	76.1	3.00	94.0	3.70	124.0	4.88
B	38.8	1.53	60.3	2.37	74.0	2.91	94.6	3.70
C	11.5	0.45	11.5	0.45	11.5	0.45	11.5	0.45
D	31.2	1.23	30.5	1.20	30.2	1.18	30.2	1.18
E	7.5	0.30	10.0	0.39	11.0	0.43	12.2	0.48
F	32.0	1.26	47.8	1.88	57.2	2.25	92.0	3.62
G	4.2	0.17	14.2	0.56	20.0	0.79	26.1	1.03
H	Fixing studs in same horizontal plane above ℄ 7.0mm/0.28"		9.7	0.38	8.6	0.34	Fixing studs in same horizontal plane above ℄ 7.0mm/0.28"	
J			38.0	1.50	48.5	1.91		

Presentor Style B

For front of panel mounting with bezel.

Types 19B, 29B, 39B, 49B



Dim	19B		29B		39B		49B	
	mm	inches	mm	inches	mm	inches	mm	inches
A	46.0	1.81	79.5	3.13	97.5	3.84	127.7	5.03
B	40.0	1.57	61.9	2.44	76.4	3.01	96.6	3.80
C	11.5	0.45	11.5	0.45	11.5	0.45	11.5	0.45
D	31.2	1.23	30.5	1.20	30.2	1.18	30.2	1.18
E	7.5	0.30	10.0	0.39	11.0	0.43	12.2	0.48
F	32.0	1.26	47.8	1.88	57.2	2.25	92.0	3.62
G	4.8	0.19	15.0	0.59	20.8	0.82	26.9	1.06
H	Fixing studs in same horizontal plane above ℄ 7.0mm/0.28"		9.7	0.38	8.6	0.34	Fixing studs in same horizontal plane above ℄ 7.0mm/0.28"	
J			38.0	1.5	48.5	1.91		

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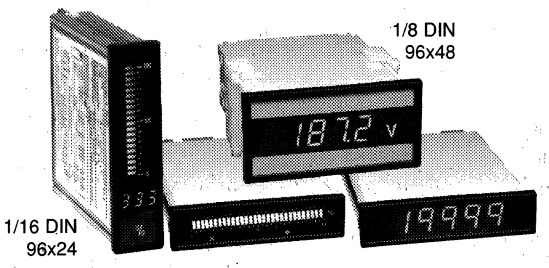
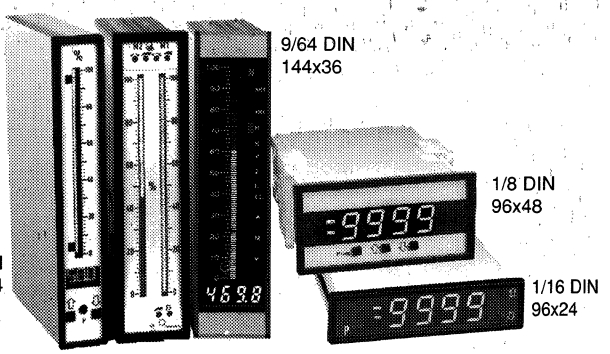
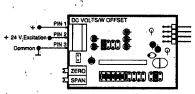


LYNX FAMILY



LEOPARD FAMILY

Single-input signal conditioners work with Lynx, Leopard, Tiger, and Super Tiger Families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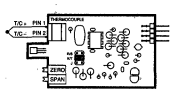
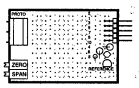
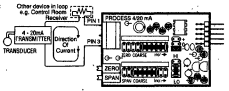
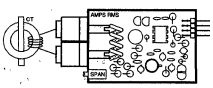
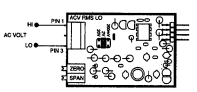
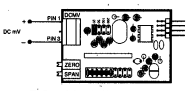

Thermocouple J or K

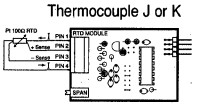

Prototype w/ Ref

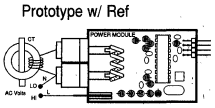

4-20 mA w/ 24V Excitation

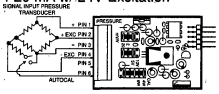

5-amp AC RMS


AC volts RMS

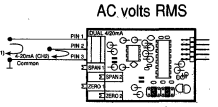

DC mV 20-50-100-200 mV


RTD Pt 100 2-3-4-Wire


Watts 300 V / 5 amp


Pressure w/ 5-10 V Excitation

YOUR CUSTOM-DESIGNED MODULE


Dual 4-20 mA

Lynx Family

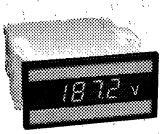
- Basic 3.5 / 4.5 digit meters and bargraphs
- Analog scaling and offset from rear
- Over 24 signal conditioners, single inputs only
- Indication only, no outputs
- Universal auto-sensing AC/DC power supply

Leopard Family

- Smart 4-digit meters, multicolor bargraphs
- Front-panel digital scaling, offset, and setpoints
- Over 28 signal conditioners, single inputs only
- Dual 5-amp relay or single relay plus analog output
- Universal auto-sensing AC/DC power supply
- Transformer power supply for DI-40R

The World's Largest and Most Comprehensive

1/8 DIN Dedicated-Function Meters

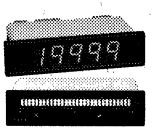


DU Series
- 3.5, 4, or 4.5 digit 0.56" LED display
- 21 dedicated meters measure DC, AC, ACRMS signals
- T/C (J, K), RTD, pressure, and all process signals
- 110/220 VAC or 9-36 VDC / 24 VAC power supply

NEMA Case Low-Cost Utility Meters

UM Series
- 3.5, 4, or 4.5 digit 0.56" or 0.8" LED display
- 15 dedicated meters measure DC and AC signals
- T/C (J, K) RTD, pressure, and all process signals
- 110/220 VAC or 9-36 VDC / 24 VAC power supply

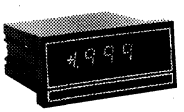
1/16 DIN Half-Height Short-Depth Meter, 2 1/2" Depth



BN Series
- 3.5 or 4.5 digit 0.56" LEDs • 7 meters and 4-20 mA DC
- 5 V / 12 V / 24 V DC isolated/non-isolated power supplies

AM-30 Series
- 50 mV to 10 V or 4-20 mA • 1 or 2 relays • 5 VDC pwr

NEMA Case Single-Function Meters



RP Series
- 3.5 or 4.5 digit 0.56" LED display
- 10 dedicated meters measure DC and all process signals
- 110/220 VAC power supply

1/8 DIN Ultra-Short-Depth Meters, 1" Depth

SD/SI Series
- 3.5 or 4.5 digit 0.56" LED/LCD display
- 7 dedicated meters measure DC and process signals
- 5 VDC isolated and non-isolated power supplies

37x15 mm Miniature Meters

DVM Series
- 3.5 digit 0.276" LED display
- 3 dedicated meters measure DCV, DCmV, and 4-20 mA process signals
- 5 VDC power supply

1/32 DIN (48 x 24 mm) Meters

MU Series
- 3.5 digit 0.3" LED display
- 7 dedicated meters measure DCV, DCmV, temperature, and all process signals
- 5 VDC or 9-36 VDC / 24 VAC power supply

1/4 and 1/16 DIN Temperature Controllers

VT Series
- 4 digit 0.4" dual LED display
- Auto-tune PID controllers with ramp and soak
- Popular T/C, RTD, and linear inputs
- Universal auto-sensing AC power supply

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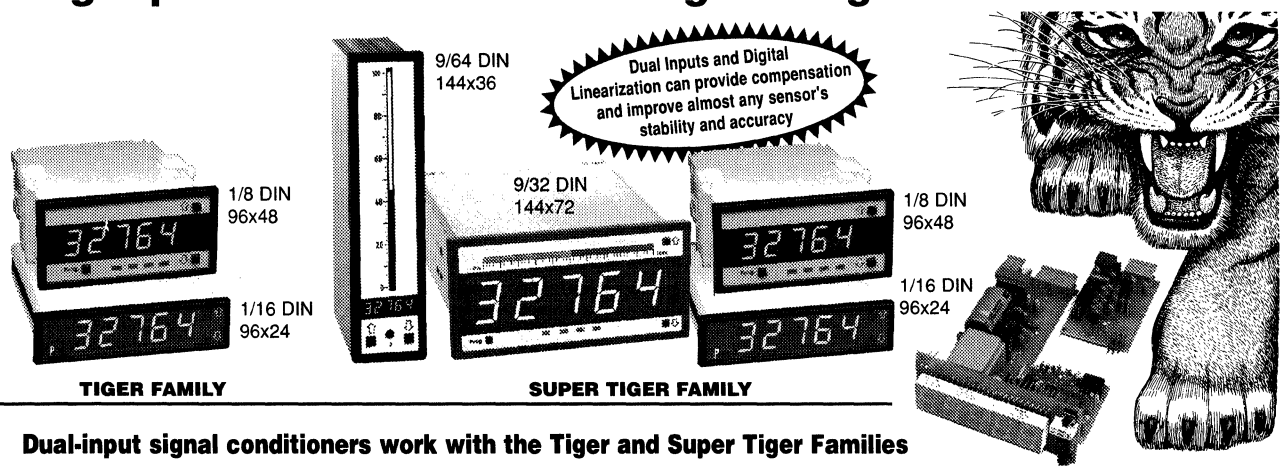
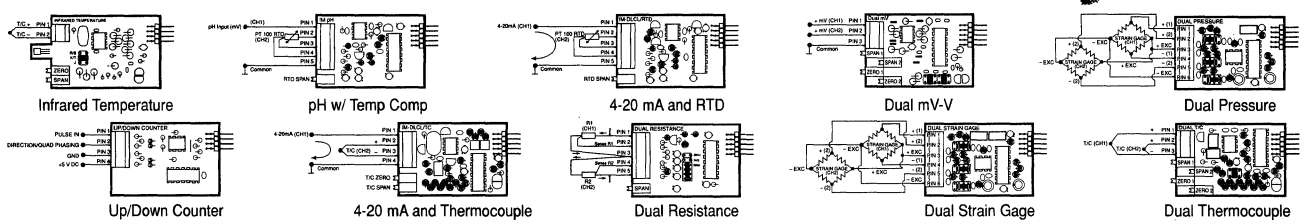
Bargraphs with Over 100 Plug-In Signal Conditioners



Dual-input signal conditioners work with the Tiger and Super Tiger Families



Tiger Family

- Intelligent digital meters
- Front-panel digital calibration and function selection
- Over 45 signal conditioners, single and dual inputs
- 10-point linearization
- 4 relays 10 and 5 amp or open collector outputs
- Analog output plus serial communication
- Universal auto-sensing AC/DC power supply

Super Tiger Family

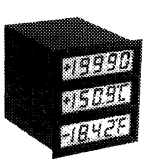
- Super-intelligent digital meters and multicolor bargraphs
- Front-panel digital calibration and function selection
- Over 65 signal conditioners, single and dual inputs
- 32-to 128-point flex linearization plus macros
- 4 relays, 10 and 5 amp or open collector outputs
- Analog output plus serial communication
- Universal auto-sensing AC/DC power supply

Range of Panel Meters

Visit our web site: www.texmate.com

Slim-Bezel Case LED and LCD Meters

AM-20
- 0.15" high 20-element
- Bar and dot mode
- 5 VDC powered
- Accepts all standard process signal inputs



CM Series
- 0.48" high 3.5 digit LCD meters
- 4-20 mA loop-powered, fully user-scalable
- Needs NO EXTERNAL POWER SUPPLY
- Standard and low-loop-drop versions

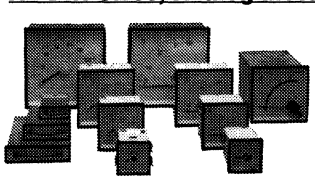
PM Series
- 3.5 and 4.5 digit LED and LCD meters
- BCD output option
- 5 VDC powered

SP Series
- 0.48" high 3.5 digit LCD meters
- Signal-powered ACV and DCV measurement

SM Series
- 3.5 digit LED and LCD meters
- Fully user-scalable
- 5 VDC powered

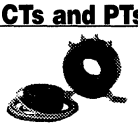
TM Series
- 3.5 digit LED and LCD temperature meters
- J and K T/C
- °C or °F display
- 5 VDC powered

All DIN Sizes, Analog Meters



- DCV, DCA, ACV, ACA, process, Hz
- Quadratic, circular, and edgewise system
- Interchangeable scales
- Case sizes: from 48x18.5 mm DIN to 144x144 mm DIN

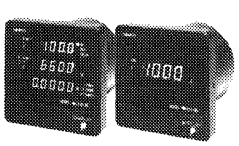
CTs and PTs



CTs: 1:5 to 12500:5

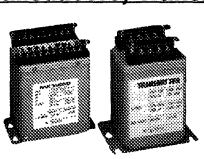
PTs: outputs up to 600 V & 400 VA thermal rating

4 1/2" AC Power Meters and AC Transducers, Transmitters



RM-110
- 3-phase, 3-display multi-function power meter

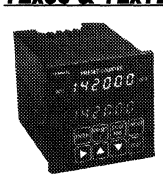
RM-111
- 3-phase, 1 display,



T Series
- AC volts, amps, power, Hz

TR Series
- T/C, RTD, Hz, 4-20 mA, and DC

72x36 & 72x72 DIN Tachometers, Counters, Timers and Totalizers



PC Series

LT Series
- Single and dual presets
- 16-mode operation
- 4 or 6 digital display
- Universal power supply

TAC Series

TAT Series
- Selectable pulses per revolution
- 3, 4, or 5 digit display
- Shaft-diameter setting
- Universal power supply

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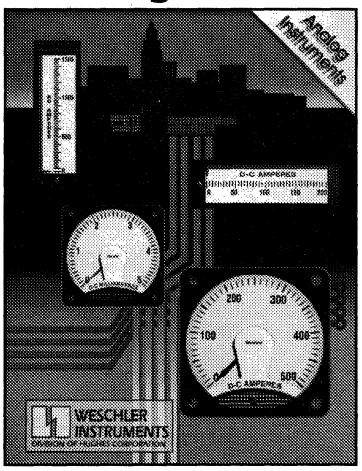
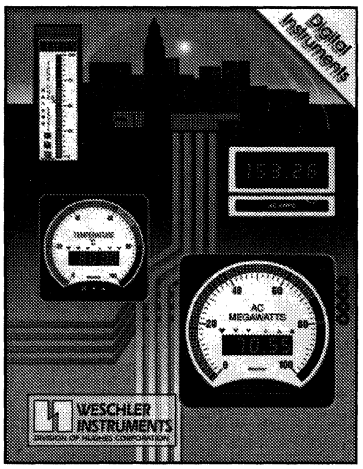
Analog Meters



This catalog includes Switchboard, Panel, Portable, and Specialty Meters.

- Edgewise and circular scales.
- High accuracy, full view design.
- High overload capacity.
- Taut band suspension.
- Meets ANSI Std. C39.1.
- Military and Nuclear versions.
- Volts, amps, watts, vars, speed, frequency and power factor.
- Ultimate in reliability and performance.
- Special scales and calibration.
- Lance pointers.
- Center and suppressed zero.
- Front and rear of panel mounting.

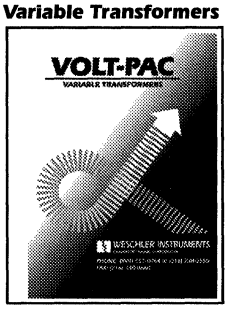
Digital Instruments



This catalog includes Intelligent BarGraphs, and Digital Panel Instruments.

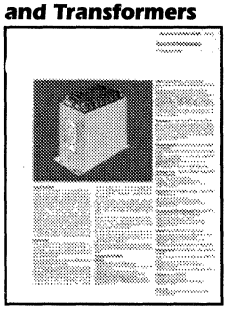
- Monitors most analog signals.
- Bright LED Bar/Digital displays.
- Programmable functions.
- Digital/analog retransmit.
- Communication: RS232/422/485.
- Setpoints, Trend, Peak/Valley.
- Powered from AC/DC voltages.
- Watts, Vars, Power Factor.
- 3"- 10" LED Bar/Digital Displays.
- Over 4,000 Combinations of I/O settings.
- Measure AC/DC volts, amps, power, rate, time, totals, temperature and more.
- Tri-Color BarGraph changes color (green, red or amber) at user determined points.

Volt-Pac Variable Transformers

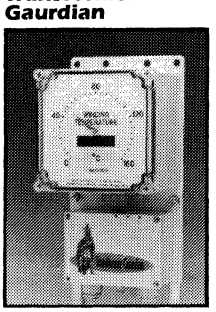


- Formerly manufactured by GE.
- Variable Transformers and Automatic Voltage Regulators.
- Single and Three Phase models.
- Manual and Motor Driven models.
- Standard models and custom designs.
- UL listed designs.
- 99% efficiency.
- Interchangeable with other manufacturers.
- Competitive pricing.

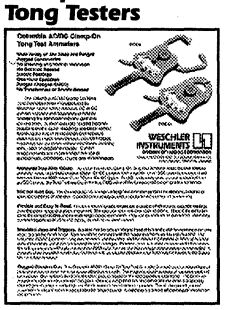
Transducers and Transformers



Transformer Gaurdian



Clamp-On Tong Testers



- Excellent maintenance tool.
- Measures DC or AC RMS current instantly and accurately.
- One-hand operation, easy to read.
- Ranges form 50-1000 amperes.
- N.I.S.T. certification available.
- Eliminate need to break circuit.
- Models for conductors with openings of 1-1/2", 2-1/2" or 3".
- Ranges can be changed quickly.
- Accurate, dependable, durable.

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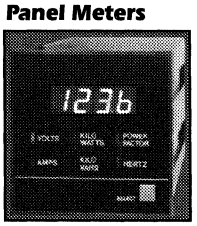
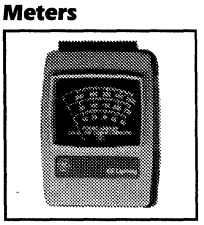
Digital Multi Meters

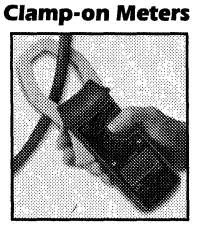
Digital Panel Meters



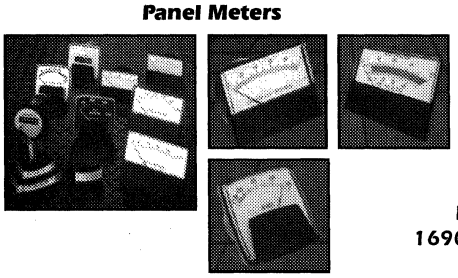
Light Meters



Digital Clamp-on Meters



Panel Meters



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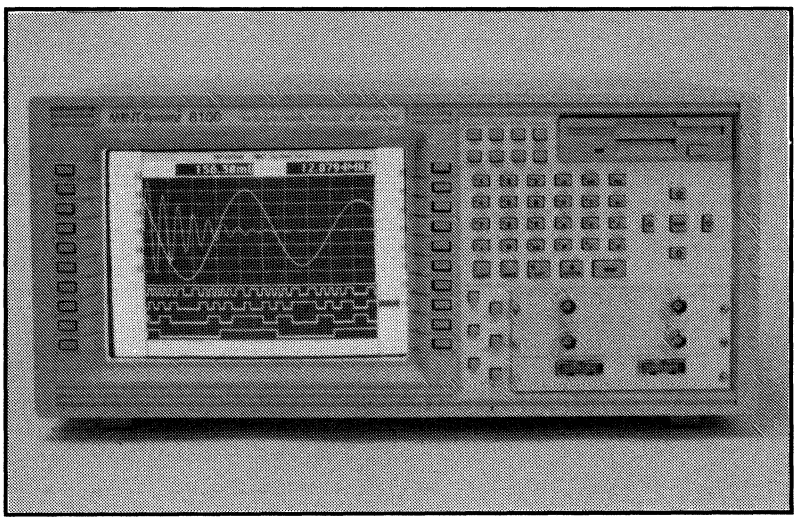
OSCILLOSCOPES

Manufacturer	Starting EEM Page No.	Model/Series	Band-width (MHz)	Rise-time (ns)	Vertical Sensi-tivity (mV/div)	Sweep Rate (µS/div)	No. of Traces	No. of Chan-nels	Lab	Field	Delayed Sweep	Auto	External Trigger	Z-Axis Input	X-Y Display Mode	Storage	IEEE-488 Interface
Mint Systems Corp.	D•1310	8100	100	3.5	2	2ns/div	6	6	√	√	√	√	√		√	√	√

MiNT Systems®

Designed for Versatility



MiNT Systems 8100 Modular DSO

- *Modular mixed-signal test system architecture*
- *Choice of scope front ends for analog and digital test and measurements*
- *100ps timing measurement*
- *Multiple analog channels*
- *Multiple digital channels*
- *Mixed Signal Waveform™ generation and measurement*
- *User configurable*
- *User upgradeable*

The modular architecture of the MiNT Systems 8100 DSO series allows users to optimize the instrumentation and application needs over time. The flexibility and variety of user plug-in modules are ideal for R&D, engineering, manufacturing, and many other test and measurement requirements. Starting with DSO modules, one can add or interchange modules as desired to develop a complete Automatic Test (ATE) System in the future. Combined with the expansion chassis, the 8100 can accept up to 16 modules to obtain extensive testing capabilities. This enables the user to perform multiple channels of mixed signal testing of devices such as ICs, modules, boards or complete systems. The 8100 high speed platform offers Mixed Signal Waveform™ display and facilitates a host of DC and AC parametric test functions with high level test language software. MiNT Systems is continuously adding new modules to the 8100 to provide this application specific instrument platform with more advanced test and measurement functions. It is not just a DSO, it is an ATE.

TECHNICAL SPECIFICATIONS (*Partial*)

DSO (Analog Input) ...

Bandwidth (-3dB)	100MHz and up
Sampling Rate	100Ms/s and up
Horizontal Time Base	2ns/div to 5s/div
Channel Number	2 per module

Analog Test ...

DC Force/Measure	0 to ±12V, 0 to ± 100mA
Channel Number	2 per module
AC Stimulus	0 to 10MHz arbitrary waveform
Channel Number	1 per module

Logic Timing (Digital Input) ...

Timing Measurement	100ps
Channel Number	16 per module

Digital Test (Stimulus/Response) ...

Digital Rate	100MHz
Channel Number	16 per module

Programmable Power Supplies ...

V1, V2	0 to +12V, 1A, 12bit resolution
V3	0 to -12V, 1A, 12bit resolution
Channel Number	1 per module

Digital Signal Processing ...

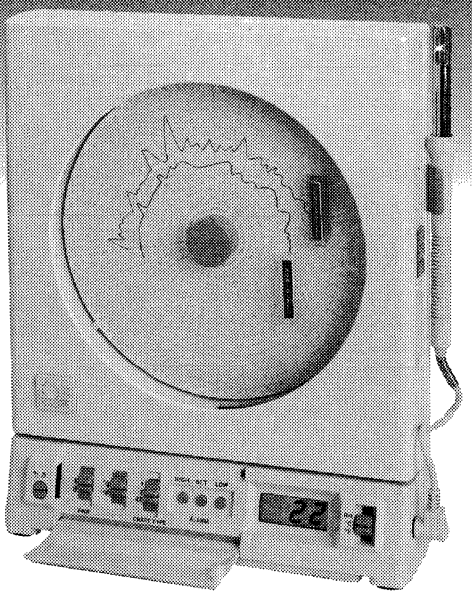
FFT	All DSO Channels
FIR Filtering	All DSO Channels
Waveform Interpolation	All DSO Channels

For more information or to address your test requirements please contact our sales office.

MiNT Systems Corporation
492 Division Street, Campbell, CA 95008 Phone: (408) 866-8823 Fax: (408) 866-8852 www.mintsystems.com

Recorders, Printers and Plotters

- Datalogging Recorders
- X-Y Recorders
- Paperless Recorders
- Circular Recorders
- Portable, Battery Powered Recorders
- Benchtop Flatbed Recorders
- Compact Panel Mount Recorders
- Modular Recording Systems



CT-485B Temperature Humidity Recorder

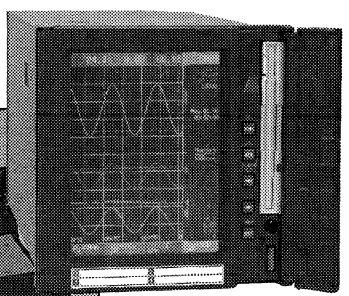
Our recorders and dataloggers provide a permanent record of an input signal or signals with either an analog trace or by printing actual numeric values onto paper. Choose between portable flatbed recorders, suited for many laboratory applications, and permanently installed vertical recorders, typically used in industrial applications. For comparing two input signals, such as temperature and pressure, our X-Y recorders can plot one against the other. Designed for portability, many of our circular chart recorders require no line voltage, and are especially useful in remote locations.

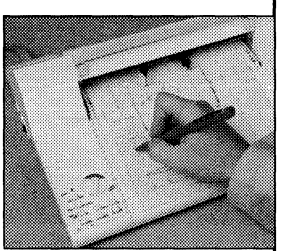
To input process signals directly into a computer, we offer a wide selection of plug-in cards and software. Our communications-based acquisition systems accept a larger number of inputs than a plug-in system, and allow a user to start small and expand the system as needed.

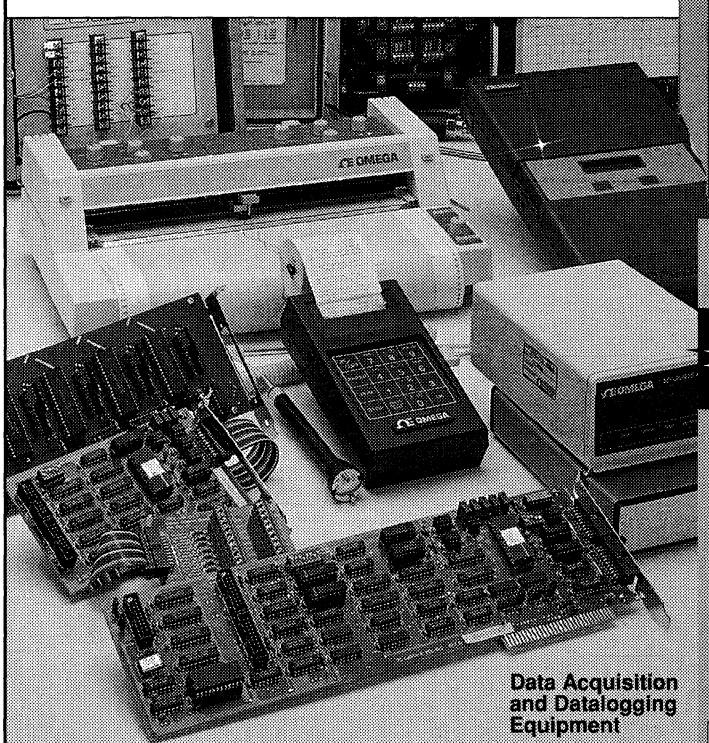
This Product Can Be Found in the OMEGA® Handbook Set, Data Acquisition, Section E.

Laboratory and Industrial Recorders

These Products Can Be Found in the OMEGA® Handbook Set, Data Acquisition, Section F.







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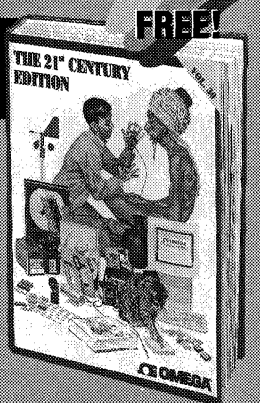

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PRIMARY BATTERIES

Manufacturer	Starting EEM Page No.	Alka-line	Carbon Zinc	Lithium					Mercury Oxide	Silver Oxide	Zinc Air	Zinc Chloride	Zinc Oxide	Mer-cury	Ther-mal	Thin Format	Standard Cell
				Carbon Mono-fluoride	Mang-anese Dioxide	Sulphur Dioxide	Thionyl Chloride	Other Types									
Avex Electronics	D•1322							√*									√*
Battery Engineering, Inc.	D•1324						√*	√*									
Battery Specialties	D•1325			√	√												√
BlueStar Battery Systems Corp.	D•1328	√			√*	√		√*									√
Cell-Con, Inc	D•1329	√		√	√	√	√	√									√
Dantona Industries	D•1335			√	√	√	√	√								√	√
Duracell	D•1341	√*			√*			√*		√*	√*						√
EAC Corp.	D•1352	√	√		√		√	√		√	√	√	√				
Eagle-Picher	D•1346							√*									
Electrochem Lithium Batteries	D•1348						√*	√*									
Friwo Silberkraft Exide Corp.	D•1350				√												
Hawker Energy Products Inc.	D•1351																√
House of Batteries	D•1345	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
NEC Electronics	D•1359				√			√									
Plainview Batteries, Inc.	D•1364	√*	√	√	√*	√*	√*	√*	√	√	√	√		√		√	
Power-Sonic	D•1320																√
SANYO Energy (U.S.A.) Corp.	D•1372				√			√									
Tauber Electronics Inc.	D•1374	√*						√*									√*

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ISO REGISTERED 9001/9002

For applications requiring greater external power, TAMURA offers direct plug-in and desktop models with output ratings from 2.0VA to 60VA.

UL File: E82180

CSA File: LR38236 LR65893 LR44447

SEMKO File: E132244

VDE File: 7969-3330 7969-3331 7969-3336

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SECONDARY BATTERIES (RECHARGEABLE)

Manufacturer	Starting EEM Page No.	Lead Acid	Lead Dioxide	Nickel-Cadmium	Nickel-Metal Hydride	Silver-Zinc	Silver Cadmium	Silver Oxide
Avex Electronics	D•1322			√*	√			
Battery Specialties	D•1325	√		√				
BlueStar Battery Systems Corp.	D•1328	√		√	√			
Cell-Con, Inc.	D•1329	√		√	√			√
Dantona Industries	D•1335	√		√	√			
Duracell	D•1341				√*			√*
EAC Corp.	D•1352	√	√	√		√		√
Exide Corporation	D•1349	√*						
Friwo Silberkraft, Exide Corp.	D•1350			√				
Hawker Energy Products Inc.	D•1351	√						
House of Batteries	D•1345	√	√	√	√	√	√	√
NEPO, Inc.	D•1362	√						
Plainview Batteries, Inc.	D•1364	√*	√	√*	√*			√
Power-Sonic	D•1320	√		√				
SANYO Energy (U.S.A.) Corp.	D•1372			√	√			
Sentry Battery	D•1373	√						
Tauber Electronics, Inc.	D•1374	√*		√*	√*			
Volta Industry	D•1317	√						
Yuasa-Exide, Inc.	D•1376	√*						

* MIL Spec.

BATTERY ACCESSORIES

Manufacturer	Starting EEM Page No.	Chargers	Clips/Holders/Retainers	Testers
Adcon Electronics, Inc.	D•1321	√		
Cell-Con, Inc	D•1329	√		
Christie Electric	D•1334	√*		√*
House of Batteries	D•1345	√	√	
Keystone Electronics Corp.	D•1354		√*	
Memory Protection Devices, Inc.	D•1358		√	
Plainview Batteries, Inc.	D•1364	√	√	
Power Dynamics, Inc.	D•1368		√	
SANYO Energy (U.S.A.) Corp.	D•1372	√	√	
Tamura Corp./AALTAM	D•1318	√		

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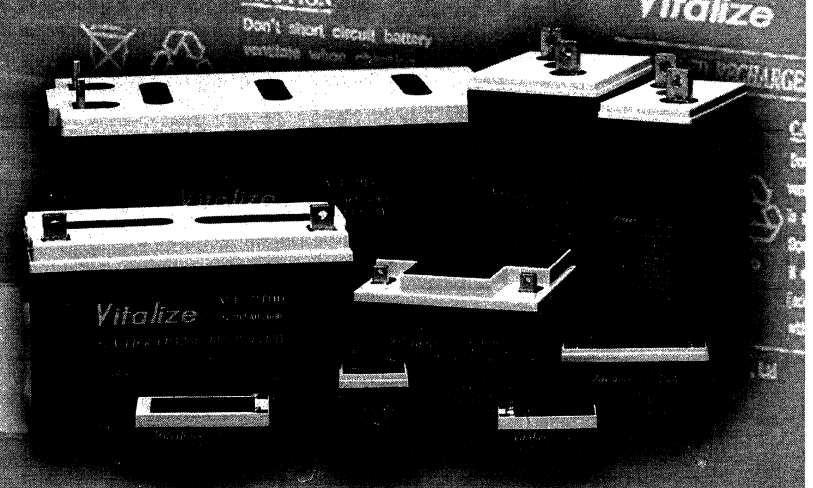

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WALL PLUG-IN BATTERY CHARGERS

UL File No. E82180

CSA File No. LR38236

MICROTRAN

Tamura battery chargers are particularly suited for charging NiCd, lead acid and Gel-Cell batteries. They are UL 1310 listed for battery charger circuits. Contact the battery manufacturer for recommended voltage and current.

FEATURES

- UL Listed For Battery Charger Ckts.
- UL 544 Medical Capability.
- Thermal Overload Protection
- 100% Testing
- Transformer: 3 flange bobbin.
- US 3-Blade Ground Plug Available.
- Temp Range: 0 to +40°C.
- Case Temp Rise: ≤35°C.
- Oper Humidity: 10-90% RH.
- Material: Black ABS resin/UL 94-V0.
- No Audible Noise.

FIG. 1
BATTERY CHARGER WITH 3-BLADE GROUND PLUG

BATTERY CHARGER-120VAC,60Hz.

UL/CSA MODEL NO	RATED OUTPUT VOLTS DC	RATED OUTPUT ma DC	OUTPUT VAC 100% FL 108VAC	OUTPUT VAC 100% FL 132VAC	OUTPUT VAC 10% FL 132VAC	UL*	CSA*	PLUG*
212A2220	4.5	150	3.80	5.20	7.35	UL*	L	Y
216A4222	4.5	350	3.50	5.20	8.70	UL*	C	F
416A2219	4.5	600	4.10	5.60	7.40	UL*	L	I
420AR4207	6.0	400	.....	REGULATED	.....	UL*	C	I
825A2617	6.0	2000	5.10	6.80	9.70	UL	C	I
212A2136	9.0	100	7.40	10.60	16.20	UL*	L	I
825A4620G	9.0	1200	7.80	10.40	13.70	UL	L	I
318A4146	12.0	200	10.30	13.50	17.60	UL*	L	L
416A2141	12.0	300	10.30	13.60	19.10	UL*	L	F
825A4425G	12.0	900	10.40	13.80	17.00	UL*	L	I
820A4276G	14.0	700	12.20	16.10	21.60	UL*	L	I
820A4279G	16.0	400	13.90	18.10	21.70	UL	L	I
416A2045	18.0	100	16.10	20.30	24.10	UL*	C	I
811A4214	3-9[5]	300	4.60	6.25	8.10	UL*	L	U

NOTE 1: Typical output voltage for % load (FL) and line (VAC) indicated.
NOTE 2: UL: UL 1310 Listed
UL*: UL 1310 & UL1411 Transformer
NOTE 3: Complies (C) with or is listed (L) to CSA 22.2, No. 223/66.
NOTE 4: See output plug table for dimensions, gender and polarity.
NOTE 5: Five switched output voltages of 3.0, 4.5, 6.0, 7.5 & 9.0 VDC with universal, polarity reversing, output plugs. Ratings are for 6.0VDC setting.

MECHANICAL DIMENSION TABLE

SERIES PREFIX	LENGTH(L) mm(inch)	WIDTH(W) mm(inch)	HEIGHT(H) mm(inch)	WEIGHT gm (oz)	FIG No
212A	53 (2.09)	36 (1.42)	35 (1.38)	120 (4.23)	1
216A	53 (2.09)	36 (1.42)	38 (1.50)	140 (4.94)	1
318A	60 (2.36)	45 (1.77)	42 (1.65)	190 (6.70)	1
416A	61 (2.40)	55 (2.17)	41 (1.59)	230 (8.11)	1
420AR	61 (2.40)	55 (2.17)	41 (1.59)	270 (9.52)	1
811A	84 (3.31)	56 (2.20)	35 (1.38)	260 (9.20)	1
820A-G*	62 (3.23)	60 (2.36)	55 (2.17)	420 (14.81)	1
825A-G*	82 (3.23)	60 (2.36)	55 (2.17)	490 (17.28)	1

* with US 3-blade ground plug.

FIG. 2 FEMALE

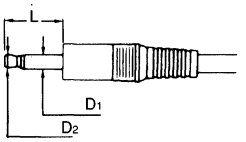

FIG. 3 MALE

OUTPUT PLUG DIMENSIONS

PLUG TYPE	D1 (mm)	D2 (mm)	L (mm)	MALE/ FEMALE	CTR PIN (+/-)	FIG No.
I	5.5	2.10	9.5	FEMALE	-	2
F	5.0	2.50	11.5	FEMALE	-	2
L	5.5	2.10	16.0	FEMALE	+	2
U	..... Universal/Reversible Connector				rev	4
Y	3.5	3.00	14.0	MALE	+	3

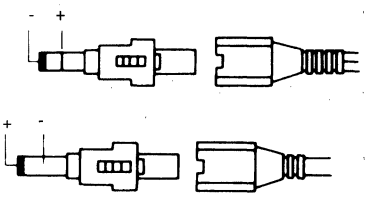

FIG. 4
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SEALED LEAD-ACID BATTERIES

Model	Nominal Voltage V	Nominal Capacity @ 20 hr. rate A.H.	Discharge Current @ 20 hr. rate mA	DIMENSIONS								Weight		Std. Terminals
				Length		Width		Height		Ht. Over Terminal				
				in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kg.	
PS-260	2	6.0	300	1.97	50	1.34	34	3.94	100	4.13	105	0.9	0.41	F1
PS-445	4	4.5	225	1.89	48	2.09	53	3.70	94	3.86	98	1.4	0.65	F2
PS-470	4	7.0	350	2.52	64	2.08	53	3.70	94	3.92	100	1.9	0.9	F1
PS-490	4	9.0	450	3.97	101	1.73	44	3.74	95	4.02	102	2.8	1.28	F2
PS-4100	4	10.0	500	4.02	102	1.97	50	3.72	94	3.92	100	3.1	1.4	F1
PS-605	6	0.5	25	2.24	57	0.55	14	1.97	50	1.97	50	0.2	0.09	WL
PS-610	6	1.0	50	2.00	51	1.65	42	2.00	51	2.20	56	0.6	0.3	F1
PS-612	6	1.3	65	3.82	97	0.94	24	2.00	51	2.19	56	0.6	0.3	F1
PS-630	6	3.0	150	5.28	134	1.34	34	2.35	60	2.56	65	1.5	0.7	F1
PS-632	6	3.2	160	2.60	66	1.30	33	4.65	118	4.80	122	1.5	0.7	F1
PS-640	6	4.5	225	2.76	70	1.89	48	4.02	102	4.25	108	1.95	0.9	F1 or WL
PS-650L	6	5.0	250	2.63	67	2.63	67	3.78	96	4.28	109	2.0	0.9	Spring
PS-665	6	6.5	325	3.86	98	2.20	56	4.05	103	4.05	103	3.0	1.4	P
PS-670	6	7.0	350	5.95	151	1.34	34	3.70	94	3.86	98	3.0	1.4	F1
PS-682	6	8.0	400	3.86	98	2.20	56	4.65	118	4.65	118	3.3	1.5	F1 or WL
PS-695	6	9.5	475	4.26	108	2.75	70	5.54	141	5.54	141	4.9	2.2	P
PS-695 Toy	6	9.5	475	4.26	108	2.75	70	5.54	141	5.54	141	4.9	2.2	TS or TH
PS-6100	6	10.0	500	5.95	151	2.00	51	3.70	94	3.86	98	4.6	2.1	F1 or F2
PS-6120	6	12.0	600	4.26	108	2.75	70	5.54	141	5.54	141	5.2	2.4	P
PS-6120 Toy	6	12.0	600	4.26	108	2.75	70	5.54	141	5.54	141	5.2	2.4	TS or TH
PS-6200	6	20.0	1000	6.18	157	3.27	83	4.92	125	4.92	125	8.2	3.7	NB
PS-6360	6	36.0	1800	6.25	159	3.35	85	6.50	165	6.95	176	13.8	6.2	F2 or NB
PS-832	8	3.2	160	5.28	134	1.42	36	2.49	63	2.70	69	1.9	0.85	F1
PS-1208	12	0.8	40	3.78	96	0.98	25	2.42	62	2.42	62	0.8	0.35	WL
PS-1212	12	1.2	60	3.82	97	1.65	42	2.00	51	2.13	54	1.3	0.6	F1
PS-1220	12	2.2	110	7.01	178	1.34	34	2.36	60	2.56	65	1.9	0.85	F1
PS-1223	12	2.3	115	7.17	182	0.94	24	2.42	61.5	2.42	61.5	1.76	0.8	PC
PS-1229	12	2.9	145	7.01	178	1.34	34	2.36	60	2.56	65	2.2	1.0	F1
PS-1230	12	3.0	150	5.23	134	2.64	67	2.36	60	2.60	66	2.6	1.2	F1
PS-1242	12	4.5	225	3.54	90	2.76	70	4.02	102	4.25	108	3.8	1.7	F1
PS-1252	12	5.0	250	3.54	90	2.76	70	4.02	102	4.25	108	4.2	1.9	F2
PS-1270	12	7.0	350	5.95	151	2.56	65	3.70	94	3.86	98	5.7	2.6	F1
PS-1282	12	8.0	400	3.86	98	4.40	112	4.65	118	4.65	118	6.7	3.0	F1
PS-12100	12	10.0	500	5.95	151	4.00	102	3.70	94	3.86	98	9.2	4.2	F1 or F2
PS-12120	12	12.0	600	5.95	151	3.86	98	3.70	94	3.94	100	9.0	4.1	F2
PS-12120L	12	12.0	600	8.38	213	2.75	70	5.50	140	5.50	140	10.7	4.8	P
PS-12180	12	18.0	900	7.13	181	2.99	76	6.57	167	6.57	167	13.1	5.9	F2 or NB
PS-12260	12	26.0	1300	6.89	175	6.54	166	4.95	126	4.95	126	20.8	9.4	F2 or NB
PS-12280	12	28.0	1400	6.54	166	4.95	126	6.89	175	6.89	175	20.8	9.4	NB
PS-12330	12	33.0	1650	7.70	196	5.19	132	6.10	155	6.85	174	26.5	12.0	HP
PS-12400	12	40.0	2000	7.72	196	6.42	163	6.85	174	6.85	174	30.5	13.8	NB
PS-12550	12	55.0	2750	9.50	241	5.45	138	8.10	206	8.95	227	44.1	18.7	HP
PS-12600	12	60.0	3000	10.25	260	6.60	168	8.20	208	9.45	240	54.4	24.7	HP
PS-12750	12	75.0	3750	10.25	260	6.60	168	8.20	208	9.45	240	55.1	25.0	HP
PS-12800	12	80.0	4000	12.00	305	6.60	168	8.20	208	9.45	240	62.4	28.4	HP
PS-121000	12	100.0	5000	12.00	305	6.60	168	8.20	208	9.45	240	65.7	29.8	HP

SEALED NICKEL-CADMIUM BATTERIES

STANDARD CELLS: Capacities ranging from 110 to 7000 mAh
HIGH-TEMP CELLS: Capacities ranging from 110 to 8000 mAh
HIGH-CAPACITY CELLS: Capacities ranging from 700 to 8000 mAh
HIGH-RATE CHARGE/DISCHARGE: Capacities ranging from 600 to 4500 mAh
HIGH-CAPACITY/RAPID CHARGE: Capacities ranging from 700 to 5000 mAh
PCBM (Printed Circuit Board): Voltages from 2.4 to 3.6, 110 mAh
BUTTON CELLS: Capacities ranging from 60 to 280 mAh

For more information regarding our extensive line-up of rechargeable Nickel-Cadmium batteries, please contact our Sales office listed below

POWER-SONIC CORPORATION
3106 Spring Street • Redwood City, CA 94063
Tel: (650) 364-5001 http://www.power-sonic.com Fax: (650) 366-3662
E-mail: national-sales@power-sonic.com

Battery Charger for NiCd, NiMH, Gel, Lead Acid Batteries and etc.

Battery Charger for NiCd, NiMH batteries

Model 300: Alkaline Recognition Charger with microprocessor control.

For removable and replaceable battery applications. Allow the mix uses between NiCd (NiMH) and alkaline battery set. To prevent the leakage of alkaline batteries when they are being charged. Available in Minus Delta V and Timed versions.

Model 310: Minus Delta V Charger

Automatically charge batteries to full condition, from medium to fast charge rate, with safety back up timer. Available in Single or Dual rate modes.

Model 320: Zero Slope Charger

Automatically charge NiCd and NiMH to full condition, with safety back up timer. It can be used from medium and fast charge applications. Available in Single or Dual rate modes.

Model 330: Timed Control Charger

By using a preset timer function to charge NiCd and NiMH safely. It can be used in overnight and fast charge applications. Available in Single or Dual rate modes.

Model 340: Temperature Sensing Charger

With temperature sensor embedded inside the battery pack, the batteries can be charged for overnight or short time fast charge applications. Available in Single or Dual rate modes.

Model 350: Constant Current Charger

With 0.1C charge current, the batteries can be charged fully within 12-16 hours and can be left in charger indefinitely without damage the batteries

Model 360: Tapper Charger

Unregulated low cost float type charger, for overnight charging application.

Battery Charger for Gel batteries

Model 100: Automatic Dual Rate Charger

Automatically shift from high to float rate charge by sensing the battery capacity. Designed for cyclic applications with shorter charging time. The battery can be safely left on charge indefinitely.

Model 110: Regulated Float Charger

Specially designed for long term continuous charge applications, such as stand by battery systems and unattended charge.The battery will seek its own fully charge level and can be left on charge indefinitely.

Model 120: Unregulated Float Charger

Low cost tapper charger, can be used as overnight charger.

Battery Charger for seal or wet lead acid batteries

Model 200: Automatic Dual Rate Charger

Automatically shift from high to float rate charge by sensing the battery capacity. Design for cyclic applications with shorter charging time. The battery can be safely left on charge indefinitely.

Model 210: Regulated Float Charger

Specially designed for long term continuous charge applications, such as stand by battery systems. The battery can be left on charge indefinitely.

Model 220: Unregulated Float Charger

Low cost tapper charger, can be used as overnight charger.

Battery Charger for Rechargeable lithium batteries

Model 400: Regulated Charger

Both voltage and current are precisely regulated based on which types of batteries are being used.

Multiple Bench Battery Charger

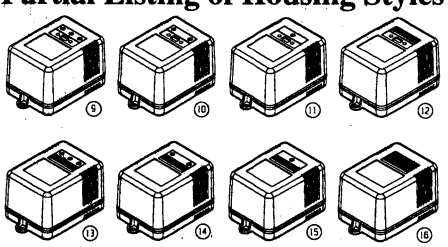
Model 600: Multiple bench chargers, available from 2 to 16 channels with single or dual LED(s) indications on each channel for charge, fail and ready status. Both NiCd, NiMH, Gel, Seal or wet lead acid versions can be ordered with low cost unregulated tapper charging or precision controlled automatic charging methods. Each channel can also be individually configured for different type of batteries.

Programmable Battery Charger, Tester, Reconditioner

Model 900: Microprocessor controls charger, tester, exerciser, reconditioner with alphanumeric LCD display. Available from single to multiple channels.

All battery chargers are available in following configurations: Single or Dual LED(s) indications for charge, discharge, ready and fail status; Single, Dual or Multiple charge rate; Discharge before charge;Wall plug in models; Desk top models; 100-250AC input; DC input; Custom design; Private labels

Partial Listing of Housing Styles



ADCON ELECTRONICS, INC.

2828 Aiello Drive,
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Fax: 408-362-4909

Please Refer to Our Advertisement in Power Supplies D•4000 for a Wide Selection of Power Supplies.

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PORTABLE BATTERY DIVISION

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AVEX manufactures battery packs for an extensive range of applications based on all types of multi-technology button, cylindrical or prismatic cells.

NICAD® STANDARD CELLS

Cell Type	Capacity C/5AH Min - Typical	Voltage	Dimensions ø mmH	Weight (g)	Ref #
1/3AA	.110 - .140	1.2	13.4 - 16.2	7	AV-SA
1/2AA	.300 - .350	1.2	14.3 - 29.5	12	AV-SA
2/3A	.750 - .780	1.2	17.0 - 28.2	18	AV-GP
4/5A	1.200 - 1.300	1.2	16.6 - 42.0	28	AV-GP
4/3A	1.900 - 2.05	1.2	16.6 - 66.0	43	AV-SA
AA	.950 - 1.02	1.2	14.5 - 48.2	25	AV-GP
AA	.600 -.660	1.2	13.4 - 48.2	19	AV-S
1/2C	.700 - .840	1.2	25.6 - 24.0	37	AV-SA
CS	1.40 - 1.56	1.2	22.5 - 42.3	48	AV-SA
C	2.300 - 2.55	1.2	25.6 -47.2	75	AV-SA
1/2D	2.40 - 2.55	1.2	32.5 - 36.9	82	AV-SA
D	4.50 - 5.00	1.2	32.5 - 58.9	134	AV-SA
F	7.00 - 7.20	1.2	32.5 - 89.1	228	AV-SA

NICAD® HIGH TEMPERATURE CELLS

VTCs	1.20 - 1.35	1.2	22.5 - 42.3	45	AV-SA
VTC	2.20 - 2.50	1.2	25.6 - 47.2	77	AV-SA
VT 1/20	2.20 - 2.55	1.2	32.5 -36.9	82	AV-SA
VTD	4.0 - 4.4	1.2	32.5 - 58.9	134	AV-SA
VTF	7.0 - 7.6	1.2	32.5 - 89.1	228	AV-SA

NICKEL-METAL HYDRIDE CELLS

Cell Type	Capacity C/5AH Min - Typical	Voltage	Dimensions ø mmH	Weight (g)	Ref #
AAA	.550 - 5.78	1.2	10.5 - 44.7	12.5	AV-GP
AA	1.200 - 1.300	1.2	13.9 - 49.5	25	AV-SA
7/5A	3.00 - 3.100	1.2	17.5 - 66.7	51	AV-GP
C	4.00 - 4.00	1.2	26.0 - 48.00		AV-TE
D	6.500 - 6.500	1.2	33.5 - 59.00	135	AV-TE
F	10.00 - 10.00	1.2	33.5 - 90.00	228	AV-TE
NEW! AA	11.00 - 11.50	1.2	14.2 - 49.00	27	AV-EN

BUTTON CELL Ni-CAD

Cell Type	Min	Voltage	Dimensions ø mmH	Weight (g)	Ref #
GP60BNK	.060	1.2	15.4 - 6.3	3.7	AV-GP
GP170BNK	.170	1.2	25.0 - 6.3	9.6	AV-GP
GP280BNK	.280	1.2	25.0 - 8.6	13.0	AV-GP

BUTTON CELL NICKEL METAL HYDRIDE

V150H	.150	1.2	25.6 - 5.9	6	AV-VA
CP300H	.300	1.2	25.1 - 7.5	11	AV-VA

AVEX is a proud member of the Rechargeable Battery Recycling Corporation (RBRC) which is devoted to collecting and recycling nickel-cadmium batteries. For more information consult your AVEX sales person toll free: ***1-800-345-1295***

- ***48 hour delivery***
- ***EDI capable***
- ***D.O.T. 49 CFR certified to ship and handle lithium batteries***
- ***Free engineering design and technical assistance***
- ***20+ years experience***

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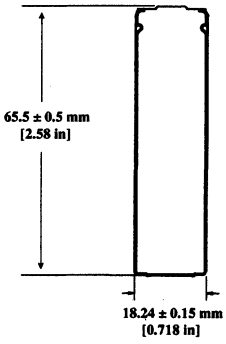
AVEX CORPORATION

PORTABLE BATTERY DIVISION

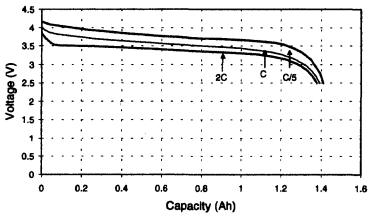
...YOUR PARTNER FOR PORTABLE POWER

LITHIUM ION BATTERIES-ICR-18650

Energy Density (Volumetric)		300 Wh/l
Energy Density: (Gravimetric)		120 Wh/kg
Capacity		1350 mAh
Weight		42 g
Voltage Range		4.2 V to 2.5 V
Average Voltage (C/5)		3.7 V
Cycle Life		500 cycles to 80% capacity
Charge Acceptance		>80% in 1 hour
Temperature Range	Charge:	0°C to 40°C
	Discharge:	-20°C to 60°C
	Storage:	-20°C to 60°C



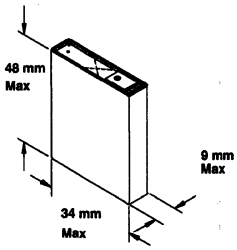
ICR-18650A



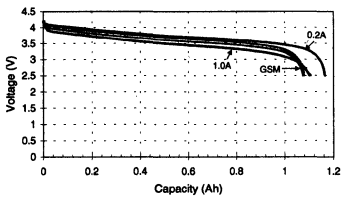
RECHARGEABLE LITHIUM-ION PRISMATIC BATTERY- ICP340948

Featuring $LiNiCoO_2$

Capacity:		1100 mAh
Energy Density (Volumetric):		275 Wh/l
Energy Density: (Gravimetric):		110 Wh/kg
Weight:		36 g
Dimensions	Height:	48 mm
	Width:	34 mm
	Thickness:	9 mm
Voltage Range:	Charge:	4.2 V
	Average (C/5):	3.7 V
	Lower Cutoff:	2.5 to 3.1 V
Temperature Range:	Charge:	0°C to 40°C
	Discharge:	-20°C to 60°C
	Storage:	-20°C to 60°C
Cycle Life:		500 cycles to 80% Capacity



ICP-340948



LITHIUM PRIMARY

Cell	Size IEC	Size ANSI	Open Circuit Voltage Volts	Nominal Voltage Volts	Nominal Capacity Ah	Maximum Recommended Constant Current mA	Operating Temperature °C	Operating Temperature F°	Diameter (max.) or Lxl mm	Diameter (max.) or Lxl in.	Height (max.) mm	Height (max.) in.	Weight g	Weight oz.	UL Recognition [a]	Features[b]
Small LS Series Thionyl Chloride																
LS14250	1/2R6	1/2AA	3.67	3.5	1.0	50	-55/+85°C	-67/+185F°*	14.5	0.571	24.9	0.980	7.5	0.26	■	B, GTM
LS14500	R6	AA	3.67	3.5	2.25	120	-55/+85°C	-67/+185F°*	14.5	0.571	50.4	1.984	15.0	0.525	■	B, GTM
LS14250C	1/2R6	1/2AA	3.67	3.5	1.20	12	-55/+85°C	-67/+185F°*	14.5	0.571	24.9	0.980	7.5	0.26	■	B, GTM
LS14500C	R6	AA	3.67	3.5	2.75	25	-55/+85°C	-67/+185F°*	14.5	0.571	50.4	1.984	15.0	0.525	■	B, GTM
Large LS Series																
LS26500	R14	C	3.67	3.5	7.2	170	-55/+85°C	-67/+185F°	26.1	1.03	50.0	1.969	50	1.76	■	B, GTM
LS33600	R20	D	3.67	3.5	16.5	300	-55/+85°C	-67/+185F°	33.6	1.32	61.5	2.43	90	3.17	■	B, GTM
LSH Series																
LSH14	R14	C	3.67	3.5	5.2	1,000**	-55/+85°C	-67/+185F°	26.1	1.031	50.0	1.97	55	1.94	■	S, GTM
LSH20	R20	D	3.67	3.5	13.0	2,000**	-55/+85°C	-67/+185F°	33.6	1.323	61.5	2.421	100	3.53	■	S, GTM
LO Series Sulphur Dioxide																
LO35SX	2/3R14	2/3C	3.0	2.8	2.0	1,200	-60/+71	-76/+160	25.6	1.010	35.6	1.40	30	1.05	■	S, GTM
LO29SHX	R14	C	3.0	2.8	3.5	1,500	-60/+71	-76/+160	25.6	1.010	50.3	1.980	40	1.40	■	S, GTM
LO40SHX	—	2/3 thin D	3.0	2.8	3.5	2,000	-60/+71	-76/+160	29.1	1.145	36.0	1.420	40	1.40	■	S, GTM
LO30SHX	—	thin D	3.0	2.8	5.7	2,000	-60/+71	-76/+160	29.1	1.145	59.9	2.360	63	2.24	■	S, GTM
LO26SX	R20	D	3.0	2.8	8.0	4,000	-60/+71	-76/+160	33.8	1.33	59.0	2.324	85	2.98	■	S, GTM
LO26SHX	R20	D	3.0	2.8	7.5	4,000	-60/+71	-76/+160	33.8	1.33	59.0	2.324	85	2.98	■	S, GTM
LO25SX	—	FAT D	3.0	2.8	8.5	4,000	-60/+71	-76/+160	38.7	1,525	50.0	1.97	96	3.40	■	S, GTM
LO39SHX	—	F	3.0	2.8	12.5	8,000	-60/+71	-76/+160	31.4	1.236	99.6	3.90	125	4.40	■	S, GTM
LO52X	—	DD	3.0	2.8	16	8,000	-60/+71	-76/+160	34.0	1.340	120.0	4.72	170	6.00	pending	S, GTM

•100°C/212°F possible for short periods of time.
**eixsther to get 50% of nominal capacity or to prevent excessive cell heating.
Nominal capacity either at C/700/20°C/68°F/2.0V cut-off, or C/1500/20°C/68°F/2.0V cut-off.
Open circuit voltage (at 20°C/68°F).
Nominal voltage either at C/700/20°C/68°F., or 20°C/68°F/2.0V cut-off.
Maximum recommended constant current (50% yield) at 20°C/68°F. On standard version these cells include either a 2.5A fuse or a 5A fuse.
(a) n = Yes; (b) Features: B = Bobbin construction, S = Spiral construction, GTM = Glass to metal seal.

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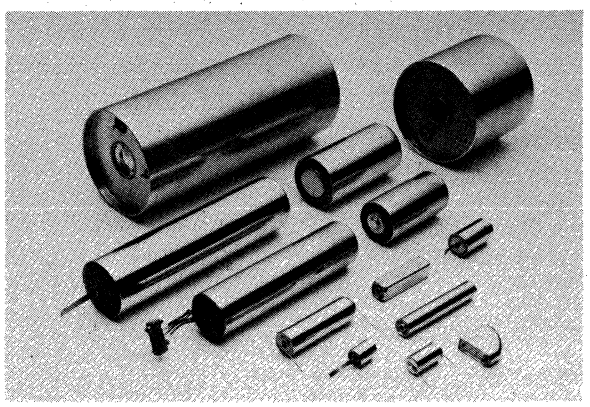
LONG LIFE LITHIUM/THIONYL CHLORIDE PRIMARY BATTERIES

Battery Engineering



FEATURES

- High energy density
- 304 L Stainless Steel construction
- Hermetic reinforced glass-to-metal seals
- 10 year shelf life
- High reliability
- Stable operating voltage (3.67 open circuit voltage)
- Wide operating temperature (-55°C to +200°C)
- Ability to withstand vibration and high G shock
- Inspection to MIL-1-45028 available

ADDITIONAL SERVICES AVAILABLE

- Custom design and fabrication of cells
- Packaging of cells into custom battery packs
- Contract funded research

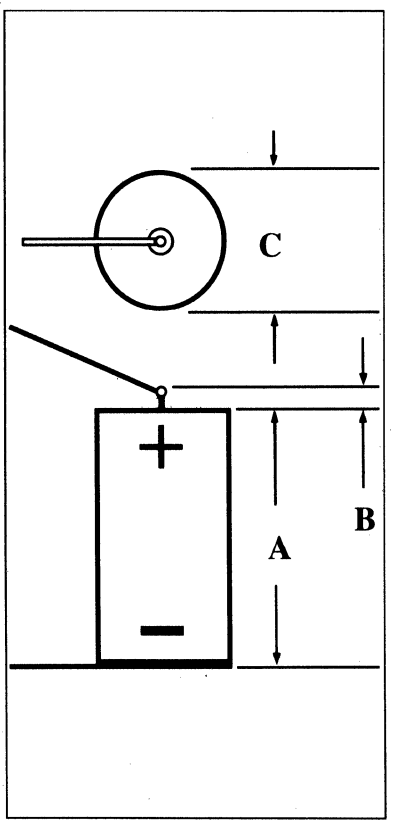
Battery Engineering, Inc., a manufacturer of standard and custom-designed lithium batteries, is committed to the development, engineering, and production of high energy density power sources for industrial, medical, and military applications.

A pioneer in Lithium Technology since 1977, Battery Engineering has been at the forefront of the design and packaging of lithium batteries. Today, Battery Engineering has state of the art facilities, and extensive engineering, quality control and R&D capabilities.

Lithium/Thionyl Chloride Batteries offer distinct advantages over other battery systems, the most significant being low self-discharge, high reliability, and the highest energy density of any electrochemical power source.

Engineering for Safety: Battery Engineering's batteries will perform safely if they are operated within the guidelines as described in the free brochure, *Safety First: A Manual for the Safe Storage and Handling of Lithium/Thionyl Chloride Batteries.*

TYPE	A (mm)	B (mm)	C (mm)	Capacity	Volume (cc)	Weight (g)
GENERAL PURPOSE TYPES (-55°C to +100°C)						
10-12	12.0	3.0	9.5	0.14	0.9	2.7
10-18	18.0	3.0	9.5	0.3	1.4	3.8
10-25	25.4	3.0	9.5	0.55	2.0	4.3
10-35	34.8	3.0	9.5	0.75	2.7	6.5
10-42 (AAA)	42.0	3.0	9.5	0.9	3.3	7.6
10-54	54.0	3.0	9.5	1.2	4.2	8.5
13-38	38.1	3.3	12.7	1.3	5.0	12.4
14-24 (1/2 AA)	24.0	3.3	13.5	0.85	3.7	10
14-48 (AA)	48.3	3.3	13.5	1.8	7.4	19
26-48 (C)	48.5	0	25.4	7	26	52
26-102 (CC)	101.6	0	25.4	16	54	100
33-60 (D)	57.9	0	31.8	12	51	105
33-127 (DD)	125.1	0	31.8	28	108	220
64-152 (#6)	152.4	0	64.3	135	489	950
HIGH TEMPERATURE TYPES (-40°C to +150°C)						
14-24HT	24.0	3.3	13.5	0.75	3.7	10
14-50HT (AA)	50.0	3.3	13.5	1.6	7.4	19
21-100HT	101.6	0	20.6	7	35	73
25-48HT (C)	48.5	0	24.6	5.5	24	50
25-102HT (CC)	101.6	0	24.6	13	50	95
26-48HT (C)	48.5	0	25.4	6	26	52
26-76HT (3/2C)	76.2	0	25.4	9	40	85
26-102HT (CC)	101.6	0	25.4	14	54	100
33-60HT (D)	57.9	0	31.8	11	51	105
33-76HT (5/4D)	76.2	0	31.8	16	65	136
33-127HT (DD)	125.1	0	31.8	24	108	220
MODERATE RATE TYPES (-40°C to +150°C)						
26-48MR (C)	48.5	0	25.4	6.5	26	52
26-76MR	76.2	0	25.4	11	40	85
26-102MR	101.6	0	25.4	16	54	100
33-60MR (D)	57.9	0	31.8	12	51	105
33-76MR	76.2	0	31.8	16	65	136
33-127MR	125.1	0	31.8	28	108	220



* All types also available with maximum temperature ratings of 180°C and 200°C.
* Capacity will vary depending on the current drain and temperature.

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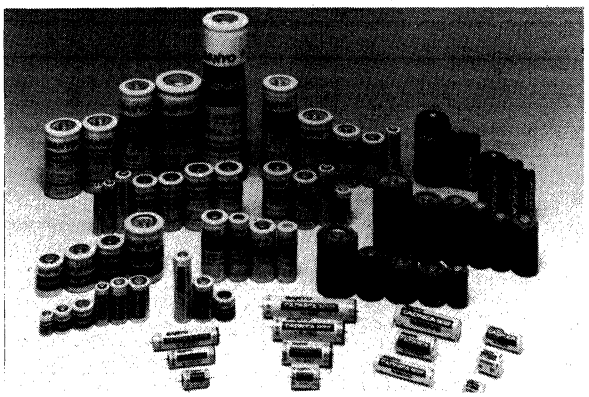
RECHARGEABLE NICKEL CADMIUM BATTERIES



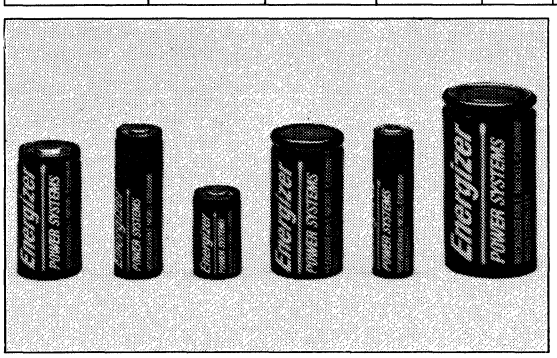
SANYO

CADNICA batteries from Sanyo and Battery Specialties meet your design requirements with:

- **Over 73 different models from 50 mAh up to 20,000 mAh operating from -20°C up to +70°C.**
- **Featuring the Extra Series with up to 40% more power and capacity and the Slim Series with a flat shape to fit tight spaces.**
- **CADNICA batteries handle 500 charge cycles.**
- **Let Battery Specialties design your next battery.**
- **Selected CADNICA batteries are shown below.**

High-capacity CADNICA batteries (E Series)

Model	Nominal Voltage (V)	Capacity (mAh) @ 0.2C Rate Min.	Capacity (mAh) @ 0.2C Rate Typical	Trickle Charge Current (mA)	Trickle Charge Time (hr.)	Standard Charge Current (mA)	Standard Charge Time (hr.)	Internal Resist. (mΩ)	External Dimension (including tube) Diameter (mm)	External Dimension (including tube) Height (mm)	Weight (approx.)
N-225AE	1.2	225	245	*	*	23	14-16	20.0	17.0 $^{0}_{-1}$	17.0 $^{0}_{-1}$	12
KR-600AE	1.2	600	650	*	*	60	14-16	10.0	17.0 $^{0}_{-1}$	28.0 $^{0}_{-1}$	21
KR-800AE	1.2	800	880	*	*	80	14-16	12.0	14.2 $^{0}_{-0.5}$	50.0 $^{0}_{-1}$	24
KR-1100AAE	1.2	1100	1200	*	*	110	14-16	12.0	14.2 $^{0}_{-0.5}$	65.0 $^{0}_{-0.2}$	32
KR-1100AEL	1.2	1100	1200	*	*	110	14-16	9.0	17.0 $^{0}_{-0.5}$	43.0 $^{0}_{-2}$	32
KR-1200AE	1.2	1200	1300	*	*	120	14-16	7.6	17.0 $^{0}_{-1}$	50.0 $^{0}_{-2}$	34
KR-1400AE	1.2	1400	1540	*	*	140	14-16	10.0	17.0 $^{0}_{-1}$	50.0 $^{0}_{-2}$	31
KR-1700AE	1.2	1700	1850	*	*	170	14-16	7.0	17.0 $^{0}_{-1}$	67.0 $^{0}_{-2}$	45
KR-1800SCE	1.2	1800	1880	*	*	180	14-16	6.5	23.0 $^{0}_{-1}$	43.0 $^{0}_{-2}$	47
KR-2300SCE	1.2	2300	2500	*	*	230	14-16	5.5	23.0 $^{0}_{-1}$	50.0 $^{0}_{-2}$	60
KR-2800CE	1.2	2800	3000	*	*	280	14-16	5.5	26.0 $^{0}_{-2}$	50.0 $^{0}_{-1}$	78
KR-5000DEL	1.2	5000	5400	*	*	500	14-16	3.5	34.0 $^{0}_{-2}$	59.0 $^{0}_{-1}$	155



Energizer

POWER SYSTEMS

EC Standard Charge Series—Long runtimes for demanding portable applications.
EP-Series—Higher power delivery for demanding applications like power tools.
EPF-Series—With one-hour charge capability
EPP-Series—Maximum power delivery and cycle life for fast charge and high discharge-rate professional applications.
ET-Series—Excellent life at elevated temperatures.
ETL-Series—Excellent high temperature life, PLUS improved high temperature charge acceptance and capacity.
ETM-Series—Memory preservation product. Excellent life and leakage protection at elevated temperature.
E-Series—Excellent performance at a standard price provides value for portable applications and personal care product.

Model Number	Cell Type	Capacity (mAhr) 0.2C min.	Capacity (mAhr) 1.0C min.	Re (mOhms)	Max. Height mm (in.)	Max. Diameter mm (in.)	Typ. Weight gr. (oz.)	Maximum Charging Current Std. (mA)	Std. Time (Hr.)	Quick (mA)	Quick Time (Hr.)
EC-800AA	AA	800	725	37	49.00 (1.929)	14.20 (0.559)	22 (0.78)	75	16-20	240	4-5
EC-1200A	A	1200	1050	29	48.82 (1.922)	16.71 (0.658)	32 (1.13)	105	16-20	350	4-5
EC-5000D	D	5000	4750	11	58.47 (2.302)	32.39 (1.275)	140 (4.94)	450	16-20	1600	4-5
EC-5700D	D	5700	4750	11	58.47 (2.302)	32.39 (1.275)	140 (4.94)	475	16-20	2500	3-4
ECF-800AA	AA	800	725	37	49.00 (1.929)	14.20 (0.559)	22 (0.78)	Fast Charge (mA) 870			
ECF-1200A	A	1200	1500	29	48.82 (1.922)	16.71 (0.658)	32 (1.13)	Fast Charge (mA) 1260			
ECF-1800CS	Cs	1800	1600	22	42.24 (1.663)	22.10 (0.870)	47 (1.66)	Fast Charge (mA) 1920			
EP-1100CS	4/5Cs	1100	1050	15	33.35 (1.313)	22.10 (0.870)	37 (1.30)	105	16-20	330	4-5
EP-1300CS	Cs	1300	1200	15	42.24 (1.663)	22.10 (0.870)	44 (1.53)	120	16-20	350	4-5
EPF-1300CS	Cs	1300	1200	15	42.24 (1.663)	22.10 (0.870)	44 (1.53)	Fast Charge (mA) 1450			
EPP-1200CS	Cs	1200	1000	7	42.24 (1.663)	22.10 (0.870)	50 (1.75)	Fast Charge (mA) 1440			
ET-4300D	D	4300	4000	12	58.47 (2.302)	32.39 (1.275)	130 (4.59)	400	16-20	N/A	N/A
ETM-600AA	AA	600	-	37	49.00 (1.929)	14.20 (0.559)	24 (0.83)	60	16-20	150	5-6
E-650AA	AA	650	600	35	49.00 (1.929)	14.20 (0.559)	22 (0.76)	60	16-20	150	5-6
E-1200CS	4/5Cs	1200	1100	21	33.35 (13.13)	22.10 (0.870)	37 (1.30)	105	16-20	250	5-6
E-1600CS	Cs	1600	1500	22	42.24 (1.663)	22.10 (0.870)	47 (1.64)	150	16-20	350	5-6
E-2300D	1/2D	2300	2200	18	35.86 (1.412)	32.39 (1.275)	77 (2.71)	220	16-20	900	5-6
E-4300D	D	4300	4000	11	58.47 (2.302)	32.39 (1.275)	130 (4.59)	400	16-20	1600	4-5
EF-650AA	AA	650	600	35	49.00 (1.929)	14.20 (0.559)	22 (0.76)	Fast Charge (mA) 700			
EF-1600CS	Cs	1600	1500	22	42.24 (1.663)	22.10 (0.870)	47 (1.64)	Fast Charge (mA) 1650			
EF-4300D	D	4300	4000	11	58.47 (2.302)	32.39 (1.275)	130 (4.95)	Fast Charge (mA) 4620			

BATTERY SPECIALTIES — Leadership in Portable Power Solutions

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HAWKER ENERGY BATTERIES

CYCLON PRODUCT FAMILY

(All capacities at 10 hr. rate 25°C to 1.67 vpc)

Products (capacity)	Part Number	Internal res. of fully charged cell mΩ	Nom. short cir. current for charged cell	Dimensions				
				Diameter in. (mm)	Height in. (mm)	Height with Terminals in. (mm)	Weight oz. (gm)	Tabs in. (mm)
D cell (2.5Ah)	0810-0004	5.0	400A	1.35 (34.3)	2.41 (61.2)	2.68 (68.1)	6.28 (178.0)	.187 x .025 (4.75 x 0.64)
Tall D (4.5Ah)	0860-0004	5.0	400A	1.35 (34.3)	3.78 (96.0)	4.05 (102.9)	9.60 (272.2)	.187 x .025 (4.75 x 0.64)
X cell (5.0.Ah)	0800-0004	3.5	570A	1.75 (44.5)	2.87 (72.9)	3.21 (81.5)	12.77 (362.0)	.250 x .025 (6.35 x 0.64)
E cell (8.0Ah)	0850-0004	3.0	665A	1.75 (44.5)	3.94 (100.1)	4.28 (108.7)	19.40 (548.9)	.250 x .025 (6.35 x 0.64)
J cell (12.5Ah)	0840-0004	2.5	800A	2.04 (51.8)	4.85 (123.2)	5.34 (135.6)	29.60 (839.2)	.0.3312 x 0.032 (7.92 x 0.81)
BC cell (25Ah)	0820-0004	1.5	1,335A	2.57 (65.3)	6.25 (158.8)	6.82 (173.2)	58.88 (1669.2)	M6 (-) and M8 (+) terminals

Products (capacity)	Part Number	Internal res. of fully charged Monobloc mΩ	Nom. short cir. current for charged Monobloc	Dimensions				
				Length in. (mm)	Width in. (mm)	Height in. (mm)	Weight lb. (kg)	Tabs in. (mm)
D (2.5Ah)	0819-0010	10.0	400A	3.13 (79.5)	1.81 (46.0)	2.75 (69.9)	.80 (.36)	0.187 x .025 (4.75 x 0.64)
X (5.0.Ah)	0809-0010	7.0	570A	3.80 (96.5)	2.12 (53.8)	3.02 (76.7)	1.62 (.74)	0.250 x .025 (6.35 x 0.64)
E (8.0Ah)	0859-0010	6.0	665A	3.81 (96.8)	2.13 (54.1)	4.00 (101.6)	2.11 (.96)	0.250 x .025 (6.35 x 0.64)

Products (capacity)	Part Number	Internal res. of fully charged Monobloc mΩ	Nom. short cir. current for charged Monobloc	Dimensions				
				Length in. (mm)	Width in. (mm)	Height in. (mm)	Weight lb. (kg)	Tabs in. (mm)
D (2.5Ah)	0819-0012	15.0	400A	4.48 (113.8)	1.81 (46.0)	2.75 (69.9)	1.15 (.52)	0.187 x .025 (4.75 x 0.64)
X (5.0Ah)	0809-0012	10.0	570A	5.48 (139.2)	2.12 (53.8)	3.02 (76.7)	2.16 (.98)	0.250 x .025 (6.35 x 0.64)
E (8.0Ah)	0859-0012	8.0	665A	5.48 (139.2)	2.13 (54.1)	4.00 (101.6)	3.15 (1.43)	0.250 x .025 (6.35 x 0.64)

Panasonic Batteries

LITHIUM BATTERIES

(CF)n/LI POLY-CARBON MONOFLUORIDE (BR) - *CYLINDRICAL TYPE*

Model No.	Electrical Characteristics					Dimensions (Max.)		Weight (g)
	Nominal Voltage (V)	*Nominal Capacity (mah)	Standard Drain (ma)	Continuous Maximum Drain (ma)	Maximum Pulse (ma)	Diameter (mm)	Approximate Height (mm)	
BR-C	3	5,000	150	300	1,000	26.0	50.0	42.0
BR-A	3	1,800	2.5	250	1,000	17.0	45.5	18.0
BR-2/3A	3	1,200	2.5	250	1,000	17.0	33.5	13.5
BR-1/2A	3	650	2	120	500	17.0	23.0	9.5
BR-2/3AA	3	600	2	80	500	14.5	33.5	9.5

MnO_2/LI: MANGANESE DIOXIDE (CR) - *COIN TYPE*

Model No.	Electrical Characteristics (20°)					Recommended Drain		Dimensions		
	JIS	IEC	Nominal Voltage (V)	*Nominal Capacity (mAh)	Pulse (mA)	Standard (mA)	Low (µA)	Diameter (mm)	Height (mm)	Weight (g)
CR1025	CR1025	—	3	30	5	0.10	1	10.0	2.50	0.7
CR1216	CR1216	—	3	25	5	0.10	1	12.5	1.60	0.7
CR1220	CR1220	CR1220	3	35	5	0.10	1	12.5	2.00	0.9
CR1616	CR1616	—	3	55	8	0.10	1	16.0	1.60	1.2
CR1620	—	CR1620	3	75	8	0.10	1	16.0	2.00	1.3
CR1632	—	—	3	125	8	0.10	1	16.0	3.20	1.8
CR2012	CR2012	—	3	55	10	0.10	1	20.0	1.20	1.4
CR2016	CR2016	CR2016	3	90	10	0.10	2	20.0	1.60	1.7
CR2025	CR2025	CR2025	3	165	15	0.20	3	20.0	2.50	2.5
CR2032	CR2032	CR2032	3	220	15	0.20	4	20.0	3.20	3.3
CR2320	CR2320	—	3	130	15	0.20	3	23.0	2.00	3.0
CR2330	CR2330	—	3	265	15	0.20	5	23.0	3.00	4.0
CR2354	—	—	3	560	15	0.20	5	23.0	5.40	5.9
CR3032	—	—	3	500	15	0.20	10	30.0	3.20	7.1
CR2477	—	—	3	1000	10	0.20	10	24.5	7.70	10.5

* Normal capacity shown is based on standard drain.

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A Commitment to Total Service. When you call Battery Specialties, you get action. Whether you need stock pricing, cross-referencing assistance, technical help, or even if you're just checking order status, we're committed to delivering complete satisfaction in the shortest possible time.

Custom Assembly & Test. Since 1979 we have met the West's growing demand for custom, lightweight power in portable applications. We work with you, ideally during design phase, to determine the optimum solution for your requirements.

Many leading manufacturers whose products we distribute have selected Battery Specialties for their "authorized assembler" programs, which includes cost-effective engineering, subsystem manufacturing and state-of-the-art testing to the AQL you specify. Every phase of our assembly and test adheres to MIL-SPEC standards.

And We Ship—Fast. Stock orders are shipped same day or following morning. First article prototypes on custom assemblies ship in one to four weeks, depending on complexity.

Off-the-Shelf Inventory

▪ *Nickel Cadmium* ▪ *Nickel Metal Hydride*
▪ *Sealed Lead Acid* ▪ *Alkaline* ▪ *Carbon Zinc*
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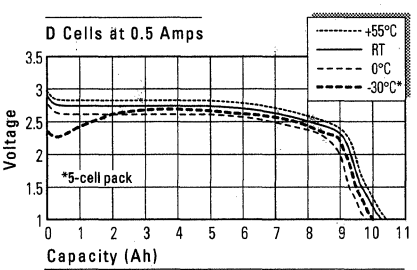
An important part of our service is to provide customized battery packs. We work closely with our customers during the design phase of new equipment, and develop battery packs to meet their specific requirements.

BlueStar Battery Systems Corporation

BlueStar is a leading international supplier to commercial and military markets worldwide providing:

- BlueStar non-rechargeable lithium cells and batteries
- BlueStar sea water activated batteries
- BlueStar assembled battery packs

BlueStar is committed to providing customers with the optimum battery design to meet the requirements of each application. All product is manufactured using the ISO 9001 standard. Many steps in the manufactuing and testing of batteries meet or exceed the military specification MIL-PRF-49471 and MIL-B-49430.



BlueStar's $LiMnO_2$ is a reliable high rate cell that can run at either continuous or pulsed discharge. Chart shows constant current discharge for D cell at 0.5 Amps

Technologies

BlueStar manufactures two types of lithium cells and one style of silver chloride (sea water activated) cell:

- Lithium Sulphur Dioxide ($LiSO_2$)
- Lithium Manganese Dioxide ($LiMnO_2$)
- Silver Chloride/Magnesium (AgClMg)

Battery packs may be made using:

- BlueStar manufactured cells
- Nickel Cadmium cells (NiCd)
- Nickel Metal Hydride cells (NiMH)
- Alkaline cells
- Rechargeable Alkaline cells
- Sealed Lead Acid cells
- Other cell types as required

Applications

Lithium primary batteries are the energy of choice when:

- Low temperature operations is required from as low as -60°C
- Maximum energy is required within minimum size and weight
- The battery may be inactive for as long as 10 years before use

Benefits

BlueStar Lithium battery cells provide 3.0 volts nominal, come in a wide range of sizes and use a fully welded hermetic construction:

$LiSO_2$ cells have a number of additional advantages:

- Specific energy of 300 Whrs/kg
- Ability to sustain high continuous current (>3 Amps)
- Provide pulse currents in excess of 20 Amps
- Operation at -60°C

$LiMnO_2$ cells offer:

- Energy density of up to 550 Whrs/litre
- Minimal voltage delay after prolonged storage
- Operation to -40°C

AgClMg cells offer:

- Exceptional long term storage (100% capacity after 10 years)
- Lightweight
- High energy density
- Good response to pulse loads

NiCd and NiMH cells for:

- Multiple use of battery pack
- Good cost/usage ratio

Protective Devices

BlueStar offers a wide range of protective devices for battery packs. We stock solid state fuses (polyswitches), thermal fuses, bimetal circuit breakers, PTC thermistors, blocking diodes, etc.

For further information call our applications hot line at 800 542 3557 (604 543 4350 outside North America) or contact our web page at www.bstar.com

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BlueStar Battery Systems Corp.

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BATTERIES, CHARGERS & POWER SUPPLIES

Batteries & Chargers

- NICKEL CADMIUM
- NICKEL METAL HYDRIDE
- LITHIUM ION
- LITHIUM
- ALKALINE
- LEAD ACID

"We Do What We Say We Will Do"

ISO 9002 QMI REGISTERED QUALITY SYSTEM

Cell-Con battery packs carry a full 1-year warranty. We provide prototypes within several days of stocked cells and offer competitive pricing with responsible service.

See our page in DC Power Supply, Section 4000, Page **D•1521**

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CELL-CON INCORPORATED SEALED LEAD ACID BATTERIES & CHARGERS

SEALED LEAD-ACID BATTERIES (UL 924 LISTED)

BATTERY TYPE NUMBER	NOMINAL VOLTAGE (V)	NOMINAL CAPACITY AH (20HR)	DIMENSIONS INCH L	W	H	TH	MILLIMETER L	W	H	TH	ASSEMBLY FIGURE	MAX CHARING CURRENT (A)
YP4-2	2	4	1.85	0.98	3.98	4.21	47	25	101	107		1.20
YP4.2-4	4	4.2	1.93	2.09	3.70	3.86	49	53	94	98		1.26
YP1.2-6	6	1.2	3.82	0.98	2.01	2.24	97	25	51	57		0.36
YP3-6	6	3	5.28	1.34	2.36	2.60	134	34	60	66		0.90
YP4-6	6	4	2.76	1.89	4.02	4.25	70	48	102	108		1.20
YP4-6WL	6	4	2.76	1.89	4.02	4.02	70	48	102	102		1.20
YP6-6	6	6	5.94	1.34	3.70	3.94	151	34	94	100		1.80
YP8-6	6	8	5.94	1.97	3.70	3.94	151	50	94	100		2.40
YP10-6	6	10	5.94	1.97	3.70	3.94	151	50	94	100		3.00
YP1.2-12	12	1.2	3.82	1.69	2.01	2.24	97	43	51	57		0.36
YP1.9-12	12	1.9	7.01	1.34	2.36	2.60	178	34	60	66		0.57
YP2-12	12	2	7.01	1.34	2.36	2.60	178	34	60	66		0.60
YP3-12	12	3	5.28	2.64	2.36	2.60	134	67	60	66		0.90
YP4-12	12	4	3.54	2.76	4.02	4.25	90	70	102	108		1.20
YP6.5-12	12	6.5	5.94	2.56	3.70	3.94	151	65	94	100		1.95
YP7-12	12	7	5.94	2.56	3.70	3.94	151	65	94	100		2.10
YP15-12	12	15	7.13	2.99	6.57	6.57	181	76	167	167		4.50
YP17-12	12	17	7.13	2.99	6.57	6.57	181	76	167	167		5.10
YP24-12	12	24	6.54	6.89	4.92	4.92	166	175	125	125		7.20
YP38-12	12	38	7.76	6.50	6.69	6.69	197	165	170	170		11.40

SEALED LEAD-ACID CHARGERS (UL & cUL LISTED)

PN	VOLTAGE	NOMINAL CURRENT	DIMENSIONS (INCHES)
95372	6	500mA	2.90x2.28x1.87
95374	6	1A	2.90x2.28x1.87
95373	12	600mA	2.90x2.28x1.87
95375	12	1A	3.35x2.70x2.22

• Wall Plug-in • Distinctive LED display • Manufactured in the USA
• Thermally Protected • Molded Strain Relief

See our page in DC Power Supply, Section 4000, Page D•1521

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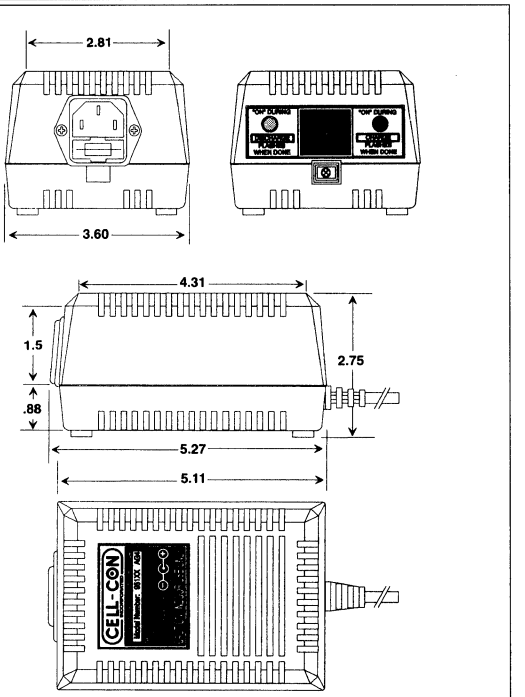
CELL-CON INCORPORATED BATTERY ASSEMBLIES & CHARGERS

CHARGERS SMART/FAST AND POWER SUPPLIES

Made In USA

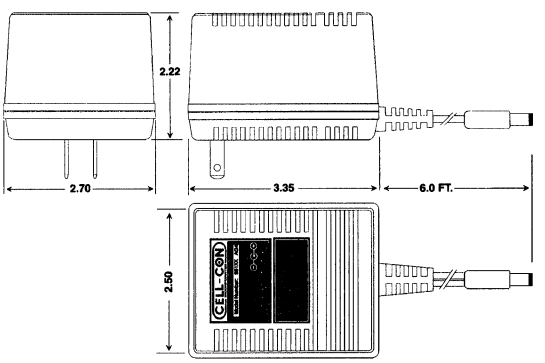
DT-25 DESK CASE

- Samples 1-2 weeks
- Micro Processor controlled
- Custom Nameplate
- Thermistor control option
- IEC Connector Optional
- Fused I/O as Required
- 120/240VAC input switch
- Custom Output cable
- Fast/Smart Charge Rates
- Molded Strain Relief
- Discharge Option
- Output plugs as required
- LED Function Indicators
- UL/CSA Available



P-20 WALL CASE

- Samples 1-2 weeks
- Custom Nameplate
- DC Charger
- AC or Dc Power Supply
- Up to 15W / 40V A
- Vented Case
- Molded Strain Relief
- Output plugs as required
- UL/CSA Listed
- Smaller case sizes available



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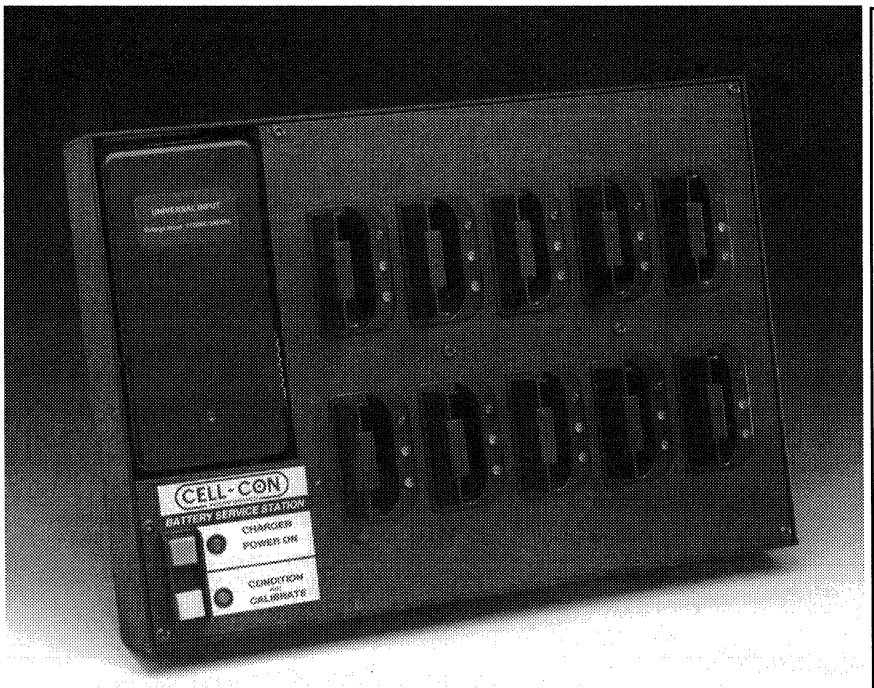
- 12 VDC Input
- Fast/Smart Microprocessor Controlled
- 4-10 Cell NiCd or NiMh
- LED Charge Status Indicator
- Can be used with UL & cUL listed power supplies for use with 120 VAC input

CUSTOM DESIGNED MULTIPOSITION CHARGER & CONDITIONER



- CPU Controlled
- Universal Input
- Complete LED Indicators
- Communicates with Smart Battery
- Conditions & Calibrates
- Agency Approvals Available

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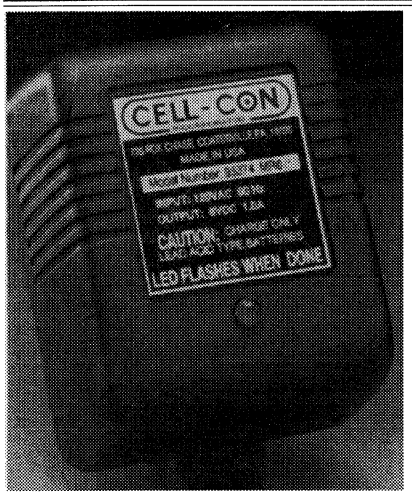
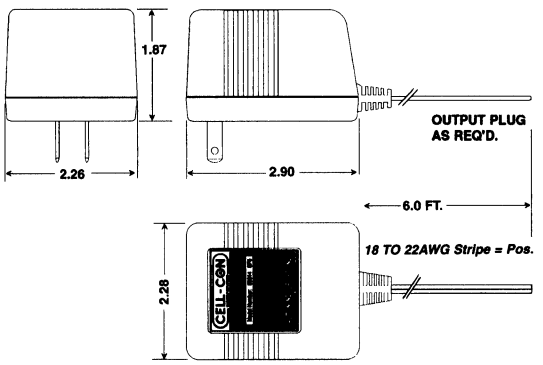
CELL-CON INCORPORATED LEAD ACID CHARGERS & SWITCHING ADAPTERS

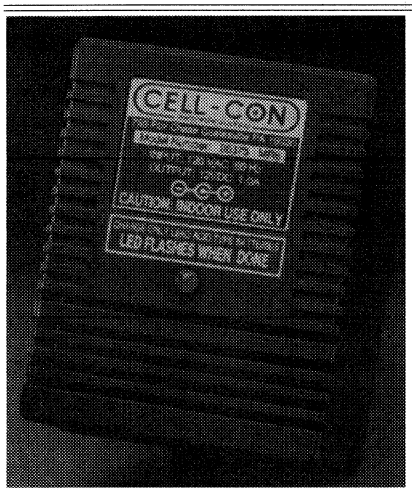
P-14 LEAD ACID CHARGER



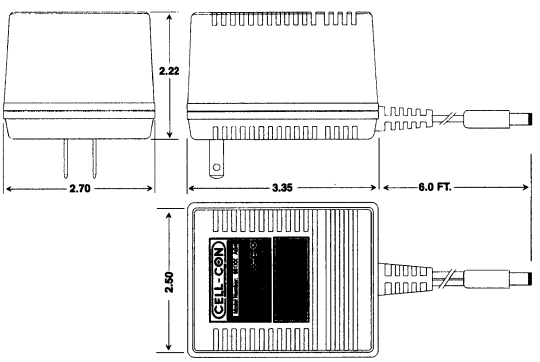
- Float System
- UL and cUL Listed
- 3-4 week Lead Time
- Custom Labeling
- Distinctive LED indication
- Thermally protected



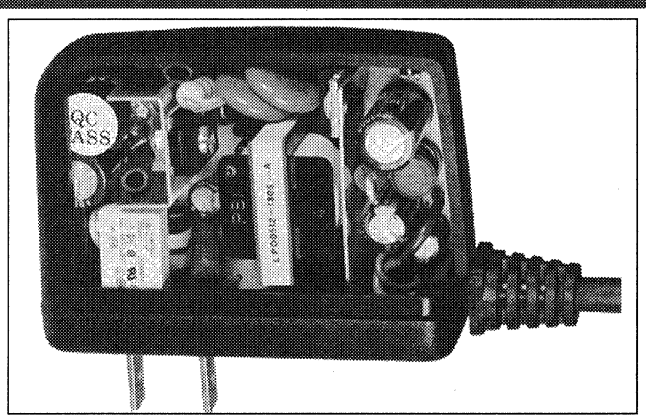
P-20 LEAD ACID CHARGER



- Float System
- UL and cUL Listed
- 3-4 week Lead Time
- Custom Labeling
- Distinctive LED indication
- Thermally protected



3 TO 15 WATT SWITCHING ADAPTER



DIMENSION:
73.0 mm (L) x 34.0 mm (W) x 51.0 mm (H)
2.87" (L) x 1.33" (W) x 2.00" (H)

WEIGHT:
ONLY 4.6 OUNCES (130 Grams)

E168434 LR106032

See our page in DC Power Supply, Section 4000, Page D•1521

CELL-CON INCORPORATED 735 Fox Chase • Coatesville, PA 19320
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MICROPROCESSOR-BASED CASP® FROM CHRISTIE

SUPPORTING RECHARGEABLE BATTERIES

The CASP® concept of battery charging, analyzing, and sequencing has been proven extensively with rechargeable batteries in the most critical applications: military, aerospace, medical, aviation, video, and communications.

Reconditioning

The CASP reconditioning feature, using Christie's exclusive ReFLEX® Charger, restores the degraded Ni-Cd battery to virtually full utility – with an obvious impact on cost.

Charging With ReFLEX

With ReFLEX, the charging waveform consists of positive current charge pulses, followed by sharp, negative current discharge pulses

This results in faster charge times, elimination of "memory" effect, higher capacity, lower charge temperatures, increased charge efficiency, and improved cell-to-cell balance.

Other Charge Techniques

CASP can be programmed to handle any other charging requirement: constant current, two-step constant current, constant potential, and maintenance charging.

CASP is compatible with any rechargeable battery chemistry, including nickel-cadmium, nickel-metal hydride, lead-acid, silver-zinc and lithium-ion, as well as batteries yet to be developed

Battery Analysis

In using conventional battery chargers there is no way to know the battery's true condition or state of health. CASP, by contrast, can quickly analize a battery's charge or discharge capacity, and display this information on a LCD readout or optional printer.

Battery Recognition

When a battery is connected to any of the six CASP channels, the system recognizes the battery via the cable, and automatically processes the battery using appropriate charge and discharge characteristics. Batteries of different makes and models can be connected to CASP at the same time and processed sequentially.

Cost Effective

Foremost is the ability to recondition faded Ni-Cd batteries. And with ReFLEX, Ni-Cd batteries are more fully charged, stay cooler, and have less cell imbalance; improving their reliability.

Choose From Four Models

CASP is available in four models, the high performance, programmable CASP/2000 and CASP/1500, and the pre-programmed CASP/1200 and CASP/1100.

While all models have similar capabilities, the CASP/2000, has higher charge and discharge power, resulting in faster battery processing. CASP/1500 and CASP/2000 may be programmed from their own keyboard, making it especially valuable when the user expects to add new or newly-developed batteries to his inventory.

CASP® SPECIFICATIONS

Electrical Output

CASP Model	2000L	2000H	2000-D	1500	1200	1200-D	1100
Charging Power (Max W)	350	350	175/350	250	250	175/250	250
Charging Voltage (VDC)	0-42	0-78	0-42	0-78	0-78	0-42	0-78
Charging Current (ADC)	0-14	0-10	0-14	0-10	0-10	0-14	0-10
Discharge Power (MAX W)	65	65	65	35	35	35	35
Discharge Voltage (VDC)	0-42	0-78	0-42	0-78	0-78	0-42	0-78
Discharge Current (ADC)	0-14	0-14	0-14	0-14	0-14	0-14	0-14

Electrical Input

AC Models - 90-135VAC or 180-265VAC, automatically selected.
Frequency - 47 to 440Hz
Current - 5A maximum

DC Models - 10.5 to 40VDC
Current - 30A maximum

Mechanical

Size - 8.75" x 14" x 4" (CASP/2000)
(22..2 x 35.6 x 10.2cm)

Weight (Lbs./kg) -

CASP/1100	10/4.6
CASP/1500	10/4.6
CASP/1200	12/5.5
CASP/2000	14/6.4

Note: All specifications subject to change without notice.

CHRISTIE® ELECTRIC CORP.
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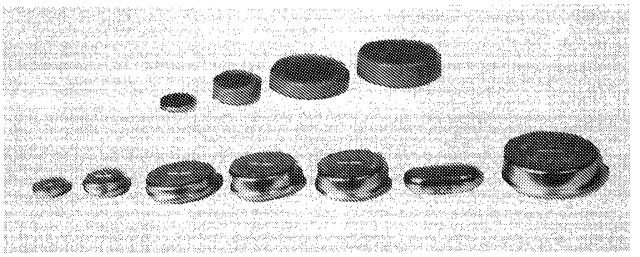
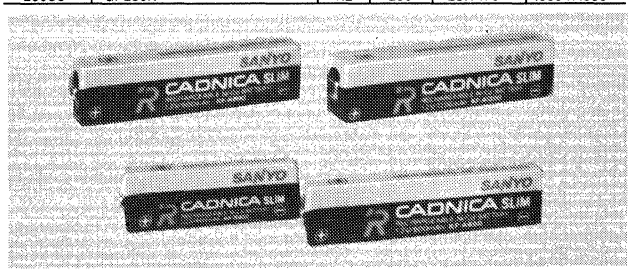
NI-CAD SINGLE CELLS

PART NO.	X-REF/DESCRIPTION	VOLTS	mAh	DIAMETER x HEIGHT (MM)	DIAMETER x HEIGHT (INCHES)
N-75P	N-75P	1.2	75	13 x 45	.51 x .57
N-120TA	N-120TA	1.2	120	7.8 x 42.5	.306 x 1.67
1/3AAA-50	N-50 AAA	1.2	50	10.5 x 16	.414 x .630
AAA-180	STANDARD AAA	1.2	180	10.5 x 44.5	.414 x 1.75
AAA-250	N-250 AAA	1.2	250	10.5 x 44.5	.414 x 1.75
N-180		1.2	180	12 x 29.5	.473 x 1.16
N-150	N-150N	1.2	150	12 x 29.5	.473 x 1.16
1/3AA-110	N-110 AA	1.2	110	14.5 x 17	.571 x .670
1/2AA-270	N-270 AA	1.2	270	14.5 x 30	.571 x 1.18
1/2AA-320	N-320 AA	1.2	320	14.5 x 30	.571 x 1.18
AA-500	STANDARD AA	1.2	500	14.2 x 50	.559 x 1.97
AA-600	N-600 AA	1.2	600	14.2 x 50	.559 x 1.97
AA-700	N-700 AA	1.2	700	14.2 x 50	.559 x 1.97
AA-800	N-800 AA	1.2	800	14.2 x 50	.559 x 1.97
5/4AA-1100	N-1100 AAE LONG AA	1.2	1100	14.2 x 65	.559 x 2.50
1/3AF-225	1/3A SUB F NI-CAD CELL	1.2	225	17 x 17	.670 x .670
2/3AF-600	2/3A SUB F NI-CAD CELL	1.2	600	17 x 28	.670 x 1.10
4/5AF-1000	4/5A SUB F NI-CAD CELL	1.2	1000	17 x 43	.670 x 1.69
AF-1200	KR-1200 AE A SUB F CELL	1.2	1200	17 x 50	.670 x 1.97
AF-1400E	KR-1400 AE	1.2	1400	17 x 50	.670 x 1.97
AF-1400U	KR-1400 AU	1.2	1400	17 x 50	.670 x 1.97
AFR-800	N-800AR RAPID CHARGE	1.2	800	17 x 50	.670 x 1.97
5/4F-1700	5/4 A SUB F NI-CAD CELL	1.2	1700	17 x 67	.670 x 2.64
1/2SC-650	1/2 SUB-C CELL	1.2	650	23 x 26	.906 x 1.02
1/2SCR-600	1/2 SUB-C RAPID CHARGE	1.2	600	23 x 26	.906 x 1.02
4/5SCR-1000	4/5 SUB-C RAPID CHARGE	1.2	1000	23 x 34	.906 x 1.34
SC-1200	STANDARD SUB-C	1.2	1200	23 x 43	.906 x 1.69
SCH-1200	HIGH TEMP	1.2	1200	23 x 43	.906 x 1.69
SC-1300	KR-1300 SC	1.2	1300	23 x 43	.906 x 1.69
SCR-1300	RAPID CHARGE CELL	1.2	1300	23 x 43	.906 x 1.69
SC-1500	SUB-C CELL	1.2	1500	23 x 43	.906 x 1.69
SCR-1500	SUB-C RAPID CHARGE	1.2	1500	23 x 43	.906 x 1.69
SCR-1700	KR1700 SCR	1.2	1700	23 x 43	.906 x 1.69
SC-1800	KR1800 SC	1.2	1800	23 x 43	.906 x 1.69
5/4SC-2300	KR2300 SCE	1.2	2300	23 x 50	.906 x 1.97
1/2C-700	1/2 C SIZE CELL	1.2	700	26 x 24	1.02 x .946
3/5C-1100	3/5 C SIZE CELL	1.2	1100	26 x 30	1.02 x 1.18
C-1200	CONSUMER C CELL	1.2	1200	26 x 50	1.02 x 1.97
C-1800	STANDARD C CELL	1.2	1800	26 x 50	1.02 x 1.97
C-2000	KR-2000 C	1.2	2000	26 x 50	1.02 x 1.97
C-2500		1.2	2500	26 x 50	1.02 x 1.97
C-2800	KR-2800 CE	1.2	2800	26 x 50	1.02 x 1.97
1/2D-2300	1/2 D SIZE CELL	1.2	2300	33 x 36.8	1.30 x 1.45
3/5D-2800	3/5 D SIZE CELL	1.2	2800	34 x 44	1.34 x 1.73
D-1200	CONSUMER D CELL	1.2	1200	34 x 61	1.34 x 2.40
D-4000	STANDARD D CELL	1.2	4000	34 x 61	1.34 x 2.40
DR-4000	RAPID CHARGE N-4000 DR	1.2	4000	34 x 61	1.34 x 2.40
D-4400	HIGH CAPACITY D CELL	1.2	4400	34 x 61	1.34 x 2.40
D-4500		1.2	4500	34 x 61	1.34 x 2.40
D-5000	KR-5000 DE	1.2	5000	34 x 61	1.34 x 2.40
F-7000	KR-7000 F	1.2	7000	34 x 91	1.34 x 3.59
M-10000	KR-10000 M	1.2	10000	43 x 91	1.69 x 3.59
M-20000	KR-20000 M	1.2	20000	43 x 146	1.69 x 5.75



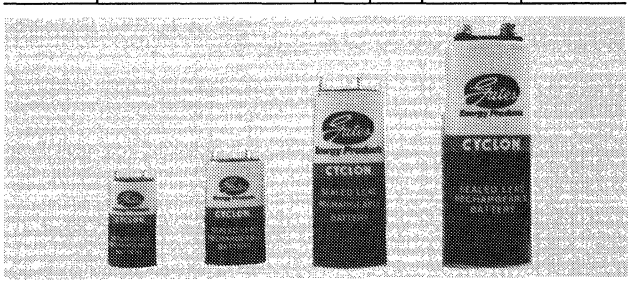
NI-CAD BUTTON CELLS

PART NO.	X-REF/DESCRIPTION	VOLTS	mAh	DIAMETER x HEIGHT (MM)	DIAMETER x HEIGHT (INCHES)
11FSS	FLARED BUTTON CELL V11R	1.2	11	11.5 x 3.1	.453 x .122
11FSNMH	V11H-VARTA 55601-101-000	1.2	11	11.5 x 3.1	.453 x .122
30FSS	FLARED BUTTON CELL V30R	1.2	30	11.5 x 5.35	.453 x .211
30FSNMH	V30H-VARTA 55603-101-000	1.2	30	11.5 x 5.35	.453 x .211
50FSS	FLARED BUTTON CELL V50R	1.2	50	15.5 x 6	.611 x .236
60FSS	FLARED BUTTON CELL V60R	1.2	60	15.5 x 6	.611 x .236
70FSMH	V70H-VARTA 55606-101-000	1.2	70	15.5 x 6	.611 x .236
100FSS0	OVAL BUTTON CELL V100R	1.2	100	OVAL	OVAL
170FSS	FLARED BUTTON CELL V170R	1.2	170	25.1 x 6.7	.989 x .264
225FSS	FLARED BUTTON CELL 225DKZ	1.2	225	25.1 x 9.1	.989 x .358
250FSMH	V250H-VARTA 55617-101-000	1.2	250	25.1 x 6.7	.989 x .264
280FSS	FLARED BUTTON CELL V280R	1.2	280	25.1 x 8.8	.989 x .347
300FSMH	CP300H-VARTA 55628-101-000	1.2	300	25.1 x 7.55	.989 x .295
500FSS	FLARED BUTTON CELL V500RH	1.2	500	34.4 x 10	1.35 x .394
5SS	GP5K	1.2	5	11.5 x 2.1	.453 x .082
30SS	GP30K	1.2	30	11.6 x 5.4	.457 x .213
60SS	GP60K	1.2	60	15.5 x 6.2	.611 x .244
100SS	GP100K	1.2	100	15.3 x 7.8	.603 x .307
170SS	GP170K	1.2	170	25.1 x 6.7	.989 x .264
280SS	GP280K	1.2	280	25.1 x 9	.989 x .355



NI-CAD SLIM LINE CELLS

PART NO.	X-REF/DESCRIPTION	VOLTS	mAh	DIAMETER x HEIGHT (MM)	DIAMETER x HEIGHT (INCHES)
KF-B400	KF-B400	1.2	400	48 x 17 x 6.1	1.89 x .67 2.4
KF-A600	KF-A600	1.2	600	67 x 17 x 6.1	2.6 x .67 x 2.4
KF-B650	KF-B650	1.2	650	48 x 17 x 8.3	1.89 x .67 x .33
KF-A900	KF-A900	1.2	900	67 x 17 x 8.1	2.6 x .67 x .31
KF-1200	KF-A1200	1.2	1200	67 x 17 x 10.3	2.6 x .67 x .40



GATES CYCLON SINGLE CELLS

PART NO.	VOLTS	CAPACITY	LENGTH	DIAMETER	WEIGHT	PICTURE #
0810-0004 CYCLON-D	2V	2.5 AH	2.65 IN.	1.34 IN.	6.5 OZ.	1
0800-0004 CYCLON-X	2V	5.0 AH	3.16 IN.	1.74 IN.	13.0 OZ.	2
0840-0004 CYCLON-J	2V	12.5 AH	5.83 IN.	2.04 IN.	1.90 LBS.	3
0820-0004 CYCLON-BC	2V	25.0 AH	6.78 IN.	2.55 IN.	3.50 LBS.	4

ALL ITEMS IN STOCK FOR IMMEDIATE DELIVERY

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SEALED LEAD ACID RECHARGEABLE BATTERIES

UPS/SPS SYSTEMS, EMERGENCY LIGHTING, ALARM SYSTEMS

PART NUMBER	VOLTS	CAPACITY 20 HR. RATE	DIMENSIONS (INCHES) LENGTH	WIDTH	HEIGHT INC. TERM	WEIGHT (LBS)	CROSS REFERENCE	TERMINATIONS
LEAD-4-3	4	3.0	3.56	1.33	2.51	.94	NP3-4	.187 TAB
LEAD-4-4.2	4	4.2	1.89	1.40	4.68	1.23	NP4.2-4, LCS-384P, 414P	FLAT CONTACT
LEAD-4-4.5PS	4	4.5	1.93	2.09	3.86	1.5	PS445	.250 TAB
LEAD-4-10	4	10	4.02	1.97	3.85	2.97	NP10-4, PS-490	.250 TAB
LEAD-6-1	6	1.0	2.00	1.67	2.15	.55	NP1-6, PS-610	.187 TAB
LEAD-6-1PS	6	1.0	2.00	1.67	2.15	.55	PS 610 / NP1-6	.187 TAB
LEAD-6-1.2	6	1.2	3.82	.98	2.15	.66	NP1.2-6, LCR6V1.3P, PS-612	.187 TAB
LEAD-6-1.2PS	6	1.2	3.82	.94	2.13	.06	PS 612	.187 TAB
LEAD-6-1.3 HRD	6	1.3	3.82	.98	2.15	0.71	NPH 1.3-6	.187 TAB
LEAD-6-2.6	6	2.6	5.27	1.33	2.52	1.23	NP2.6-6	.187 TAB
LEAD-6-3	6	3.0	5.27	1.33	2.52	1.43	NP3-6, PS-630	.187 TAB
LEAD-6V-3.2P	6	3.2	2.60	1.30	4.92	1.46	LCR6V3.2P	.187 TAB
LEAD-6-3.2 HRD	6	3.2	5.28	1.34	2.52	1.54	NPH3.2-6	.187 TAB
LEAD-6-4	6	4.0	2.76	1.85	4.15	1.87	NP4-6, LCR6V4P, PS-640	.187 TAB
LEAD-6-4PS	6	4.5	2.76	1.89	4.25	1.95	PS-640F1	.187 TAB
LEAD-6-4W	6	4.0	2.76	1.85	4.04	1.87	NP4-6W, LCR6V4PL	WIRE & CONNECTOR
LEAD-6-4.2	6	4.4	1.89	2.03	4.68	1.76	NP4-2-6H, LCS416P	FLAT CONTACT
LEAD-6-5L	6	5	2.63	2.63	4.28	2.00	PS650L	SPRING
LEAD-6-7	6	7.0	5.95	1.33	3.84	2.98	NP7-6, LCR6V6.5P, LCR6V7.2P, PS-670	.187 TAB
LEAD-6-8PS	6	8.0	3.86	2.20	4.65	3.3	PS682	.187 TAB
LEAD-6-9.5PS	6	9.5	4.26	2.65	5.54	4.9	PS695	FASTON
LEAD-6-9.5TOY	6	9.5	4.26	2.65	5.54	5.4	–	CONNECTOR
LEAD-6-10	6	10	5.95	1.97	3.84	4.41	NP10-6. LCR6V10P, PS-6100	.187 TAB
LEAD-6-10-250	6	10	5.95	1.97	3.84	4.41	NP10-6-250	.250 TAB
LEAD-6-10PS	6	10	5.95	2.00	3.86	4.6	PS-6100	.187 TAB
LEAD-6-12TOY	6	12	4.26	2.65	5.54	5.40	PS-612TH	CONNECTOR
LEAD-6-20PS	6	20	6.18	3.27	4.92	8.2	PS6200	NUT & BOLT
LEAD-6-36PS	6	36	6.25	3.35	6.95	13.8	PS6360	.250 TAB
LEAD-8-3	8	3.0	7.12	1.33	2.51	2.0	JC828	.187 TAB
LEAD-12-0.8	12	0.8	3.78	0.98	2.42	.77	NP0.8-12, PS1207	WIRE & CONNECTOR
LEAD-12-1.2	12	1.2	3.82	1.89	2.15	1.25	NP1.2-12, LCR12V1.3P, PS-1212	.187 TAB
LEAD-12-1.3 HRD	12	1.3	5.28	2.64	2.52	3.09	NPH 1.3-12	.187 TAB
LEAD-12-2	12	2.0	5.91	.79	3.35	1.54	NP2-12	.187 TAB
LEAD-12-2.3	12	2.3	7.01	1.34	2.52	2.07	NP2.3-12, PS1220, 1226	.187 TAB
LEAD-12-2.6	12	2.6	5.27	2.64	2.52	2.47	NP2.6-12, PS-1230	.187 TAB
LEAD-12-3.2 HRD	12	3.2	5.28	2.64	2.52	3.09	NPH3.2-12	.187 TAB
LEAD-12-3.2PS	12	3.2	7.68	1.85	2.95	3.1	PS1232	.187 TAB
LEAD-12-4	12	4.0	3.54	2.75	4.17	3.74	NP4-12, PS-1242	.187 TAB
LEAD-12-5 HRD	12	5.0	3.54	2.75	4.17	4.41	NPH5-12	.250 TAB
LEAD-12-7	12	7.0	5.95	2.56	3.84	5.84	NP7-12, LCR12V6.5P, PS-1270	.187 TAB
LEAD-12-7FR	12	7.0	5.95	2.56	3.84	5.84	NP7-12FR	.187 TAB
LEAD-12-7PS	12	7.0	5.95	2.56	3.86	5.7	PS-1270	.187 TAB
LEAD-12-12	12	12	5.95	3.86	3.84	8.82	NP12-12, LCR12V10P, PS12120.250	TAB
LEAD-12-18	12	18	7.12	2.99	6.57	13.70	NPG-18-12, LCR12V17BP	NUT & BOLT
LEAD-12-24B	12	24	6.54	6.89	4.92	19.10	NP24-12B, PS12260	NUT & BOLT
LEAD-12-24T	12	24	6.54	6.89	4.92	19.10	NP24-12, PS-12260F	.250 TAB
LEAD-12-26B-PS	12	26	6.89	6.54	4.92	18.7	PS12260NB	NUT & BOLT
LEAD-12-26T-PS	12	26	6.89	6.54	4.92	18.7	PS12260F2	.250 TAB
LEAD-12-33PS	12	33	7.68	5.19	7.15	26.5	PS12330, U1	NUT & BOLT
LEAD-12-38	12	38	7.75	6.50	6.69	30.40	NP38-12, LCR12V38P, PS-12400	NUT & BOLT
LEAD-12-55	12	55	10.16	6.73	8.82	39.5	DM55-12	NUT & BOLT
LEAD-12-60PS	12	60	10.25	6.60	9.45	52.3	PS12600	NUT & BOLT
LEAD-12-65	12	65	13.78	6.53	6.85	50.20	NP65-12, LCR12V65P	NUT & BOLT
LEAD-12-80PS	12	80	12.05	6.60	9.45	62.4	PS12800	NUT & BOLT
LEADCHG-6V	6V LEAD ACID CHARGER							
LEADCHG-12V	12V LEAD ACID CHARGER							

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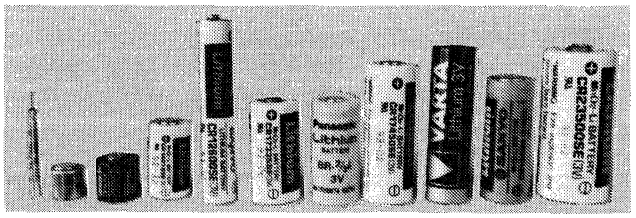


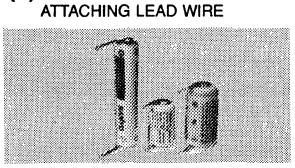
3V LITHIUM CYLINDRICAL CELLS

PART NO.	X-REFERENCE	PIC #	VOLTS	DIMENSIONS(mm) DIAMETER	x HEIGHT	TERMINATION
LITH-28	BR425	1	3	25	4.2 x 25.9	–
LITH-29	BR435	1	3	50	4.2 x 35.9	–
COMP-15	CR1/3N	2	3	160	11.6 x 10.8	–
COMP-15-1	CR1/3N-T	2	3	160	11.6 x 10.8	1
COMP-15-2	CR1/3N-P	2	3	160	11.6 x 10.8	2
COMP-15-3	CR1/3N-FT	2	3	160	11.6 x 10.8	3
COMP-7	CR14250SE	3	3	850	14.5 x 25.0	–
COMP-7-1	CR14250SE-T	3	3	850	14.5 x 25.0	–
COMP-7-2	CR14250SE-P	3	3	850	14.5 x 25.0	2
COMP-7-3	CR14250SE-FT	3	3	850	14.5 x 25.0	3
COMP-7-5	CR14250SE-SP1	3	3	850	14.5 x 25.0	5
COMP-3	CR12600SE	4	3	1400	12.0 x 60.0	–
COMP-3-1	CR12600SE-T	4	3	1400	12.0 x 60.0	1
COMP-3-2	CR12600SE-P	4	3	1400	12.0 x 60.0	2
COMP-3-3	CR12600SE-FT	4	3	1400	12.0 x 60.0	3
COMP-29	CR17335SE	5	3	1800	17.0 x 33.5	–
COMP-29-1	CR17335SE-T	5	3	1800	17.0 x 33.5	1
COMP-29-2	CR17335SE-P	5	3	1800	17.0 x 33.5	2
COMP-29-3	CR17335SE-FT	5	3	1800	17.0 x 33.5	3
COMP-5	BR2/3A	6	3	1200	17.0 x 33.5	–
COMP-5-1	BR2/3AT2SP	6	3	1200	17.0 x 33.5	1
COMP-5-2	BR2/3AP2SP	6	3	1200	17.0 x 33.5	2
COMP-5-3	BR2/3AE2SP	6	3	1200	17.0 x 33.5	3
COMP-5DUR	DL2/3A	7	3	1200	17.0 x 33.5	–
COMP-5DUR1	DL2/3A	7	3	1200	17.0 x 33.5	1
COMP-5DUR2	DL2/3A	7	3	1200	17.0 x 33.5	2
COMP-5DUR3	DL2/3A	7	3	1200	17.0 x 33.5	3
LITH-12	CR17450SE	8	3	2500	17.0 x 45.0	–
LITH-12-1	CR17450SE-T	8	3	2500	17.0 x 45.0	1
LITH-12-2	CR17450SE-P	8	3	2500	17.0 x 45.0	2
LITH-12-3	CR17450SE-FT	8	3	2500	17.0 x 45.0	3
COMP-70	CR-AA	9	3	2000	14.75 x 50.5	–
LITH-9-1	CR15400T	10	3	1300	15.2 x 40.0	1
LITH-13	CR23500SE	11	3	5000	23.0 x 50.0	–
LITH-13-1	CR23500SE-T	11	3	5000	23.0 x 50.0	1
LITH-14-PANA	BR-C	12	3	5000	26.0 x 50.0	–
LITH-14-1PANA	BR-C	12	3	5000	26.0 x 50.0	1
COMP-87	BR-A	13	3	1800	17.0 x 45.5	–
COMP-94	BR-1/2A	14	3	650	17.0 x 23.0	–
COMP-74	BR-2/3AA	15	3	600	14.5 x 33.5	–
COMP-68	B9503	16	2.9	1900	25.0 x 39.0	9V
COMP-66	B9508	17	3	1400	16.0 x 35.0	9v

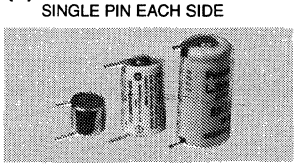
CELL TERMINATIONS

MATCH CELL PICTURE # WITH TERMINATION TO DETERMINE PART NO. IF NO TERMINATION IS INDICATED, CELL HAS PRESSURE CONTACT.

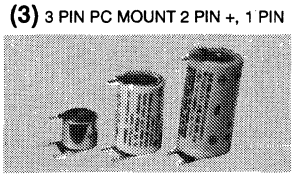
(1) FLAT SOLDER TAB FOR ATTACHING LEAD WIRE



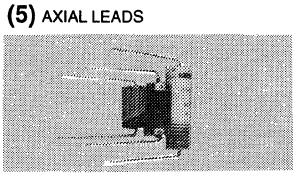
(2) 2 Pin PC MOUNT SINGLE PIN EACH SIDE

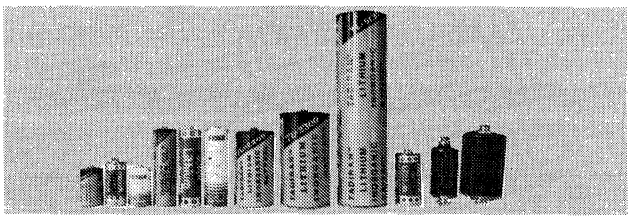


(3) 3 PIN PC MOUNT 2 PIN +, 1 PIN



(5) AXIAL LEADS





3.6 LITHIUM CYLINDRICAL CELLS

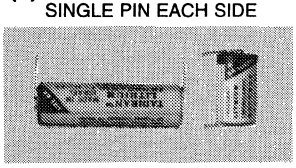
PART NO.	X-REFERNCE	PIC #	VOLTS	CAP. mAh	DIA. x Ht.	CELL SIZE	TER-MINATION
COMP-4	TL-5101/S	4	3.6	950	14.7 x 25.2	1/2AA	–
COMP-4-1	TL-5101/t	4	3.6	950	14.7 x 25.2	1/2AA	1
COMP-4-2	TL-5101/PC	4	3.6	950	14.7 x 25.2	1/2AA	2
COMP-4-5	TL-5101/P	4	3.6	950	14.7 x 25.2	1/2AA	
COMP-4-MAX	ER3#5TC	3	3.6	750	14.5 x 30.5	1/2AA	–
COMP-4-MAX-S	ER3STC	2	3.6	750	14.5 x 25.4	1/2AA	–
COMP-4-5-MAX	ER3#4AX	3	3.6	750	14.5 x 30.5	1/2AA	5
COMP-4-SAFT	LS3BA,LS14250	1	3.6	800	14.5 x 25.2	1/2AA	–
COMP-100	TL5155/S	–	3.6	1450	14.5 x 33.5	2/3AA	–
COMP-100-1	TL5155/T	–	3.6	1450	14.5 x 33.5	2/3AA	1
COMP-100-2	TL5155/PT2	–	3.6	1450	14.5 x 33.5	2/3AA	2
COMP-100-3	TL5155/PT	–	3.6	1450	14.5 x 33.5	2/3AA	3 PIN
COMP-100-5	TL5155/P	–	3.6	1450	14.5 x 33.5	2/3AA	5
COMP-6	TL-5104/S	8	3.6	2100	14.7 x 50.5	AA	–
COMP-6-1	TL-5104/T	8	3.6	2100	14.7 x 50.5	AA	1
COMP-6-2	TL-5104/PC	8	3.6	2100	14.7 x 50.5	AA	2
COMP-6-5	TL-5104/P	8	3.6	2100	14.7 x 50.5	AA	5
COMP-6-MAX	ER6#5TC	7	3.6	1900	14.5 x 50.5	AA	–
COMP-6-WK9	ER6WK9	17	3.6	1900	14.5 x 50.5	AA	CONN
COMP-6-5-MAX	ER6#4AX	7	3.6	1900	14.5 x 50.5	AA	5
COMP-6-SAFT	LS6BA	6	3.6	1900	14.5 x 50.5	AA	–
LITH-10	TL-2100/S	8	3.6	2100	14.7 x 50.5	AA	–
LITH-10-1	TL-2100/T	8	3.6	2100	14.7 x 50.5	AA	1
LITH-10-5	TL-2100/P	8	3.6	2100	14.7 x 50.5	AA	5
LITH-11	TL-5114/S(VENTED)	8	3.6	1900	14.7 x 50.5	AA	–
COMP-65	TL-5903/S	8	3.6	2400	14.7 x 50.5	AA	–
COMP-65-5	TL-5903/P	8	3.6	2400	14.7 x 50.5	AA	5
LITH-6	TL-2150/S	4	3.6	950	14.7 x 25.2	1/2AA	–
LITH-6-1	TL-2150/T	4	3.6	950	14.7 x 25.2	1/2AA	1
LITH-6-5	TL-2150/P	4	3.6	950	14.7 x 25.2	1/2AA	5
LITH-7	TL-5111/S(VENTED)	4	3.6	850	14.7 x 25.2	1/2AA	–
LITH-21	TL-5902/S	4	3.6	1200	14.7 x 25.2	1/2AA	–
LITH-21-5	TL-5902/P	4	3.6	1200	14.7 x 25.2	1/2AA	5
LITH-14	TL-2200/S	9	3.6	7200	26.2 x 50.0	C	–
LITH-14-1	TL-2200/T	9	3.6	7200	26.2 x 50.0	C	1
LITH-14-SAFT	LSH14BA	10	3.6	5200	26.1 x 50.0	C	–
LITH-14-1SAFT	LS14T	10	3.6	5200	26.1 x 50.0	C	1
LITH-15	TL-2300/S	12	3.6	16500	32.9 x 61.5	D	–
LITH-15-1	TL-2300/T	12	3.6	16500	32.9 x 61.5	D	1
LITH-15-SAFT	LSH20BA	11	3.6	13000	33.6 x 61.5	D	–
LITH-15-1SAFT	LS20T	11	3.6	13000	33.6 x 61.5	D	1
LITH-16	TL-5137/S	13	3.6	35000	32.9 x 124.5	DD	–
LITH-16-1	TL-5137/T	13	3.6	35000	32.9 x 124.5	DD	1
COMP-29-MAX	ER17/33#5TC	5	3.6	1500	17.0 x 36.0	2/3A	–
COMP-29-T3MAX	ER17/33T3	14	3.6	1500	17.0 x 34.0	2/3A	3 PIN
COMP-29-5-MAX	ER17/33#4AX	5	3.6	1500	17.0 x 36.0	2/3A	5
COMP-64	ER10/28#4AX	15	3.6	410	10.0 x 28.0	N	5
COMP-84	ER10/28/CONN	16	3.6	410	10.0 x 28.0	N	CONN
COMP-88	LTC-7PN	18	3.5	750	1.0 x .62 x 250	–	4 PIN

CELL TERMINATIONS

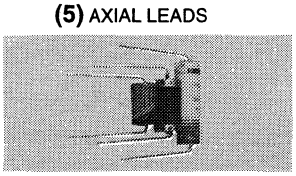
MATCH CELL PICTURE # WITH TERMINATION TO DETERMINE PART NO. IF NO TERMINATION IS INDICATED, CELL HAS PRESSURE CONTACT.

(1) FLAT SOLDER TAB FOR ATTACHING LEAD WIRE

(2) 2 Pin PC MOUNT SINGLE PIN EACH SIDE



(5) AXIAL LEADS



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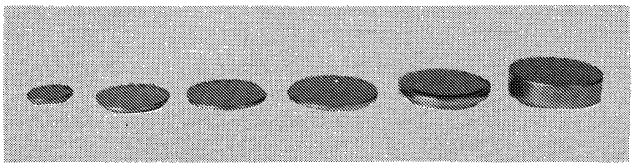
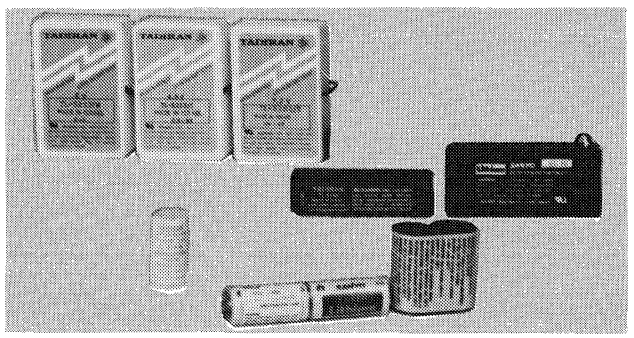


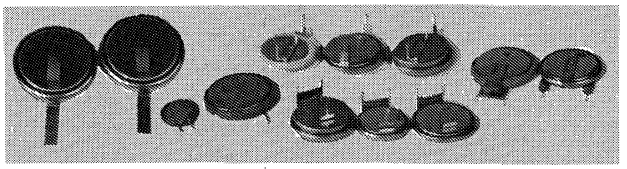
LITHIUM 3 VOLT COIN CELLS

PART NO.	X-REF/DESCRIPTION	VOLTS	mAh	DIAMETER x HEIGHT (MM)
LITH-35	CR927	3	30	9 x 2.7
LITH-25	CR1025	3	30	10 x 2.5
LITH-26	BR1216	3	25	12 x 1.6
LITH-31	CR1216	3	25	12 x 1.6
LITH-1	CR1220	3	35	12 x 2.0
LITH-2	BR1225	3	40	12 x 2.5
LITH-20	CR1616	3	50	16 x 1.6
LITH-3	CR1620	3	60	16 x 2.0
LITH-34	CR1632	3	120	16 x 3.2
LITH-24	CR2012	3	55	20 x 1.2
COMP-30	CR2016	3	75	20 x 1.5
LITH-4	BR2016	3	75	20 x 1.6
LITH-27	BR2020	3	100	20 x 2.0
COMP-31	CR2025	3	150	20 x 2.5
COMP-32	CR2032	3	200	20 x 3.2
LITH-23	CR2040	3	280	20 x 4.0
LITH-30	CR2320	3	120	23 x 2.0
LITH-5	BR2320	3	110	23 x 2.0
COMP-2	BR2325	3	175	23 x 2.5
COMP-60	BR2330	3	255	23 x 3.0
COMP-61	CR2354	3	560	23 x 5.4
COMP-1	CR2430	3	270	24 x 3.0
COMP-33	CR2450	3	550	24 x 5.0
LITH-32	CR2477	3	950	24 x 7.7
LITH-33	CR3032	3	500	30 x 3.2



LITHIUM COMPUTER PACKS / WAFER CELLS

PART NO.	PIC #	CONNECTOR LETTER	VOLTS	CAP mAh	X-REF	DIMENSIONS L x W x H
COMP-8	8	CA	3.6	2100	TL-5242/W	62 x 18 x 16
COMP-9	6	CA	7.2	1900	TL-5280/T	59 x 38 x 20
COMP-9R	7	CC	7.2	1900	TL-5280	59 x 38 x 20
COMP-10	4	CA	6	1900	TL-5293/W,BRE3	59 x 38 x 20
COMP-11	1	CA	4.5	1150	844 ALKALINE	60 x 28 x 22
COMP-11ROV	2	CA	4.5	1150	844 ORIGINAL	60 x 28 x 22
COMP-11SML	3	CA	4.5	800	840 ALKALINE	25 x 19 x 28
COMP-12	12	Pressure	6	1600	2CR17335SEV, BRP2, PC223A	33.8 x 19.5 x 35.9
COMP-12-1	12	Solder Tabs	6	1600	2CR17335SE, BRP2, PC223A	33.8 x 19.5 x 35.9
COMP-14	11	CG	6	1700	2CR17335SE-TC2	60.1 x 18.2
COMP-22	5	CA	6.8	1900	TL-5253/C	59 x 38 x 20
COMP-25	9	CC	6	1400	2CR12600SE	64 x 41 x 15
COMP-26	8	CB	3.6	2100	TL-5283/C	62 x 18 x 16
COMP-42	8	CD	3.6	2100	TL-5242	62 x 18 x 16
COMP-43	8	CE	3.6	2100	TL-5242/T	62 x 18 x 16
COMP-45	8	CB	3.6	2100	TL-5242/S	62 x 18 x 16
COMP-59	10	CF	3.6	950	TL-5276	28.6 x 16.8
COMP-71	8	CA	3.6	1900	TL-5292/PW	62 x 18 x 16
COMP-72	13	Pressure	6	1400	6A1400/GOULD	3.50 x 2.9
COMP-20	14	–	3.6	1700	TL-5135/P	32.9 x 10.0
COMP-24	15	–	3.6	1000	TL-5134/P	32.9 x 6.5
COMP-28	16	–	3.6	400	TL-5186/P	22.5 x 6.8



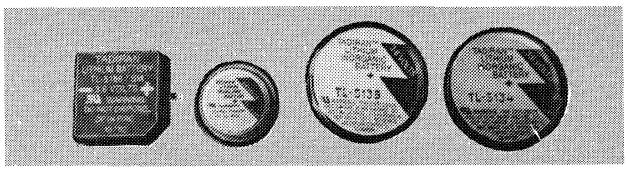
COIN CELLS WITH TABS & PC MOUNT

PART NO.	X-REF	VOLTS	mAh	DESCRIPTION	FIG #
PLAIN SOLDER TAB FOR ATTACHING WIRE					
LITH-35-1	CR927-T	3	30	SOLDER TAB	1
LITH-25-1	CR1025-T	3	30	SOLDER TAB	1
LITH-1-1	CR1220-T	3	35	SOLDER TAB	1
LITH-2-1	BR1225-T	3	40	SOLDER TAB	1
LITH-3-1	CR1620-T	3	60	SOLDER TAB	1
COMP-31-1	CR2025-T	3	150	SOLDER TAB	1
COMP-32-1	CR2032-T	3	200	SOLDER TAB	1
LITH-23-1	CR2040-T	3	280	SOLDER TAB	1
COMP-2-1	BR2325-T	3	175	SOLDER TAB	1
COMP-1-1	CR2430-T	3	270	SOLDER TAB	1
COMP-33-1	CR2450-T	3	550	SOLDER TAB	1
2 PIN HORIZONTAL PC MOUNT					
LITH-1-2	CR1220-P1	3	35	2 PIN PC MOUNT	2
LITH-2-2	BR1225-1HC	3	40	2 PIN PC MOUNT	2
COMP-32-2	CR2032-T14-1	3	200	2 PIN PC MOUNT	2
COMP-32-2-15	CR2032-P5-1	3	200	15mm PIN SPREAD	2
COMP-2-2	BR2325-IHG	3	175	2 PIN PC MOUNT	2
COMP-1-2	CR2430-P1-2	3	270	2 PIN PC MOUNT	2
COMP-33-2	CR2450-P2	3	550	2 PIN PC MOUNT	2
COMP-60-2	BR2330-1HE	3	255	2 PIN PC MOUNT	2
LITH-32-2	CR2477-1HF	3	1000	2 PIN PC MOUNT	2
3 PIN HORIZONTAL PC MOUNT					
COMP-32-3	CR2032-FT10	3	200	3 PIN PC MOUNT	3
COMP-1-3	CR2430-FT10	3	270	3 PIN PC MOUNT	3
COMP-33-3	CR2450-FT2-1	3	550	3 PIN PC MOUNT	3
COMP-2-3	BR2325-1HG	3	165	3 PIN PC MOUNT	3
COMP-60-3	CR2330-1GUF	3	255	3 PIN PC MOUNT	3
COMP-61-3	CR2354-1GU	3	560	3 PIN PC MOUNT	3
LITH-32-3	CR2477-HE4H	3	1000	3 PIN PC MOUNT	3
COMP-33-3-205	CR2450-HE3	3	550	3 PIN PC MOUNT	3
2 PIN VERTICAL PC MOUNT					
COMP-32-2VL	CR2032-T9-2	3	200	2 PIN VERTICAL	2VL
COMP-1-2VL	CR2430-P2-2	3	270	2 PIN VERTICAL	2VL
LITH-2-2VL	BR1225-1VC	3	40	2 PIN VERTICAL	2VL
COMP-2-2VL	BR2325-1VC	3	165	2 PIN VERTICAL	2VL
COMP-60-2VL	BR2330-1VC	3	255	2 PIN VERTICAL	2VL
3 PIN VERTICAL MOUNT					
COMP-32-3VL	CR2032-FT4-2	3	200	3 PIN VERTICAL	3VL
COMP-1-3VL	CR2430-FT4-2	3	270	3 PIN VERTICAL	3VL
COMP-33-3VL	CR2450-FT5-4	3	550	3 PIN VERTICAL	3VL
COMP-60-3VL	CR2330-1GV	3	255	3 PIN VERTICAL	3VL
COMP-2-3VL	BR2325-1VG	3	165	3 PIN VERTICAL	3VL

LITHIUM WAFER CELLS

COMPUTER PACK CONNECTORS

Match Pack No. With Connector Letter to Get Part # (Computer Connectors Not Sold Seperately



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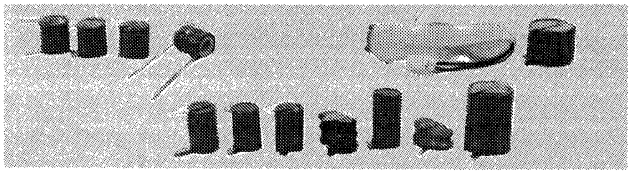
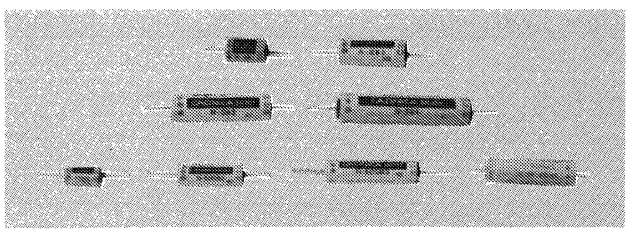


NI-CAD COMPUTER PACKS (MEMORY BACKUP)

PART NO.	PIC #	VOLTS	CAP mAh	CROSS REFERENCE	TERMINATION
COMP-16	1	3.6	60	3/V60R	PRESSURE
COMP-16-1	2	3.6	60	3/V60R,3/60DK, GP60BNK3AIH	SOLDER TAB
COMP-16-2	3	3.6	60	3/V60R,3/60DK-PC, GP60BNK-3A2H	2 PIN PC MOUNT
COMP-16-3	4	3.6	60	3/V60R,3/60DK-SLF, GP60BNK-3A3H	3 PIN PC MOUNT
COMP-16-5	5	3.6	60	3/V60R,3/60DK-AX	AXIAL LEADS
COMP-17	6	4.8	60	4/V60R	PRESSURE
COMP-17-1	7	4.8	60	4/V60R,4/60DK-ST	SOLDER TAB
COMP-17-2	8	4.8	60	4/V60R,4/60DK-PC	2 PIN PC MOUNT
COMP-17-3	9	4.8	60	4/V60R,4/60DK-SLF	3 PIN PC MOUNT
COMP-18-3	10	3.6	100	3/V100R,3/100DKO-PC	3 PIN PC MOUNT
COMP-19-1	11	6.0	60	5/V60R	
COMP-19-2	12	6.0	60	5V/60R,5/60DK-PC	2 PIN PC MOUNT
COMP-21-3	13	2.4	100	2/V100R,2/100DKO-PC	3 PIN PC MOUNT
COMP-40-3	14	4.8	280	4/V280R,4/280DK-PC3	3 PIN PC MOUNT
COMP-48	15	3.6	170	FL3/170DK-WR	LEAD WIRE/CONNECTOR
COMP-56-2	16	3.6	170	3/V170R,3/170DK-PC	2 PIN PC MOUNT
COMP-56-3	17	3.6	170	3/V170R	3 PIN PC MOUNT
COMP-96	18	9.6	270	DELL BATTERY	LEAD WIRE&CONNECTOR

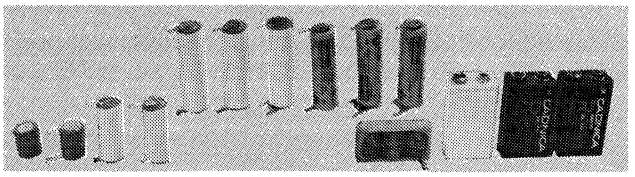


NI-CAD COMPUTER PACKS (MEMORY BACKUP)

PART NO.	PIC #	VOLTS	CAP mAh	CROSS REFERENCE	TERMINATION
COMP-57	1	1.2	90	N-SB1	AXIAL LEAD
COMP-34	2	2.4	90	N-SB2	AXIAL LEAD
COMP-35	3	3.6	90	N-SB3	AXIAL LEAD
COMP-36	4	4.8	90	N-SB4	AXIAL LEAD
COMP-51	5	1.2	45	N-50SB1	AXIAL LEAD
COMP-50	6	2.4	45	N-50SB2	AXIAL LEAD
COMP-52	7	3.6	45	N-50SB3	AXIAL LEAD
COMP-67	8	3.6	45	3N-50AAAS	WIRE PINS

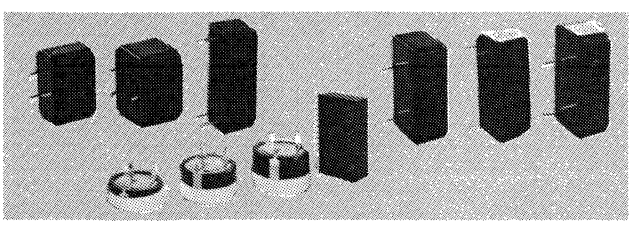
NICKEL METAL HYDRIDE BATTERIES - CYLINDRICAL

PART NO.	VOLTS	Cap. mAh	DIAMETER x HEIGHT (MM)	DIAMETER x HEIGHT (INCHES)
NMH-AAA450	1.2	450	10.5 x 44.5	.41 x 1.75
NMH-AAAL650	1.2	650	10.5 x 50.0	.41 x 1.97
NMH-4/5AA1200	1.2	1200	14.5 x 43.0	.57 x 1.69
NMH-AA1300	1.2	1300	14.5 x 50.0	.57 x 1.97
NMH-AAL1800	1.2	1800	14.5 x 65.0	.57 x 2.56
NMH-4/5A1600	1.2	1600	17.0 x 43.0	.67 x 1.69
NMH-4/5A1800	1.2	1800	17.0 x 43.0	.67 x 1.69
NMH-A1800	1.2	1800	17.0 x 50.0	.67 x 1.97
NMH-A2100	1.2	2100	17.0 x 50.0	.67 x 1.97
NMH-AL3000	1.2	3000	17.0 x 67.0	.67 x 2.64
NMH-4/3AL3500	1.2	3500	17.0 x 67.0	.67 x 2.64



NI-CAD COMPUTER PACKS (MEMORY BACKUP)

PART NO.	PIC #	VOLTS	CAP mAh	CROSS REFERENCE	TERMINATION
COMP-37-1	1	1.2	110	P-11AAH-1	SOLDER TAB
COMP-37-2	2	1.2	110	P-11AAH-2	2 PIN PC MOUNT
COMP-38-1	3	2.4	110	P01H-L2N2	SOLDER TAB
COMP-38-2	4	2.4	110	P-01H-L2P2	2 PIN PC MOUNT
COMP-39	5	3.6	110	P-01H PRESSURE	PRESSURE
COMP-39-1	6	3.6	110	P-01H-L3N2	SOLDER TAB
COMP-39-2	7	3.6	110	P-01H-L3P5	2 PIN PC MOUNT
COMP-39-3	8	3.6	110	P-01H-L3P3	3 PIN PC MOUNT
COMP-41-1	9	1.2	600	P-50AAHT	SOLDER TAB
COMP-41-2	10	1.2	600	P-50AAH-P2	2 PIN PC MOUNT
COMP-41-3	11	1.2	600	P-50AAH-P3	3 PIN PC MOUNT
COMP-41-3R	12	1.2	600	P-50AAH-RP3, AUTO COMPUTERS	3 PIN PC MOUNT (2PIN-1 PIN+)
COMP-46-2	13	3.6	110	P-01H-F3P2	2 PIN PC MOUNT
COMP-75	14	3.6	60		CONNECTOR
COMP-76	15	3.6	60		CONNECTOR
COMP-77	16	3.6	60		CONNECTOR
COMP-78	17	3.6	60		CONNECTOR
COMP-79	18	7.2	50		CONNECTOR
COMP-80	19	4.8	1400		CONNECTOR
COMP-81	20	4.8	60		CONNECTOR
COMP-82	21	2.4	60		CONNECTOR
COMP-83	22	6.0	60		CONNECTOR
COMP-85	23	3.6	60		CONNECTOR
COMP-86	24	3.6	60		3 PIN PC MOUNT
COMP-90	25	4.8	120		CONNECTOR



NI-CAD COMPUTER PACKS (MEMORY BACKUP)

PART NO.	PIC #	VOLTS	CAP mAh	CROSS REFERENCE	TERMINATION
COMP-23NLA USE COMP-21-3	1	2.4	100	SAFETRONIC, 53310-702-013	3 PC PINS
COMP-23-3.6	2	3.6	100	SAFETRONIC, 53310-703-013	3 PC PINS
COMP-24-2.4	3	2.4	100	MEMPAC-S, 53310-702-012, 53311-702-42	4 PC PINS
COMP-24-2.4NIMH	3	2.4	120	MEMPAC 55611-702-012 (NIMH)	4 PC PINS
COMP-24-3.6	4	3.6	100	MEMPAC-S, 53310-703-012, 53311-703-42	4 PC PINS
COMP-24-3.6NIMH	4	3.6	120	MEMPAC 55611-703-012 (NIMH)	4 PC PINS
COMP-44NLA USE COMP-24-2.4	3	2.4	100	DATA SENTRY, DS-2GT	4 PC PINS
COMP-62NLA USE COMP-24-3.6	4	3.6	100	DATA SENTRY, DS-3GT	4 PC PINS
COMP-53	5	2.4	100	MMB-2.4P	3 PC PINS
COMP-54	6	3.6	100	MMB-3.6P	3 PC PINS
COMP-55	7	4.8	100	MMB-4.8P	3 PC PINS
COMP-98	8	3V	–	Dallas Clock Chip, DS-1260-100	16 PIN IC CHIP
COMP-47	11	–	–	Dallas Clock Battery, DS-1287	18 PIN IC CHIP
COMP-47A	12	–	–	Dallas Clock Battery, DS-1287A	19 PIN IC CHIP
COMP-73	9	–	–	Dallas Clock Battery, DS-1387	20 PIN IC CHIP
COMP-99	10	–	–	Dallas Clock Battery, DS-1587	24 PIN IC CHIP
COMP-97	11	–	–	Dallas Clock Battery, DS-12887	18 PIN IC CHIP
COMP-97A	12	–	–	Dallas Clock Battery, DS-12887A	19 PIN IC CHIP

ALL ITEMS IN STOCK FOR IMMEDIATE DELIVERY

DANTONA INDUSTRIES, INC.

38 St. John's Place • P.O. Box 168 • Freeport, NY 11520
Tel: 516.379.6171 • Fax: 516.379.6273
Toll Free: 1.800.DANTONA • (Entire U.S.A.) (1.800.326.8662)

CUSTOM PACK ASSEMBLY

STYLE	VOLTS	CELLS	CONFIGURATIONS	DIAGRAM
1	2.4	2		
2	3.6	3		
3	4.8	4		
4	6.0	5		
5	7.2	6		
6	8.4	7		
7	9.6	8		
8	10.8	9		
9	12.0	10		
10	4.8	4		
11	7.2	6		
12	9.6	8		
13	12.0	10		
14	2.4	2		
15	3.6	3		
16	4.8	4		
17	6.0	5		

STYLE	VOLTS	CELLS	CONFIGURATIONS	DIAGRAM
18	4.8	4		
19	7.2	6		
20	9.6	8		
21	12.0	10		
22	7.2	6		
23	9.6	8		
24	12.0	10		
25	3.6	3		
26	4.8	4		
27	6.0	5		
28	9.6	8		
29	7.2	6		

PANASONIC LEAD-ACID BATTERIES

UPS/SPS SYSTEMS, EMERGENCY LIGHTING, ALARM SYSTEMS

PART NUMBER	VOLTS	CAPACITY 20 HR. RATE	DIMENSIONS (INCHES) LENGTH	WIDTH	HEIGHT INC. TERM	WEIGHT (LBS)	CROSS REFERENCE	TERMINATIONS
LEAD-214P	4	2.2	1.90	1.41	2.50	.57	LC-S042R1P, LCS-214P	PRESSURE
LEAD-414P	4	4.3	1.88	1.40	4.69	1.12	LC-S044R1P, LCS-414P	PRESSURE
LEAD-6V-1.3P	6	1.3	3.82	.94	2.16	.66	LC-R061R3P, LCR6V1.3P	.187 TAB
LEAD-6V-2.4P	6	2.4	2.60	1.30	4.11	1.15	LCR6V2.4P, LC-R062R4P	.187 TAB
LEAD-6V-3.2P	6	3.2	2.60	1.30	4.92	1.46	LCR6V3.2P, LC-R063R2P	.187 TAB
LEAD-6V-3.4P	6	3.4	5.28	1.34	2.60	1.37	LC-R063R4P, LCR6V3.4P	.187 TAB
LEAD-6V-4P	6	4	2.76	1.85	4.26	1.98	LC-RB064P, LCR6V4BP	.187 TAB
LEAD-6V-4PW	6	4	2.76	1.89	4.26	2.10	LCR6V4PL	WIRE & CONNECTOR
LEAD-6V-4.2P	6	4.3	1.88	2.03	4.69	2.10	LCR6V4PL	WIRE & CONNECTOR
LEAD-6V-5P	6	5	2.76	1.85	4.26	1.63	LC-S064RIPU	PRESSURE
LEAD-6V-6.5P	6	6.5	5.95	1.34	3.94	2.56	LC-RB066R5P, LCR6V6.5BP	.187 TAB
LEAD-6V-7.2P	6	7.2	5.95	1.34	3.94	2.78	LC-R067R2P, LCR6V7.2P	.187 TAB
LEAD-6V-10P	6	10	5.95	1.97	3.94	3.93	LC-RB0610P, LCR6V10BP	.187 TAB
LEAD-6V-10P-250	6	10	5.95	1.97	3.94	3.93	LCR-6V10BP1	.250 TAB
LEAD-6V-12P	6	12	5.95	1.97	3.94	4.30	LC-R0612P, LCR6V12P	.187 TAB
LEAD-218P	8	2.2	2.65	1.89	2.50	1.15	LC-S082R1P, LCS-218P	PRESSURE
LEAD-318P	8	3.2	2.65	1.89	4.95	1.55	LC-S083R1P, LCS-318P	PRESSURE
LEAD-12V-1.3P	12	1.3	3.82	1.87	2.16	1.30	LC-R121R3P, LCR12V1.3P	.187 TAB
LEAD-12V-2.2P	12	2.2	6.97	1.34	2.60	1.76	LC-R122R2P, LCR12V2.2P	.187 TAB
LEAD-12V-3.4P	12	3.4	5.28	2.64	2.60	2.65	LC-R123R4P, LCR12V3.4P	.187 TAB
LEAD-12V-4P	12	4	3.54	2.76	4.26	3.84	LC-R124P, LCR12V4BP	.187 TAB
LEAD-12V-5P	12	5	3.54	2.76	4.26	4.25	LC-R125P, LCR12V5P	.187 TAB
LEAD-12V-6.5P	12	6.5	5.95	2.54	3.94	5.00	LC-RB126R5P, LCR12V6.5BP	.187 TAB
LEAD-12V-6.5P-250	12	6.5	5.95	2.54	3.94	5.05	LCR12V-6.5BP1	.250 TAB
LEAD-12V-7.2P	12	7.2	5.95	2.54	3.94	5.45	LC-R127R2P, LCR12V7.2P	.187 TAB
LEAD-12V-12P	12	12	5.95	4.00	4.01	8.60	LC-R1212P, LCR12V12PF	.187 TAB
LEAD-12V-17P	12	17	7.13	2.99	6.57	14.3	LC-RC1217P, LCR12V17CP	NUT & BOLT
LEAD-12V-20P	12	20	7.28	4.92	6.50	16.5	LCL-12V20P	NUT & BOLT
LEAD-12V-24PB	12	24	6.50	4.92	6.89	19.2	LC-L1224P, LCL12V24P	NUT & BOLT
LEAD-12V-33P	12	33	7.70	5.12	7.09	26.5	LC-LA1233P, LCL12V33AP	NUT & BOLT
LEAD-12V-38P	12	38	7.76	6.50	6.89	28.7	LC-L1238P, LCL-12V38P	NUT & BOLT
LEAD-12V-65P	12	65	13.78	6.54	6.89	44.1	LC-L1265P, LCL12V65P	NUT & BOLT
LEAD-12V-75P	12	75	11.95	6.73	9.29	57.3	LCR12V75P	NUT & BOLT
LEAD-12V-100P	12	100	16.03	6.82	9.69	79.4	LCR12V100AP	NUT & BOLT
LEAD-12V-140P	12	140	19.89	8.67	10.12	114.7	LCR12V140P	NUT & BOLT

ALL ITEMS IN STOCK FOR IMMEDIATE DELIVERY

DURACELL®

SPECIFICATION SUMMARY: SELECTED PRODUCTS

ALKALINE
PRIMARY CELLS & BATTERIES

DURACELL® alkaline-manganese dioxide batteries are the popular choice for most consumer, industrial and military applications where an economical, general purpose battery is required. Advantages include high energy output, reliability, long shelf life, and superior low temperature performance.(1) In standard sizes, the DURACELL® alkaline battery system is generally available in cylindrical and multicell configurations.

	DURACELL PRODUCT NUMBER	SIZE	NOMINAL VOLTAGE (V)	RATED CAPACITY(2) (mAh)	RATED VOLTAGE CUTOFF (V)	RATED LOAD (OHMS)	APPROX. DRAIN (mA)	DIMENSIONS(4) MAXIMUM in.	MAXIMUM mm	MAXIMUM in.	MAXIMUM mm	MAXIMUM in.	MAXIMUM mm	AVERAGE WEIGHT oz.	AVERAGE WEIGHT g	MAXIMUM VOLUME in³	MAXIMUM VOLUME cm³	TERMINALS(3)	CROSS REFERENCE NEDA/ ANSI	CROSS REFERENCE IEC
	CYLINDRICAL CELLS – STANDARD PRODUCTS							**DIAMETER**		**HEIGHT**										
	MN1300	D	1.5	15,000	0.8	10	115	1.346	34.20	2.421	61.50	—	—	4.86	138.0	3.44	56.4	F	13A	LR20
	MN1400	C	1.5	7,800	0.8	20	60	1.031	26.20	1.969	50.00	—	—	2.29	65.0	1.64	26.9	F	14A	LRI4
	MN1500	AA	1.5	2,850	0.8	43	28	0.571	14.50	1.988	50.50	—	—	0.83	23.6	0.51	8.4	F	15A	LR6
	MN2400	AAA	1.5	1,150	0.8	75	15	0.413	10.50	1.752	44.50	—	—	0.39	11.0	0.23	3.8	F	24A	LR03
	MN9100	N	1.5	800	0.8	100	12	0.472	12.00	1.189	30.20	—	—	0.34	9.6	0.21	3.4	F	910A	LR1
	OTHER SELECTED MULTICELL BATTERIES – STANDARD PRODUCTS							**LENGTH**		**HEIGHT**		**WIDTH**								
	MN1203	—	4.5	4,400	2.4	20	175	2.441	62.00	2.638	67.00	0.866	22.00	5.43	154.0	5.58	91.4	F	706A	3LR12
	7K67	J	6.0	580	3.2	340	14	1.400	35.56	1.900	48.26	0.360	9.14	1.20	34.0	0.96	15.7	RF	1412AP	4LR61
*	MN908	LANTERN	6.0	11,500	3.2	15	290	2.665	67.69	4.312	109.52	2.665	67.69	21.60	612.0	30.62	501.8	CS	908A	—
*	MN918	LANTERN	6.0	24,000	3.2	9	490	5.365	136.27	4.937	125.40	2.865	72.77	44.80	1,270.0	75.88	1,243.5	IS	918A	—
	MN1604	9-VOLT	9.0	580	4.8	620	12	1.043	26.50	1.909	48.50	0.689	17.50	1.62	45.9	1.39	22.8	S	1604A	6LR61
	MN21	CYLINDRICAL	12.0	34	6.0	20K	.50	0.406	10.32	1.122	28.50	—	—	0.26	7.4	0.14	2.3	F	1811A	—
	CYLINDRICAL CELLS – PROFESSIONAL PRODUCTS							**DIAMETER**		**HEIGHT**										
	PC1300	D	1.5	15,000	0.8	10	115	1.346	34.20	2.421	61.50	—	—	4.86	138.0	3.44	56.4	F	13A	LR20
	PC1400	C	1.5	7,800	0.8	20	60	1.031	26.20	1.969	50.00	—	—	2.29	65.0	1.64	26.9	F	14A	LR14
	PC1500	AA	1.5	2,850	0.8	43	28	0.571	14.50	1.988	50.50	—	—	0.83	23.6	0.51	8.4	F	15A	LR6
	PC2400	AAA	1.5	1,150	0.8	75	15	0.413	10.50	1.752	44.50	—	—	0.39	11.0	0.23	3.8	F	24A	LR03
	OTHER SELECTED MULTICELL BATTERIES – PROFESSIONAL PRODUCTS							**LENGTH**		**HEIGHT**		**WIDTH**								
	PC1604	9-VOLT	9.0	580	4.8	620	12	1.043	26.50	1.909	48.50	0.689	17.50	1.62	45.9	1.39	22.8	S	1604A	6LR61
*	PC908	LANTERN	6.0	11,500	3.2	15	290	2.665	67.69	4.312	109.52	2.665	67.69	21.60	612.3	30.62	501.8	CS	908AC	—
*	PC915	LANTERN	6.0	11,500	3.2	15	290	2.665	67.69	4.350	110.49	2.665	67.69	21.60	612.3	30.89	506.2	IS	915AC	—
*	PC918	LANTERN	6.0	24,000	3.2	9	490	5.365	136.27	4.937	125.40	2.865	72.77	44.80	1,270.0	75.88	1,243.5	IS	918AC	—
*	PC903	LANTERN	7.5	39,000	4.0	10	650	7.250	184.15	3.749	95.22	4.062	103.17	78.40	2,222.6	110.41	1,809.3	IS	903AC	—

(1) Operating temperature range is -4°F (-20°C) 10 130°F (54°C)
(2) Rated at 70°F (21°C). Typical capacities can be higher or lower based on user's particular application.
(3) Terminal code: F-flat; S-snap; RF-recessed flat; CS-coiled springs; IS-insulated screw.
(4) Dimensions are IEC/ANSI standards.
* Dimensions are Duracell standards.

LITHIUM/MnO_2
PRIMARY CELLS & BATTERIES

DURACELL® lithium/manganese dioxide ($LiMnO_2$) batteries possess high energy density, high rate capability over a broad temperature range,(1) and excellent capacity retention determined at over 95% after five years at room temperature. DURACELL® Li/MnO_2 batteries are ideally suited for a wide range of uses, from supplying high current output for pulse-type applications to providing long-term standby power for memory retention.

DURACELL PRODUCT NUMBER	SIZE	NOMINAL VOLTAGE (V)	TYPICAL VOLTAGE (V)	RATED CAPACITY(2) (mAh)	LOAD (ohms)	APPROX. DRAIN (mA)	VOLTAGE CUTOFF (V)	MAXIMUM DISCHARGE CURRENT (mA)		MAXIMUM REVERSE CHARGING CURRENT(3) (mA)	DIMENSIONS				AVERAGE WEIGHT		AVERAGE VOLUME		TERM-INALS(4)	CROSS REFERENCE
											MAXIMUM DIAMETER		MAXIMUM HEIGHT							
								(cont.)	(pulse)		in.	mm	in.	mm	oz.	g	$in.^3$	cm^3		NEDA/ANSI
HIGH POWER CYLINDRICAL CELLS (Spiral-Wound)																				
DL123A	1x2/3A	3.0	3.2-3.3	1,400	100	14.0	2.0	1,200	5,000	20	0.665	16.89	1.358	34.50	0.600	17.0	0.438	7.18	F	5018LC
DL2/3A	2/3A	3.0	3.2-3.3	1,400	100	14.0	2.0	1,200	5,000	20	0.669	16.99	1.333	33.86	0.600	17.0	0.438	7.18	F	5017LC
DLCR2	NEW	3.0	3.2-3.3	750	250	10.0	2.0	1,000	2,500	10	0.614	15.60	1.063	27.00	0.388	11.0	0.315	5.16	F	TBD
DLI/3N	1/3N	3.0	3.2-3.3	160	2,700	1.0	2.0	20	80	2	0.457	11.61	0.425	10.80	0.116	3.3	0.069	1.13	F	5008LC
MICROLITHIUM™ CYLINDRICAL CELLS (Bobbin)																				
DL1/2AAL	1/2AA	3.0	3.2-3.3	850	5,600	0.5	2.0	3	10	5	0.571	14.50	0.906	23.01	0.247	7.0	0.210	3.50	F, PC	5028LC
DL2/3AL	2/3A	3.0	3.2-3.3	1,700	2,700	0.9	2.0	4	20	10	0.669	17.00	1.319	33.50	0.529	15.0	0.439	7.20	F, PC	5026LC
MICROLITHIUM™ COIN CELLS																				
DL2016	—	3.0	3.1-3.3	75	15,000	0.2	2.0	4	15	8	0.787	20.00	0.063	1.60	0.063	1.8	0.031	0.50	F	5000LC
DL2025	—	3.0	3.1-3.3	150	15,000	0.2	2.0	3	15	8	0.787	20.00	0.098	2.50	0.078	2.2	0.048	0.79	F	5003LC
DL2032	—	3.0	3.1-3.3	220	15,000	0.2	2.0	3	15	8	0.787	20.00	0.126	3.20	0.099	2.8	0.062	1.00	F, PC	5004LC
DL2430	—	3.0	3.1-3.3	300	15,000	0.2	2.0	3	20	10	0.965	24.50	0.118	3.00	0.141	4.0	0.086	1.41	F, PC	5011LC
DL2450	—	3.0	3.1-3.3	600	15,000	0.2	2.0	2	15	10	0.965	24.50	0.197	5.00	0.217	6.2	0.144	2.36	F, PC	5029LC
STANDARD BATTERIES																				
DL245	2x2/3A	6.0	6.4-6.6	1,400	200	14.0	4.0	1,200	5,000	20	(6)	(6)	(6)	(6)	1.400	39.7	1.320	21.70	—	5032LC
DL223A(5)	2x2/3A	6.0	6.4-6.6	1,400	200	14.0	4.0	1,200	5,000	20	(6)	(6)	(6)	(6)	1.340	38.0	1.340	20.10	—	5024LC
PX28L	2x1/3N	6.0	6.4-6.6	160	5,400	1.0	4.0	20	80	2	0.512	13.00	0.992	25.20	0.329	9.4	0.204	3.35	—	1406LC

(1) Operating temperature range is -40°F (-40°C) to 140°F (60°C). Information on performance beyond this range available upon request.
(2) Rated at 70°F (21°C). Typical capacities can be higher or lower based on user's particular application.
(3) Li/MnO_2 cells should not be charged. UL has established these values as the maximum current the cell will tolerate in the event of diode failure.
(4) Terminal code: PC-printed circuit board pins; F-flat
(5) DL223A is also available as DL223AR with wire leads, connector and Velcro patch for computer clock/calendar, and memory back-up applications.

(6)

	HEIGHT		WIDTH		THICKNESS	
	in.	mm	in.	mm	in.	mm
DL245	1.772	45.00	1.339	34.00	0.669	17.00
DL223A	1.417	36.00	1.378	35.00	0.768	19.50

DURACELL®

ZINC AIR

PRIMARY CELLS & BATTERIES

When discharged on a continuous or frequent basis, DURACELL® zinc air cells and batteries deliver high energy density at a low operating cost compared to other primary systems. Zinc air batteries also provide a constant output voltage throughout their operating life and are well suited for various medical, communications and monitoring applications. Each cell and battery is sealed at the factory to provide a consistently fresh product to the end user. DURACELL® zinc air button cells can be designed and manufactured into multicell battery packs, capable of meeting specific electrical/mechanical requirements.

DURACELL PRODUCT NUMBER	NOMINAL VOLTAGE (V)	RATED CAPACITY(1) (mAh)	RATED VOLTAGE CUTOFF (V)	LOAD (OHMS)	APPROX. DRAIN (mA)	DIMENSIONS MAXIMUM		MAXIMUM		MAXIMUM		AVERAGE WEIGHT		AVERAGE VOLUME		TERMINALS	LIMITING CURRENT (mA)	INTERNAL IMPEDANCE (Ohms)(2)	CROSS REFERENCE NEDA/ANSI
						in.	mm	in.	mm	in.	mm	oz.	g	in.³	cc				
BUTTON CELLS						DIAMETER		HEIGHT											
DA230	1.4	65	0.9	3000	0.50	0.229	5.82	0.140	3.56	—	—	0.010	0.3	0.005	0.08	FLAT	2.0	16.0	7005ZD
DA312	1.4	130	0.9	1500	0.85	0.305	7.75	0.138	3.51	—	—	0.020	0.6	0.008	0.13	FLAT	6.0	7.5	7002ZD
DA13	1.4	260	0.9	1500	0.85	0.305	7.75	0.210	5.33	—	—	0.032	0.9	0.013	0.21	FLAT	10.0	7.5	7000ZD
DA675	1.4	600	0.9	620	2.00	0.455	11.56	0.210	5.33	—	—	0.063	1.8	0.031	0.50	FLAT	25.0	3.0	7003ZD
DA630	1.4	1000	1.0	220	3.90	0.613	15.57	0.245	6.22	—	—	0.120	3.5	0.062	1.02	FLAT	25.0	2.0	7007Z
PRISMATIC/RECTANGULAR BATTERIES						LENGTH		HEIGHT		WIDTH									
DA146	8.4	1500	6.0	1300	5.80	1.040	26.42	1.750	44.45	0.662	16.81	1.270	36.0	1.090	17.86	SNAP	22.0	12.0	7004Z
DA164	5.6	950	4.0	2200	2.30	0.662	16.81	1.750	44.45	—	—	0.700	20.0	0.578	9.47	FLAT	22.0	6.0	—

(1) Rated at 70°F (21°C). Typical capacities can be higher or lower based on user's particular application. (2) Impedance is less than or equal to number shown,

SILVER

PRIMARY CELLS & BATTERIES

The high volumetric energy density of DURACELL® silver oxide button cells, and their ability to deliver this energy at relatively high current drains, makes them ideal for miniature devices where space is limited. Silver cells also have an extremely stable discharge voltage, good shelf life, and the ability to operate over a wide temperature range.

DURACELL PRODUCT NUMBER	NOMINAL VOLTAGE (V)	RATED CAPACITY(1) (mAh)	RATED VOLTAGE CUTOFF (V)	LOAD (OHMS)	APPROX. DRAIN (mA)	DIMENSIONS MAXIMUM DIAMETER		MAXIMUM HEIGHT		AVERAGE		MAXIMUM WEIGHT		TERMINALS VOLUME	CROSS REFERENCE	
						in.	mm	in.	mm	oz.	g	in³	cm³		NEDA/ANSI	IEC
SELECTED BUTTON & CYLINDRICAL CELLS																
D301/386	1.55	120	1.2	15,000	0.10	0.455	11.56	0.165	4.19	0.060	1.70	0.026	0.426	FLAT	1133S0	SR43
D303/357	1.55	165	1.2	1,000	1.50	0.455	11.56	0.220	5.58	0.080	2.30	0.033	0.540	FLAT	1131S0	SR44
D309/393	1.55	70	1.2	10,000	0.15	0.310	7.87	0.212	5.38	0.036	1.00	0.015	0.245	FLAT	1137S0	SR48
D361/362	1.55	24	1.2	50,000	0.03	0.308	7.83	0.085	2.15	0.016	0.44	0.006	0.098	FLAT	1158S0	SR720
D364	1.55	18	1.2	50,000	0.03	0.268	6.80	0.085	2.15	0.012	0.35	0.004	0.066	FLAT	1175S0	SR60
D370/371	1.55	33	1.2	30,000	0.05	0.372	9.45	0.085	2.15	0.023	0.64	0.009	0.147	FLAT	1171S0	SR920
D377	1.55	25	1.2	50,000	0.03	0.267	6.78	0.104	2.64	0.014	0.40	0.005	0.082	FLAT	1176S0	SR66
D379	1.55	14	1.2	68,000	0.02	0.228	5.79	0.085	2.15	0.008	0.23	0.003	0.049	FLAT	1191S0	—
D381/391	1.55	40	1.2	15,000	0.10	0.455	11.56	0.087	2.21	0.030	0.85	0.013	0.213	FLAT	1160S0	SR55
D384/392	1.55	42	1.2	15,000	0.10	0.310	7.87	0.142	3.60	0.025	0.72	0.010	0.164	FLAT	1135S0	SR41
D389/390	1.55	70	1.2	13,000	0.11	0.455	11.56	0.120	3.05	0.042	1.20	0.021	0.327	FLAT	1138S0	SR54
D395/399	1.55	55	1.2	30,000	0.05	0.374	9.50	0.106	2.69	0.029	0.81	0.011	0.180	FLAT	1165S0	SR57
D396/397	1.55	30	1.2	30,000	0.05	0.311	7.90	0.104	2.64	0.019	0.54	0.007	0.114	FLAT	1163S0	SR59
MS76	1.55	180	1.2	1,500	1.00	0.455	11.56	0.210	5.33	0.081	2.30	0.033	0.540	FLAT	1184S0	SR44

(1) Rated at 70°F (21°C). Typical capacities can be higher or lower based on user's particular application.

DURACELL®

NICKEL-METAL HYDRIDE
RECHARGEABLE BATTERIES

DURACELL® nickel-metal hydride batteries deliver high energy density and excellent rate capability in a rechargeable chemical system. In high power consumer devices, nickel-metal hydride batteries are the preferred rechargeable battery due to one hour charge capability, broad temperature range[1] and long cycle life.

DURACELL PRODUCT NUMBER	SIZE	NOMINAL VOLTAGE (V)	RATED CAPACITY[2] (mAh)	RATED VOLTAGE CUTOFF (V)	RATED LOAD (mA)	MAXIMUM LENGTH [3]		MAXIMUM HEIGHT [3]		MAXIMUM WIDTH [3]		AVERAGE WEIGHT		MAXIMUM VOLUME		TERMINALS
						mm	in.	mm	in.	mm	in.	g	oz.	cm^3	in^3	
Single cells						**Diameter**		**HEIGHT**								
DHAA	AA	1.2	1200	0.8	240	14.40	0.57	49.00	1.93	—	—	26	9.0	8.0	0.5	Flat
DHAAA	AAA	1.2	550	0.8	110	10.50	0.41	43.60	1.72	—	—	12	0.4	3.8	0.2	Flat
DH45A	4/5A	1.2	1800	0.8	360	17.00	0.67	42.80	1.69	—	—	32	1.1	9.6	0.6	Flat
Standard Batteries						LENGTH[3]		HEIGHT[3]		WIDTH[3]						
DR10	5 x4/5A	6.0	1800	4.0	360	89.3	3.52	19.1	0.75	46.00	1.81	187	6.6	78	4.8	Flat
DR11	10 x 4/5A	6.0	3600	4.0	720	89.3	3.52	36.5	1.44	46.00	1.81	360	12.7	150	9.2	Flat
DR121	4 x AA	4.8	1200	3.2	240	103.2	4.06	14.9	0.59	31.30	1.23	115	4.1	42	2.6	Flat
DR154	4 x AAA	4.8	550	3.2	110	46.7	1.84	11.7	0.46	42.60	1.66	55	2.0	22	1.4	Flat
DR157	3 x AAA	3.6	550	2.4	110	46.7	1.84	11.7	0.46	32.30	1.27	40	1.4	16	1.0	Flat
DR160	3 x AA	3.6	1200	2.4	240	52.3	2.06	15.6	0.61	44.00	1.73	85	3.0	34	2.1	Flat

(1) Operating temperature range: Charge: 0°C (32°F) to 45°C (113°F)
Discharge: -20°C (-4°F) to 50°C (122°F)

(2) Rated at 21°C (70°F). Typical capacities can be higher or lower based on user's particular application.

(3) Dimensions indicated are Duracell standards.

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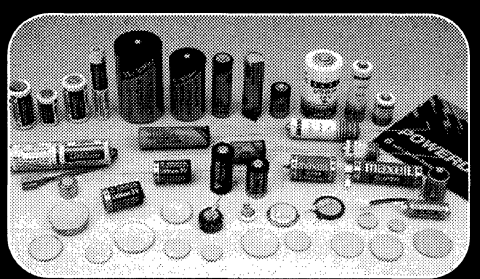

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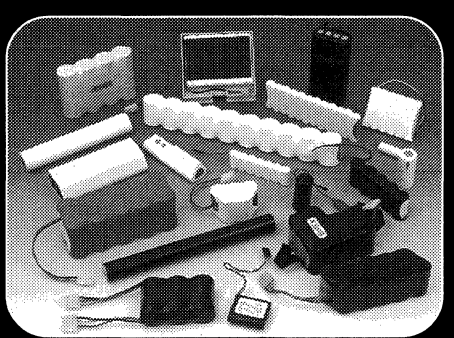

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Years of low rate, continuous use.

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Highest utilization of valuable board space when compared to round and cylindrical cells.

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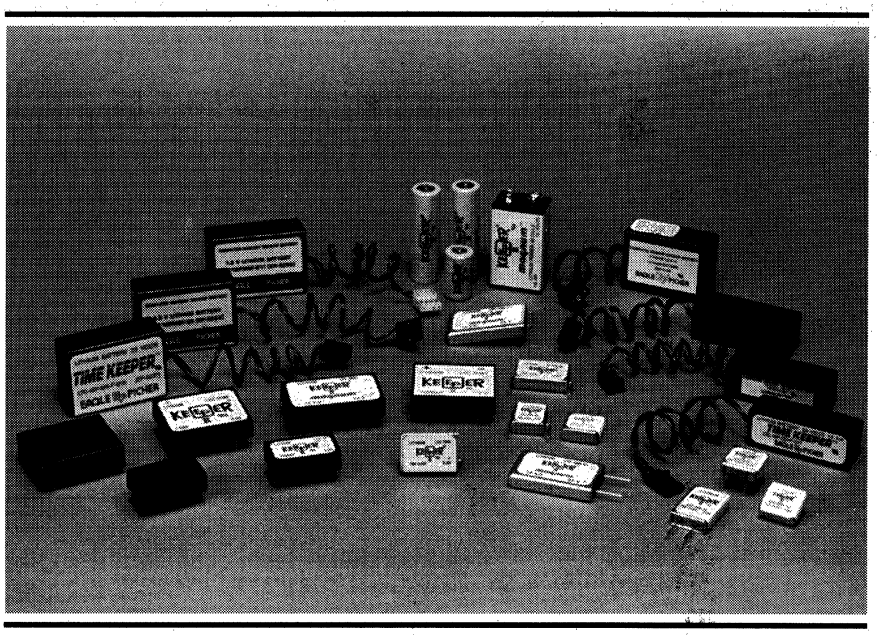

All Eagle-Picher batteries are made in the United States of America

Keeper II® Lithium Batteries

Battery No.	Working Voltage	Capacity 350 hr. rate	Length		Width		Thickness		Weight (Grams)
			IN.	MM	IN.	MM	IN.	MM	
LTC-3PN	3.5	350mAH	.60	15.24	.65	16.51	.25	6.35	4.0
LTC-3PN-S2	3.5	350mAH	.65	16.51	.25	6.35	.60	15.24	4.0
LTC-3PN-S4	3.5	350mAH	.60	15.24	.25	6.35	.65	16.51	4.0
LTC-7P	3.5	750mAH	1.20	30.48	.70	17.78	.35	8.89	9.0
LTC-7PN	3.5	750mAH	1.00	25.40	.65	16.51	.25	6.35	6.8
LTC-7PN-S4	3.5	750mAH	.65	16.51	.25	6.35	1.00	25.40	6.8
LTC-7PN-S6	3.5	750mAH	1.00	25.40	.25	6.35	.65	16.51	6.8
LTC-7PMP	3.5	1500mAH	1.50	38.10	1.20	30.48	.35	8.89	19.0
LTC-7PMS	7.0	750MAH	1.50	38.10	1.20	30.48	.35	8.89	19.0
LTC-16P*	3.5	1600mAH	1.44	36.58	.55	13.97	.55	13.97	16.0
LTC-7P-MP-F-S2***	3.5	1500mAH	1.50	38.10	1.20	30.48	.45	11.43	25.0
LTC-16P-CO-F-S11**	3.5	1600mAH	1.86	47.24	.66	16.76	.66	16.76	25.0

*Standard termination button negative case positive also available with tabs. ***Standard termination is .20 square pins, 1.700 center to center.
***Battery contains diode and resistor protection (IN5817 diode 1.6K resistor). Working voltage rate dependent.

Keeper II®Magnum™ Batteries

Battery No.	Working Voltage	Capacity 350 hr. rate	Length		Width		Thickness		Weight (Grams)
			IN.	MM	IN.	MM	IN.	MM	
LTC-15M-S4	3.5	1500mAH	1.20	30.48	.90	22.86	.280	7.11	14
LTC-16M	3.5	1600mAH	1.71	43.43	.99	25.15	.37	9.40	20
LTC-16M-S2	3.5	1600mAH	1.50	38.10	.90	22.86	.28	7.11	18
LTC-16M-MS-S1*	7.0	1600mAH	1.92	48.79	1.03	26.16	.68	17.27	45

*Battery is standard transistor-type configuration

Keeper II Cylindrical Batteries

Battery No.	Universal Size	Nominal Working Voltage	Nominal Capacity 350 hr. rate	Length		Diameter		Weight (Grams)
				IN.	MM	IN.	MM	
LTC-9C	1/2 AA	3.5	950 mAH	.985	25.02	.540	13.72	8.6
LTC-17C	AA	3.5	1700 mAH	1.950	49.53	.540	13.72	15.5

Also available with: •.030 diameter radial pins •pin tabs •.005 x .125 tabs

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UL approved.

HE Series, and selected Carefree and Carefree Magnum batteries, are available in flame retardant V-O cases.

Charging

To obtain the maximum life from any maintenance-free, lead-acid battery, voltage-controlled charging is required. In general the condition of usage falls into two basic classifications. These are CYCLIC and FLOAT applications. Each classification requires different charging control.

Float Service

A battery in float service is being subjected to continuous charging and is called upon to deliver power at infrequent intervals or in case of a power outage. Under this condition, the battery charging should be:

CF and CFM	Constant Potential	2.28-2.32 Volts/Cells
HE	Constant Potential	2.27-2.30 Volts/Cells
	Limiting Current	20% of Rated
	Charging Time	Capacity in Amps Continuous

Cyclic Service

A battery in cyclic service is normally being discharged at a more frequent interval than when it is in float service. In cyclic service it has less time to recharge. Under this condition, the battery charging should be:

CF and CFM	Constant Potential	2.50-2.55 Volts/Cells
HE	Constant Potential	2.43-2.50 Volts/Cells
	Limiting Current	20% of Rated
	Charging Time	Capacity in Amps 10-24 Hours

*Ocean Freight is regulated by the International Maritime Organization (IMO). Air Freight is regulated by the International Air Transport Assoc. (IATA). Under both modes of International transport, VRLA batteries are considered "Batteries, Wet, Non Spillable, Electric Storage" Class 8, UN2800, Packaging group III.

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Carefree CF Series Standard, High Service Batteries

Battery Number	Nom Cap 20 Hr. Rate	Length In (mm)	Width In (mm)	Ht. In (mm)	Ht. Incl. Terms.	Wt. Lbs	Standard Terminal
4 VOLT							
CF4V15	15.00	5.27 (133.86)	1.78 (45.21)	6.80 (172.72)	7.12 (180.85)	4.7	****
6 VOLT							
CF6V.5	0.45	1.92 (48.77)	1.00 (25.40)	2.00 (50.80)	2.25 (57.15)	0.3	A
CF6V1	0.90	2.00 (50.80)	1.65 (41.91)	1.97 (50.04)	2.20 (55.88)	0.5	A
CF6V2.6	2.60	5.30 (134.62)	1.35 (34.29)	2.37 (60.20)	2.56 (65.02)	1.4	A
CF6V5.3	5.60	5.22 (132.59)	1.85 (46.99)	3.08 (78.23)	3.08 (78.23)	2.6	C
CF6V8	8.00	6.00 (152.40)	2.00 (50.80)	3.75 (95.25)	3.93 (99.82)	3.9	C
CF6V9	9.00	4.25 (107.95)	2.75 (69.85)	5.50 (139.70)	5.50 (139.70)	4.5	*
CF6V9.5	11.00	4.25 (107.95)	2.75 (69.85)	5.50 (139.70)	5.50 (139.70)	5.1	*
CF6V15	15.00	3.60 (91.44)	3.34 (84.84)	6.49 (164.85)	6.70 (170.18)	6.4	C
CF6V30	30.00	6.25 (158.75)	3.35 (85.09)	6.50 (165.10)	6.75 (171.45)	12.1	C
CF6V50	50.00	7.24 (183.90)	4.40 (111.76)	7.42 (188.47)	8.32 (211.33)	21.5	**
8 VOLT							
CF8V6	6.00	3.34 (84.84)	2.15 (54.61)	6.50 (165.10)	6.60 (167.64)	3.9	C
12 VOLT							
CF12V.5L	0.45	3.85 (97.79)	1.00 (25.40)	2.00 (50.80)	2.25 (57.15)	0.6	A
CF12V1.5	1.50	7.02 (178.31)	1.33 (33.78)	2.40 (60.96)	2.60 (66.04)	1.9	A
CF12V2.6S1	2.60	5.28 (134.11)	2.52 (64.01)	2.30 (58.42)	2.48 (62.99)	2.7	A
CF12V5L	5.20	6.12 (155.45)	2.42 (61.47)	3.94 (100.08)	4.16 (105.66)	5.5	C
CF12V8	8.00	6.00 (152.40)	4.03 (102.36)	3.75 (95.25)	3.93 (99.82)	7.9	C
CF12V9L	9.00	8.52 (216.41)	2.75 (69.85)	5.50 (139.70)	5.50 (139.70)	9.0	*
CF12V15	15.00	7.21 (183.13)	3.34 (84.84)	6.49 (164.85)	6.70 (170.18)	12.8	C
CF12V20	22.00	6.51 (165.35)	4.91 (124.71)	6.53 (165.86)	6.75 (171.45)	16.2	C
CF12V30L	30.00	10.04 (255.02)	4.31 (109.47)	6.50 (165.10)	6.75 (171.45)	24.6	C
18 VOLT							
CF18V1	0.90	5.00 (127.00)	2.00 (50.80)	1.97 (50.04)	2.20 (55.88)	1.7	A

Carefree Porta Pac CFPP and CFMPP Series Standard, High Service Portable Batteries

12 VOLT							
CF12V1.5PP	1.5	8.75 (222.25)	1.70 (43.18)	3.0 (76.20)	NA	2.4	***
CF12V5PP	5.2	6.12 (155.45)	2.42 (61.47)	6.60 (167.64)	NA	5.7	***
CFM12V6.2PP	6.2	6.12 (155.45)	2.42 (61.47)	6.60 (167.64)	NA	5.9	***
CFM12V12.5LPP	12.5	8.52 (216.41)	2.75 (69.85)	5.50 (139.70)	5.50 (139.70)	10.2	***

Carefree Magnum CFM Series Extra Capacity Batteries

4 VOLT							
CFM4V4.6	4.60	1.87 (47.50)	1.89 (48.01)	4.02 (102.11)	4.22 (107.19)	1.3	A
CFM4V10	10.0	4.03 (102.36)	2.00 (50.80)	3.75 (95.25)	3.93 (99.82)	2.6	C
6 VOLT							
CFM6V3	3.0	5.30 (134.62)	1.35 (34.29)	2.37 (60.20)	2.56 (65.02)	1.5	A
CFM6V4.6	4.6	2.76 (70.10)	1.89 (48.01)	4.02 (102.11)	4.22 (107.19)	1.8	A
CFM6V6.4	6.4	5.22 (132.59)	1.85 (46.99)	3.08 (78.23)	3.08 (78.23)	2.9	90°C
CFM6V6.5	6.5	6.00 (152.40)	1.34 (34.04)	3.75 (95.25)	3.95 (100.33)	2.8	C
CFM6V10	10.0	6.00 (152.40)	2.00 (50.80)	3.75 (95.25)	3.93 (99.82)	3.95	C
CFM6V12.5	12.5	4.25 (107.95)	2.75 (69.85)	5.50 (139.70)	5.50 (139.70)	5.1	*
CFM6V18	18.0	3.60 (91.44)	3.34 (84.84)	6.49 (164.85)	6.70 (170.18)	6.8	C
CFM6V33	33.0	6.25 (158.75)	3.35 (85.09)	6.50 (165.10)	6.75 (171.45)	12.2	C
12 VOLT							
CFM12V3	3.0	5.28 (134.11)	2.52 (64.01)	2.30 (58.42)	2.48 (62.99)	2.8	A
CFM12V4.6M	4.6	3.55 (90.17)	2.76 (70.10)	4.01 (101.85)	4.22 (107.19)	3.9	A
CFM12V6.2L	6.2	6.12 (155.45)	2.42 (61.47)	3.94 (100.08)	4.16 (105.66)	5.7	C
CFM12V6.4	6.4	5.22 (132.59)	3.72 (94.49)	3.08 (78.23)	3.08 (78.23)	5.8	90°C
CFM12V6.5	6.5	5.95 (151.13)	2.58 (65.53)	3.75 (95.25)	3.95 (100.33)	5.6	A
CFM12V10	10.0	6.00 (152.40)	4.02 (102.11)	3.75 (95.25)	3.93 (99.82)	8.0	C
CFM12V12.5	12.5	5.53 (140.46)	4.25 (107.95)	5.50 (139.70)	5.50 (139.50)	10.2	*
CFM12V12.5L	12.5	8.52 (216.41)	2.75 (69.85)	5.50 (139.70)	5.50 (139.70)	10.2	*
CFM12V18	18.0	7.21 (183.13)	3.34 (84.84)	6.49 (164.85)	6.70 (170.18)	13.6	C
CFM12V25	25.0	6.51 (165.35)	4.91 (124.71)	6.53 (165.86)	6.75 (171.45)	17.3	C
CFM12V33	33.0	6.72 (170.69)	6.25 (158.75)	6.50 (165.10)	6.75 (171.45)	24.5	C

Carefree UPS Series Uninterruptible Power Supply Batteries

6 VOLT							
CF6V10UPS	10.0	6.0 (152.40)	2.00 (50.80)	3.75 (95.25)	3.93 (99.82)	4.1	C
CFP6V18UPS	18.0	3.60 (91.44)	3.34 (84.84)	6.49 (164.85)	7.33 (186.18)	7.2	P
CFP6V33UPS	33.0	6.25 (158.75)	3.35 (85.09)	6.40 (162.56)	7.34 (186.44)	12.5	P
CFP6V60UPS	60.0	7.42 (188.47)	4.51 (114.55)	7.42 (188.47)	8.32 (211.33)	22.0	**
12 VOLT							
CFP12V25UPS	25.0	6.51 (165.35)	4.91 (124.71)	6.50 (165.10)	7.37 (187.20)	19.7	P

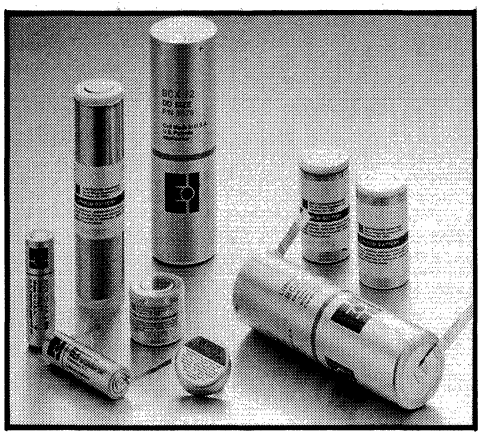
Carefree HE Series Extra High Efficiency Batteries

6 VOLT							
HE6V5	5.0	2.63 (66.8)	2.63 (66.8)	3.78 (96.0)	4.28 (108.7)	1.9	*****
HE6V7.7	7.7	5.95 (151.13)	1.35 (34.29)	3.69 (93.73)	3.88 (98.55)	3.2	90°A
HE6V12.7	12.7	5.95 (151.13)	1.97 (50.04)	3.69 (93.73)	3.88 (98.55)	4.85	90°A
12 VOLT							
HE12V7.7	7.7	5.95 (151.13)	2.53 (64.26)	3.69 (93.73)	3.88 (98.55)	6.4	90°A
HE12V12.7	12.7	5.95 (151.13)	3.94 (100.08)	3.69 (93.73)	3.88 (98.55)	9.7	90°A

* Standard is recessed terminals, negative is .187" wide x .03" thick, positive is .250" wide x .03" thick.
** Lead terminals .500" x .180" width x .920" height with 25-inch diameter hole through.
*** Standard is a cigarette lighter receptacle, tip is positive, shell is negative.
**** Cylindrical lead post, .19-inch diameter, 32" tall
***** Standard is coil spring, lantern battery configuration

NOTE: Some batteries are available in Fire Retardant (FR) cases. Ask your sales representative.

Lithium Battery Specialists



CELLS & CUSTOM PACKS

- Wide Operating Temperature Range • Cells & Packs with Protective Circuitry for Safety • Hermetically Sealed Case
- High Voltage • High Capacity • Moderate to High Rate

ELECTROCHEM - Manufacturer of Quality, High Performance Primary Lithium Batteries

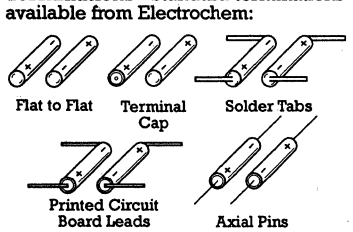
Electrochem, a U.S. manufacturer, has over 20 years of experience in designing and assembling primary lithium cells and batteries. The highest standards for safety, performance and reliability are maintained. We develop and manufacture cells and packs to meet customers' technical and operational requirements.

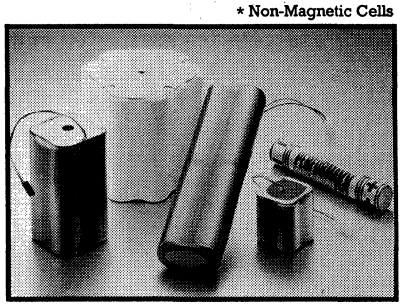
NEW CELLS FOR MWD

Series	Size	Part #	Rated Capacity Ah	Rated Current mA	Maximum Continuous Current	Open Circuit Voltage	Operating Temp Range °C
BCX 72	PC	3B50	1.0	1.0	10 mA	3.9	-55 to +72
	.5gAA	3B27	1.6	10	50 mA	3.9	-55 to +72
	AA	3B64	2.0	20	100 mA	3.9	-55 to +72
	C	3B70	7.0	50	500 mA	3.9	-55 to +72
	D	3B75	15	175	1 Amp	3.9	-55 to +72
	D-LMS*	3B4000	14	175	1 Amp	3.9	-55 to +72
	DD	3B76	30	350	3 Amps	3.9	-55 to +72
CSC 93	PC	3B45	1.0	1.0	10mA	3.9	-32 to +93
	AA	3B24	2.0	50	150 mA	3.9	-32 to +93
	2/5C	3B665	2.5	50	250 mA	3.9	-32 to +93
	1/2C	3B29	3.4	75	350mA	3.9	-32 to +93
	C	3B30	7.0	175	1 Amp	3.9	-32 to +93
	D	3B35	14	500	2 Amps	3.9	-32 to +93
	DD	3B36	30	1000	4 Amps	3.9	-32 to +93
PMX 150	AA	3B1065	1.6	20	150 mA	3.9	-40 to +150
	C	3B3700	6.2	50	500 mA	3.9	-40 to +150
	CC	3B3000	13	180	500 mA	3.9	-40 to +150
	DD	3B2800	25	350	2 Amps	3.9	-40 to +150
MWD 140	CC	3B3200	11	200	1 Amp	3.6	0 to +140
MWD 150	DD	3B3900	24	500	2 Amps	3.6	0 to +150
CFX 175	C	3B4300	5.0	50	150mA	3.2	0 to +175
QTC 85	PC	3B880	1.0	1.0	1 mA	3.6	-40 to +85
	1/2 AA	3B960	.75	.04	4 mA	3.6	-40 to +85
	2/3 A	3B950	1.5	.08	8 mA	3.6	-40 to +85
	AA	3B940	1.9	0.1	10 mA	3.6	-40 to +85

* Non-Magnetic Cells

Terminations - Standard terminations available from Electrochem:





BCX 72 - Lithium Bromine Complex/ Spirally Wound

Unique BCX technology for superior performance in moderate drain rate and low temperature applications requiring long life and high capacity.

CSC 93 Lithium Sulfuryl Chloride/Spirally Wound

With unique design and chemistry, CSC cells feature excellent restart and moderate to high rate and temperature capability. Designed for applications requiring fast power on demand or frequent on/off operation.

PMX 150 and CFX 175

PMX 150 cells and battery packs are designed for safe operation in environments up to 150°C (300°F) and CFX 175 for applications up to 175° (347°F). Primarily developed for downhole oil field applications, PMX and CFX chemistries can also be used in other high temperature applications.

MWD 140 and MWD 150

MWD cells are designed to provide optimum performance in mechanically demanding, high temperature applications. They offer excellent resistance to shock and vibration for MWD (Measurement While Drilling), downhole exploration, oil/gas production and other applications.

QTC 85 - Lithium Thionyl Chloride/Bobbin

QTC 85 cells are ideal for CMOS RAM backup and many other low drain rate applications. Low self discharge rate. Low cost. Single/multiple cell packaging available with customer specified connectors.

Custom Battery Packs

Electrochem can design custom battery packs specifically for your application. Safety and reliability are designed and manufactured into every pack taking into account application requirements, cell matching, protective circuitry, and vibration and shock specifications.

CERTIFIED ISO 9001 BSI Certificate # FM28911

Electrochem LITHIUM BATTERIES

WG

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Electrochem Battery Division
WILSON GREATBATCH LTD.
10,000 Wehrle Drive
Clarence, NY U.S.A. 14031
FAX: 716/759-2562
electrochem@greatbatch.com
www.greatbatch.com/combat.html

EXIDE®

Sonnenschein
A subsidiary of EXIDE Corporation

The Sonnenschein Dryfit A200 and A500 series of gelled electrolyte valve regulated lead acid batteries are designed for all your primary and backup power requirements. Applications include UPS, alarm, medical equipment, emergency lighting, and telecommunications use. The Dryfit series is unparalleled in cycle service. Contact Exide Corporation directly or visit our Internet site (http://www.exideworld.com/power) for more information on Exide Europe and other Sonnenschein products.

DRYFIT A200 Technical Characteristics and Data

Exide Part Number	Battery Description	Rated Voltage Volts	Full Rated Capacity (C20) after several cycles Ah	Discharge Current (I20) at 20 hr discharge mA	Maximum Load approx. A	Maximum Current for 5 sec. approx. A	Weight approx. g	Dimensions Length max. mm	Dimensions Width max. mm	Height to top edge of cover max. mm	Greatest Height Over Contacts max. mm
790502GPW	A202/10S	2	10.0	475	80	300	555	52.9	50.5	94.5	98.4
790163GPW	A204/.0K	4	1.0	50	40	240	170	34.9	42.5	50.5	51.7
790302GPW	A204/3.2S	4	3.2	150	60	300	410	90.5	34.5	60.5	64.4
790172GPW	A206/1.0S	6	1.0	50	40	240	255	51.2	42.5	50.5	54.4
790180GPW	A206/1.2U	6	1.2	55	40	240	280	97.3	25.5	51.0	52.5
790182GPW	A206/1.2S	6	1.2	55	40	240	280	97.3	25.5	51.0	54.9
790312GPW	A206/3.2S	6	3.2	150	60	300	610	134.8	34.8	60.5	64.4
790472GPW	A206/6.5S	6	6.5	325	80	300	1240	116.5	51.0	90.5	94.4
790523GPW	A206/10S	6	10.0	475	80	300	1675	152.0	50.5	94.5	98.4
790268GPW	A208/2.7S	8	2.7	125	60	240	738	133.5	36.5	63.0	66.6
790322GPW	A208/3.2S	8	3.2	150	60	300	880	178.5	34.1	60.5	64.4
790400GPW	A208/4S	8	4.0	190	60	300	995	85.9	51.8	95.0	98.9
790185GPW	A212/1.2S	12	1.2	55	40	240	555	97.5	49.5	51.0	54.9
790202GPW	A212/2S	12	2.0	90	40	240	835	178.5	34.1	60.5	64.4
790274GPW	Q212/2.7S	12	2.7	125	60	240	1110	199.5	36.7	63.5	67.4
790315GPW	A212/3.2S	12	3.2	150	60	300	1200	134.0	66.3	60.0	64.4
790432GPW	A212/6S	12	6.0	285	80	300	2185	151.7	65.5	94.5	98.4
790525GPW	A212/10S	12	10.0	475	80	300	3365	152.0	98.0	94.5	98.4
890610GPW	A212/24G	12	25.0	1200	200	800	8600	176.0	167.0	126.0	126.0
890625GPW	A212/31G	12	31.0	1400	400	1500	10700	197.0	132.0	160.0	181.0
890643GPW	A212/36G6	12	36.0	1800	400	1500	12300	210.0	175.0	175.0	175.0

DRYFIT A 500 Technical Characteristics and Data

Type No.	Type	Nom. Voltage Volt	Nom. Capacity (C 20) to 1.75 VPC Ah	Discharge Current (I20) mA	Max. Load appr. A	Max. Permissable Current Over 5 sec. appr. A	Weight appr. kg	Max. Length in mm	Max. Width In. mm	Max. Height to Lid's Upper Edge in mm	Max. Height Over Terminals Cover in mm	Connections
07 8 95502 00	A 502/10.0S	2	10.0	500	80	300	0.7	52.9	50.5	94.5	98.4	Faston terminal 4.8
07 8 95302 00	A 504/3.5S	4	3.5	175	60	300	0.5	90.5	34.5	60.5	64.4	Faston terminal 4.8
07 8 95182 00	A 506/1.2S	6	1.2	60	40	240	0.33	97.3	25.5	51.0	54.9	Faston terminal 4.8
07 8 95312 00	A 506/3.5S	6	3.5	175	60	300	0.7	134.5	34.8	60.5	64.4	Faston terminal 4.8
07 8 95391 00	A 506/4.2S	6	4.2	210	60	300	0.9	62.3	52.0	98.0	101.9	Faston terminal 4.8
07 8 95465 00	A 506/6.5S	6	6.5	325	80	300	1.3	152.0	34.5	94.5	98.4	Faston terminal 4.8
07 8 95523 00	A 506/10.0S	6	10.0	500	80	300	2.1	152.0	50.5	94.5	98.4	Faston terminal 4.8
07 8 95322 00	A 508/3.5S	8	3.5	175	60	300	0.97	178.5	34.1	60.5	64.4	Faston terminal 4.8
07 8 95185 00	A 512/1.2S	12	1.2	60	40	240	0.65	97.5	49.5	51.0	54.9	Faston terminal 4.8
07 8 95502 00	A 512/2.0S	12	2.0	100	40	240	1.0	178.5	34.1	60.5	64.4	Faston terminal 4.8
07 8 95315 00	A 512/3.5S	2	3.5	175	60	300	1.5	134.0	66.8	60.0	64.4	Faston terminal 4.8
07 8 95432 00	A 512/6.5S	12	6.5	325	80	300	2.6	152.0	65.5	94.5	98.4	Faston terminal 4.8
07 8 95436 00	A 512/6.5SR	12	6.5	325	80	300	2.6	152.0	65.5	94.5	98.4	Faston terminal 6.3
07 8 95525 00	A 512/10.0S	12	10.0	500	80	300	4.1	152.0	98.0	94.5	98.4	Faston terminal 4.8
07 8 95530 00	A 512/10.0SR	12	10.0	500	80	300	4.1	152.0	98.0	94.5	98.4	Faston terminal 6.3
07 8 95565 00	A 512/16.0G5	12	16.0	800	200	700	6.8	181.0	76.0	167.0	167.0	Screw 5
07 8 95560 00	A 512/16.0SR	12	16.0	800	100	300	6.7	181.0	76.0	152.0	156.4	Faston terminal 6.3
08 8 95615 10	A 512/24.0G5	12	24.0	1200	200	800	9.6	176.0	167.0	126.0	126.0	Screw 5
08 8 95615 00	A 512/25.0G5	12	25.0	1250	200	800	9.6	176.0	167.0	126.0	126.0	Screw 5
08 8 95625 00	A 512/30.0G6	12	30.0	1500	400	1500	11.7	197.0	132.0	160.0	184.0	Screw 6
08 8 95632 00	A 512/40.0G6	12	40.0	2000	400	1500	14.8	210.0	175.0	175.0	175.0	Screw 6
08 8 95630 00	A 512/40.0 A	12	40.0	2000	400	1500	14.8	210.0	175.0	175.0	175.0	A DIN 72311
08 8 95660 00	A 512/55.0A	12	55.0	2750	400	1500	19.0	261.0	135.0	208.0	230.0	A DIN 72311
08 8 95664 00	A 512/60.0A	12	60.0	3000	400	1500	21.8	306.0	175.0	190.0	190.0	A DIN 72311
08 8 95668 00	A 512/65.0 G6	12	65.0	3250	440	1500	25.0	381.0	175.0	190.0	190.0	Screw 6
08 8 95666 00	A 512/65.0A	12	65.0	3250	440	1500	25.0	381.0	175.0	190.0	190.0	A DIN 72311
08 8 95722 00	A 512/85.0A	12	85.0	4250	600	2600	33.0	330.0	171.0	214.0	235.5	A DIN 72311

EXIDE® Corporation
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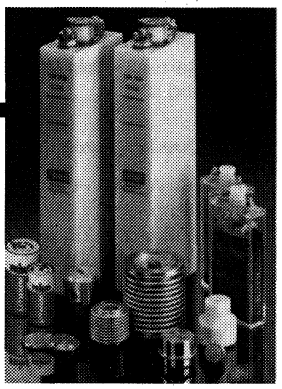
FRIWO SILBERKRAFT

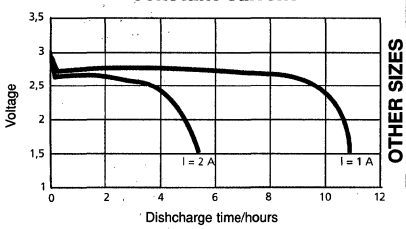


FRIWO LITHIUM MnO_2 Series

- *Powerful • High Current Load*
- *Environmentally Friendly • Durable*
- *High Energy Density • Maximum Capacity*
- *Medium / High Rate System*
- *Functions in Extreme Temperatures*

Batteries offer an extremely low self-discharge rate
Low loss of capacity

Typical discharge curves with constant current



Operating Temperature: -40°C to +60°C**
Storage Temperature: -55°C to +71°C***

Design: Hermetically sealed stainless steel case with safety vent, solder tabs or other terminals

	MODEL NUMBER	SIZE	NOMINAL VOLTAGE (V)	RATED CAP. (Ah@mA)	MAX. DISCHARGE CURRENT* (A)	DIMENSIONS DIAMETER (MM)	HEIGHT (MM)	WEIGHT (G)
OTHER SIZES AVAILABLE	M20	D	3.0	11@200	2.5	34	61	115
	M25	FAT DD	3.0	36@1500	4.0	42	125	355
	M52	C	3.0	4.75@100	1.25	26.2	51	57
	M56	5/4C	3.0	5.7@275	1.5	26	60	69

** Higher rates available under certain condition*
*** Higher operating temperatures can be achieved under certain conditions*
**** Long time storage at high temperature may affect the performance*

NiCd & Fibre Battery Systems

Pocket & Fibre Systems Offer Reliability, Low Maintenance & Long Lifetime

Features of FRIWO NiCd Batteries

- Long life
- Exceptional reliability
- Wide range of operating temperature (-40°C to +55°C)
- Resistant to electrical abuse - both overcharge and overdischarge
- Accept high rates of charge
- No inactivation as a result of corrosion

ACCORDING TO IEC 623	X	H	M	L
CAPACITY (AH)	10 to 130	14 to 222	12 to 1640	12 to 1880
TIME OF DISCHARGE	1s to 20 min	1s to 1hr	15 min to 3hr	1hr to 100hr

Applications Include: AGV, Circuit Breakers, UPS, Telecommunications Photovoltaic, Engine Starting
Emergency Applications: Braking, Lighting, Signalling, Power Supply and On Passenger Coaches

Fibre Nickel Features & Benefits

- Extended cycle life (up to 3000 cycles)
- Low temperature tolerance (more than 80% capacity available at -20°C)
- High discharge currents with x-type (extra-high rate)

Cell Case Materials

- Translucent plastic for visible electrolyte level
- Flame retardent plastic for railroad applications
- Steel for maximum mechanical durability

ELECTROCHEMICAL ACTUATOR-ECA *Easy Drives with New Actuator*

ECA FEATURES

- Forward and backward expansion due to gas evolution.
- Elongation and force proportional to applied charge
- Enables positioning control
- Hermetically sealed
- No noise and no corrosion
- Energy Storage Function
- High position-stability even in power-failure

ECA APPLICATIONS

- Switching or positioning without noise
- Silent adjustments of seats or other furniture
- Drives in contact with aggressive media or dust
- Substitution of hydraulic equipment
- Exact positioning of optical components (lenses, laser-sources) or sensors
- Drives for "Facility management"
- Fail-Safe-Drivers
- Substitution of solenoids in valves
- Dosing installations for medical uses

EXAMPLE:
FRIWO standard ECA SK 5/300-AF
- Stroke up to 5mm - Forces up to 300N - Speed up to 8sec/mm - 12VDC - Max 0.3A
- Length = 30mm - ø = 39.5mm

The ECA can be easily tailored to your application (e.g. forces up to 30,000N can be achieved).

1704 Farmshire Ct., Jarrettsville, MD 21084
Tel: 410-557-4352 Toll free: 888-GO-FRIWO
Fax: 410-692-2292 (463-7496)

P.O. Box 10 05 52 D-47005 Duisburg
Meidericher Strabe 6-8 D-47058 Duisburg Germany
Phone: +49 +203 3002-193 Fax: +49 +203 3002-241

HAWKER ENERGY

Performance by design since 1973

When You're Designing in Performance, Don't Settle For Less Than Pure Lead-Tin.

If you just need a battery, there are many choices. If you need more from your design, however, there is only one choice; pure lead-tin technology. Pure lead-tin overpowers conventional sealed lead products in every category of comparison, and it can only be found in Cyclon® and Genesis® batteries manufactured by Hawker Energy Products Inc. These two design-enhancing battery families provide:

- higher discharge rate
- longer operating life
- wider temperature range (-65°C to +80°C)
- longer shelf life
- faster recharge
- lower internal resistance
- greater design flexibility
- deep discharge capability
- rugged construction
- nonspillable classification; ship without restriction

In other words, our pure lead-tin technology can give your products a competitive edge at a remarkably low cost of ownership to the equipment owner or end user.

HOW DOES THE PURE LEAD-TIN ADVANTAGE WORK?

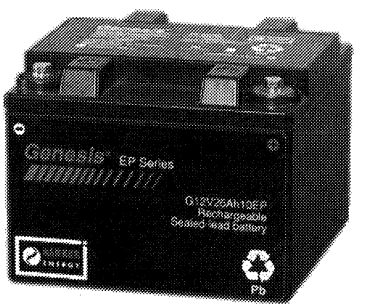
It all starts with raw materials. Our high purity system allows greater efficiency in the recombination of gas, in turn minimizing vapor loss and preventing dry-out failure. The grid corrosion rate is greatly reduced as a result of using 99.99% pure virgin lead. Our thin-plate design provides the lowest internal resistance in the sealed lead industry and increases plate surface area for the ultimate in power delivery.

CYCLON: THINKING OUTSIDE THE BOX

With the unique cylindrical shape of Cyclon single cells, and the infinite number of possibilities using 2-volt increments which range in capacity from 2.5Ah up to 25Ah, you can think outside the "box". Single cells can be combined in series and/or parallel to meet your specific voltage, ampere-hour and space requirements. Also available in 4V and 6V monoblocs, the pure lead-tin advantage is yours in whatever shape you need it.

GENESIS: PRISMATIC POWER

Purpose built for high rate power, long float life and high cycle life, the Genesis flat-plate design can best optimize your space and weight limitations.



POWERED BY PURE LEAD-TIN

You'll find Cyclon and Genesis pure lead-tin technology powering a wide variety of applications around the globe, including:

- Telecommunications
- Disc storage back-up
- Electric vehicles
- Lawn and garden equipment
- Emergency lighting
- Aerospace
- Global positioning systems
- Medical equipment
- UPS
- Specialty engine start
- Electronics/ instrumentation
- Solar
- Defense
- Fixed-point data networks

FOR MORE INFORMATION, VISIT OUR WEB SITE AT:

www.hepi.com

or call us at 1-800-964-2837

Hawker Energy Products Inc.
617 N. Ridgeview Drive
Warrensburg, MO 64093-9301 USA
800-283-2948 (Fax)

UL Recognized Component. Cyclon & Genesis meet UL 1989.

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THE ONLY ONLINE

EAC®

Powering a World on the Move℠

- Search & Select
- Current Data
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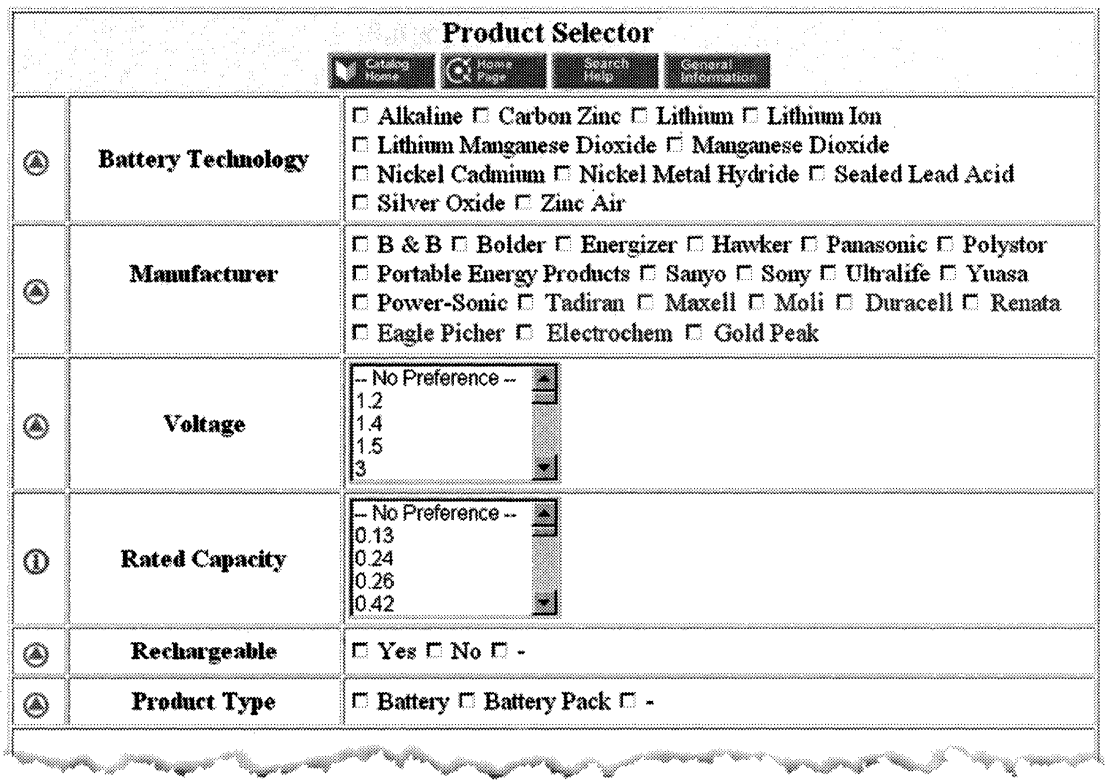

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Battery Clips & Accessories

Fig. 1

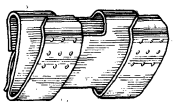

Fig. 2

Fig. 3

Fig. 4

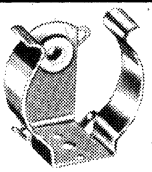

Fig. 5

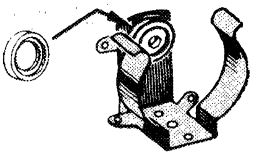

Fig. 6

Fig. 7

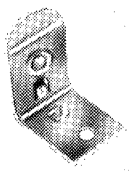

Fig. 8

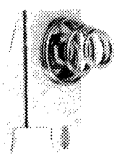

Fig. 9

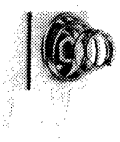

Fig. 10

Fig. 11

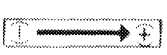

Fig. 12

Fig. 13a

Fig. 14a

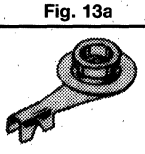

Fig. 13

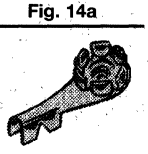

Fig. 14

Snap-On Battery Clips for Battery Compartments

Mfg. No.	Fig. No.	Battery Size	Configuration
209	1	A • AA	Single Contact
204	1	AAA • AAAA • N	Single Contact
210	2	A • AA	Dual Contact
202	2	AAA • AAAA • N	Dual Contact
228	3	A • AA	Positive Contact

Battery Clips for Battery Compartments

Mfg. No.	Fig. No.	Battery Size	Configuration
206	7	AA	Anti-Rotation Tab
207	8	C	Anti-Rotation Tab
208	8	D	Anti-Rotation Tab

Battery Clips, Insulated & Non-Insulated Contact

Mfg. No.	Fig. No.	Battery Size	Configuration
86	5	C	Non-Insulated Contact
87	5	C	Insulated Contact
88	5	D	Insulated Contact
89	5	D	Non-Insulated Contact
99	5	AA	Non-Insulated Contact
100	5	AA	Insulated Contact

Battery Clips for PC Mount

Mfg. No.	Fig. No.	Battery Size	Configuration
82	4	AAA • N	Snap-In PC Mount
92	4	A • AA	Snap-In PC Mount

Battery Spring Clips for PC Mount

Mfg. No.	Fig. No.	Battery Size	Configuration
628	9	A	PC Mount
629	10	AA • AAA	PC Mount

Battery Spring Contacts

Mfg. No.	Fig. No.	Battery Size	Material
211	11	AA • A	.025" Dia. Music Wire
211-D	11	C • D	.040" Dia. Music Wire

Battery Accessories

Mfg. No.	Fig. No.	Size/Type	Description
58	12	.250" x 1.375"	Label
59	6	Red - Insulated	Polarizing Washer
60	6	Black - Insulated	Polarizing Washer

Battery Snap-Ons

Mfg. No.	Fig. No.	Description
261	13a	Jr. Stud - .093" Hole
269	14a	Jr. Socket - .093" Hole
262	13a	Sr. Stud - .125" Hole
270	14a	Sr. Socket - .125" Hole
265	13a	Jr. Stud w/Phenolic Washer
266	14a	Jr. Socket w/Phenolic Washer
273	13a	Sr. Stud w/Phenolic Washer
274	14a	Sr. Socket w/Phenolic Washer
263	13	Jr. Stud with Crimp Lug
271	14	Jr. Socket with Crimp Lug
264	13	Sr. Stud with Crimp Lug
272	14	Sr. Socket with Crimp Lug

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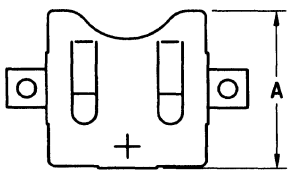
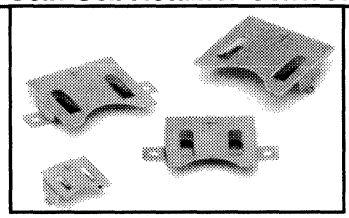
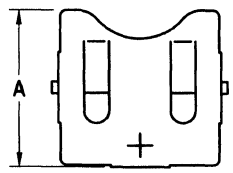
Surface & Thru Hole Mount Coin Cell Retainer Contacts

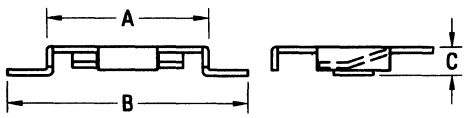
Surface Mount





Thru Hole Mount





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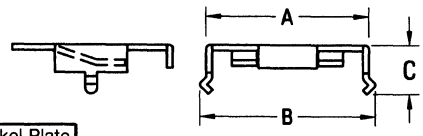


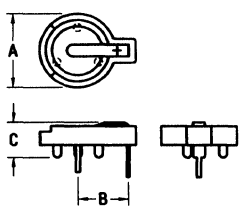
Material: Spring Steel, Nickel Plate

Mfg. No.	Cell Dia.	A	B	C	Battery Reference
3000	12mm	.520"	.770"	.118"	BR1216, BR1220, BR1225
3002	20mm	.781"	1.220"	.145"	BR2016, BR2020, BR2025, DR2032
3004	23mm	.939"	1.339"	.145"	BR2320, BR2325, BR2330
3006	24mm	1.000"	1.400"	.145"	CR2430, DL2430

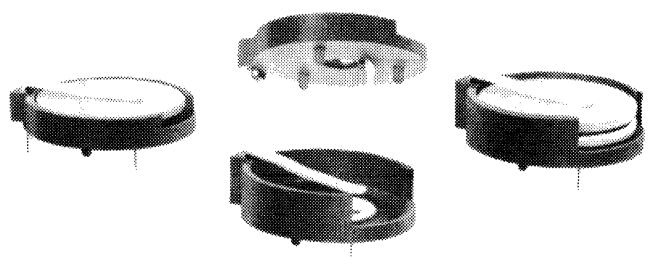
Mfg. No.	Cell Dia.	A	B	C	Battery Reference
3001	12mm	.520"	.585"	.229"	BR1216, BR1220, BR1225
3003	20mm	.781"	.886"	.270"	BR2016, BR2020, BR2025, DR2032
3005	23mm	.939"	1.004"	.256"	BR2320, BR2325, BR2330
3007	24mm	1.000"	1.065"	.256"	CR2430, DL2430

Thru Hole Mount Coin Cell Battery Holders

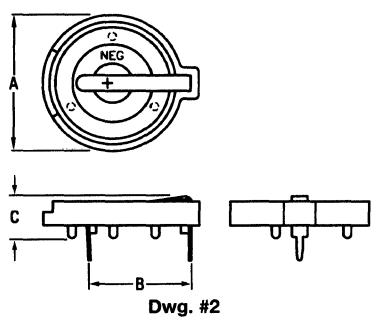
12mm to 16mm Holders



Dwg. #1



20mm to 30mm Holders



Dwg. #2

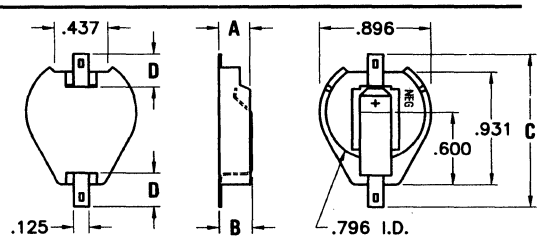
Contacts: Spring Steel, Nickel Plate over Copper; **Base:** UL 94V-O PBT

Mfg. No.	Dwg. No.	Cell Dia.	No. Cells	A	B	C	Battery Reference
500	1	12mm	1	.593"	.393"	.280"	BR1216, BR1220, BR1225
501	1	12mm	2	.593"	.393"	.380"	BR1216, BR1220, BR1225
502	1	16mm	1	.750"	.463"	.312"	CR1616, CR1620, CR1632
103	2	20mm	1	.896"	.807"	.335"	BR2016, BR2020, BR2025, BR2032
1026	2	20mm	2	1.093"	.807"	.452"	BR2016, BR2020, BR2025, BR2032
104	2	23mm	1	1.000"	.807"	.335"	BR2320, BR2325, BR2330, BR2335
1027	2	23mm	2	1.093"	.807"	.452"	BR2320, BR2325, BR2330, BR2335
105	2	24mm	1	1.093"	.807"	.335"	CR2430
1025	2	24mm	2	1.093"	.807"	.452"	CR2430, CR2450,
301	2	30mm	1	1.297"	.807"	.335"	BR2032

Surface Mount Coin Cell Battery Holders

20mm Holders

Available on Tape & Reel



Contacts: Spring Steel, Tin over Nickel Plate
Base: UL 94V-O Nylon , Stanyl-46

Mfg. No.	No. Cells	A	B	C	D	Battery Reference
1061	1	.256"	.286"	1.015"	.156"	CR2016†,CL2020, CR2025, CR2032
1062	2	.375"	.406"	1.015"	.156"	CR2016†,CL2020, CR2025, CR2032

†Mfg. No. 1061 for 1 or 2 cells; Mfg. No. 1062 for 3 cells

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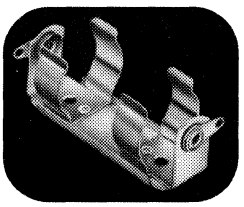

Steel Holders
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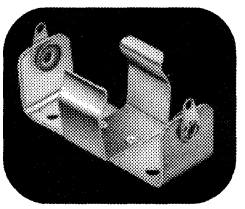
Solder Lugs,PC Lugs
or Series Conncections



Aluminum Holders
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or Series Conncections

Battery Holder Configurations

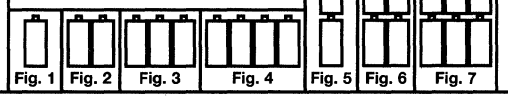

Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5 Fig. 6 Fig. 7

"AAA" Battery Holders

No. Cells	Fig. No.	Steel	Alum.	Termination
1	1	—	137	Solder Lugs
2	2	—	138	Solder Lugs
3	3	—	169	Solder Lugs
4	4	—	170	Solder Lugs

"AA" Battery Holders

No. Cells	Fig. No.	Steel	Alum.	Termination
1	1	2228	2222	PC Lugs
1	1	—	139	Solder Lugs
2	2	2229	2223	PC Lugs
2	2	—	140	Solder Lugs
2	5	2189	—	Solder Lugs
2	5	—	189	Solder Lugs
2	2	—	146	Solder Lugs (Series Connection)
2	2	2140	—	Solder Lugs/Phenolic Base
3	3	—	171	Solder Lugs
3	3	—	147	Solder Lugs (Series Connection)
3	3	2171	—	Solder Lugs/Phenolic Base
4	4	—	182	Solder Lugs
4	6	—	192	Solder Lugs
4	6	—	148	Solder Lugs (Series Connection)
4	4	2182	—	Solder Lugs/Phenolic Base
6	7	—	193	Solder Lugs

"C" Battery Holders

No. Cells	Fig. No.	Steel	Alum.	Termination
1	1	2230	2224	PC Lugs
1	1	2173	173	Solder Lugs
2	2	2231	2225	PC Lugs
2	2	—	174	Solder Lugs
2	5	2185	185	Solder Lugs
2	2	—	149	Solder Lugs (Series Connection)
2	2	2174	—	Solder Lugs/Phenolic Base
3	3	—	187	Solder Lugs
3	3	—	150	Solder Lugs (Series Connection)
3	3	2187	—	Solder Lugs/Phenolic Base
4	6	—	196	Solder Lugs
4	6	—	151	Solder Lugs (Series Connection)
4	4	2188	—	Solder Lugs/Phenolic Base
6	7	—	197	Solder Lugs

"D" Battery Holders

No. Cells	Fig. No.	Steel	Alum.	Termination
1	1	2232	2226	PC Lugs
1	1	2175	175	Solder Lugs
2	2	2233	2227	PC Lugs
2	2	2176	—	Solder Lug/Phenolic Base
2	2	—	176	Solder Lugs
2	5	2186	186	Solder Lugs
2	2	—	152	Solder Lugs (Series Connection)
3	3	2190	—	Solder Lug/Phenolic Base
3	3	—	190	Solder Lugs
3	3	—	153	Solder Lugs (Series Connection)
4	4	2192	—	Solder Lug/Phenolic Base
4	6	—	200	Solder Lugs
4	6	—	158	Solder Lugs (Series Connection)
6	7	—	201	Solder Lugs

1/2AA • 1/2A • 2/3A • AA • AAA & N Size Battery Holders

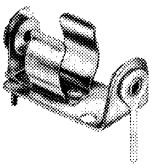

Fig. 8

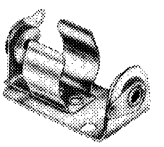

Fig. 9

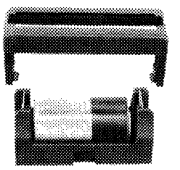

Fig. 10

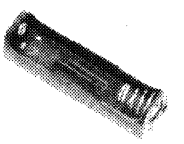

Fig. 11

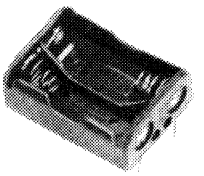

Fig. 12

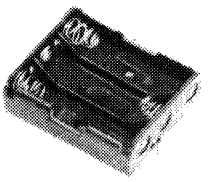

Fig. 13

"1/2AA" Battery Holders

No. Cells	Fig. No.	Mfg. No.	Matl.	Termination
1	10	108†	Plastic UI 94V-0	PC Mount
1	9	1103	Steel	Solder Lugs
1	8	2103	Steel	PC Lugs

†Mfg. No. 108C Retainer Cover for use with 108

"1/2A" Battery Holders

No. Cells	Fig. No.	Mfg. No.	Matl.	Termination
1	9	1105	Steel	Solder Lugs
1	8	2105	Steel	PC Lugs

"2/3A" Battery Holders

No. Cells	Fig. No.	Mfg. No.	Matl.	Termination
1	10	1029†	Plastic UI 94V-0	PC Mount
1	8	131	Alum.	PC Lugs
1	9	132	Alum.	Solder Lugs

†Mfg. No. 1029C Retainer Cover for use with 1029

"AA" Battery Holders

No. Cells	Fig. No.	Mfg. No.	Matl.	Termination
1	10	1028†	Plastic UI 94V-0	PC Mount
1	11	2460	Plastic	PC Lugs
1	11	2461	Plastic	6" Wire Leads
2	12	2462	Plastic	PC Lugs
2	12	2463	Plastic	6" Wire Leads
3	13	2464	Plastic	PC Lugs
3	13	2465	Plastic	6" Wire Leads

†Mfg. No. 1028C Retainer Cover for use with 1028

"AAA" Battery Holders

No. Cells	Fig. No.	Mfg. No.	Matl.	Termination
1	11	2466	Plastic	PC Lugs
1	11	2467	Plastic	6" Wire Leads
2	12	2468	Plastic	PC Lugs
2	12	2469	Plastic	6" Wire Leads

"N" Battery Holders

No. Cells	Fig. No.	Mfg. No.	Matl.	Termination
1	11	2470	Plastic	PC Lugs
1	11	2471	Plastic	6" Wire Leads
2	12	2472	Plastic	PC Lugs
2	12	2473	Plastic	6" Wire Leads

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9V Holders/Straps/Snaps

9V Battery Holders

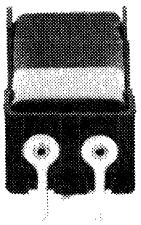

Fig. 1

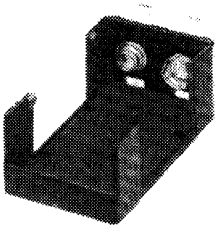

Fig. 2

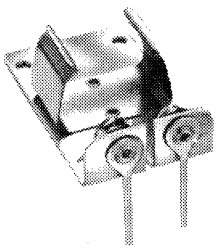

Fig. 3

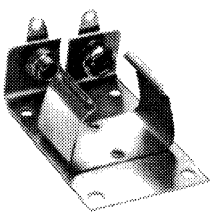

Fig. 4

Mfg. No.	Fig. No.	Matl.	Type	Termination
1294	1	Plastic	Universal Holder	PC Lugs
1295	2	Plastic	Universal Holder	Quick-Fit/Solder Lugs
1291	3	Alum.	Snap-In Holder	PC Lugs
1290	4	Alum.	Snap-In Holder	Solder Lugs

9V Battery Snap-Ons

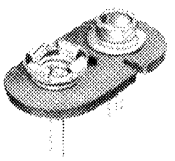

Fig. 5

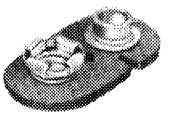

Fig. 6

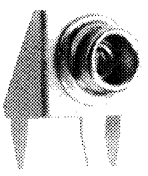

Fig. 7

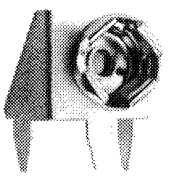

Fig. 8

Mfg. No.	Fig. No.	Matl.	Termination
968	5	Fibre	PC Pins
68	6	Fibre	Without Pins or Leads
593	7	Steel, Tin Plate	For Mounting Battery on PCB
594	8	Steel, Tin Plate	For Mounting Battery on PCB
636	8	Steel, Tin Plate	For Mounting Battery off PCB
635	7	Steel, Tin Plate	For Mounting Battery off PCB

9V Battery Straps

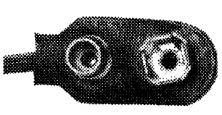

Fig. 9 - I Type

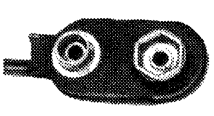

Fig. 10 - I Type

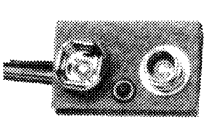

Fig. 11 - I Type

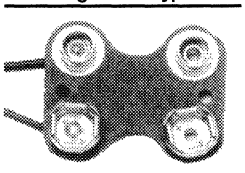

Fig. 12

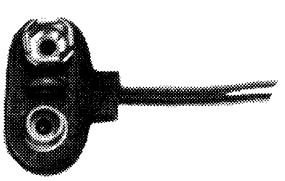

Fig. 13 - T Type

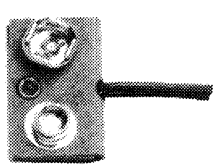

Fig. 14 - T Type

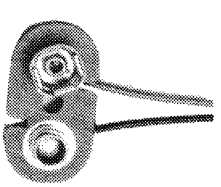

Fig. 15

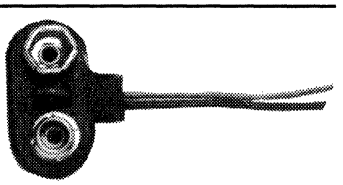

Fig. 16 - T Type

Mfg. No.	Fig. No.	Matl.	Lead Length	Type
2238	9	Rigid Vinyl	4.00"	Premium Insulated
2239	9	Rigid Vinyl	6.00"	Premium Insulated
2240	9	Rigid Vinyl	8.00"	Premium Insulated
2241	13	Rigid Vinyl	4.00"	Premium Insulated
2242	13	Rigid Vinyl	6.00"	Premium Insulated
2243	13	Rigid Vinyl	8.00"	Premium Insulated
72-4	15	.062" Fibre	4.00"	Premium
72	15	.062" Fibre	7.00"	Premium
72-8	15	.062" Fibre	8.00"	Premium
83-4	11	Fibre	4.00"	Premium Insulated
83	11	Fibre	6.50"	Premium Insulated
83-8	11	Fibre	8.00"	Premium Insulated
85-4	14	Fibre	4.00"	Premium Insulated
85-6	14	Fibre	6.50"	Premium Insulated
85-8	14	Fibre	8.00"	Premium Insulated
232	10	Flexible Vinyl	4.00"	Economy Insulated
233	10	Flexible Vinyl	6.00"	Economy Insulated
234	10	Flexible Vinyl	8.00"	Economy Insulated
235	16	Flexible Vinyl	4.00"	Economy Insulated
236	16	Flexible Vinyl	6.00"	Economy Insulated
237	16	Flexible Vinyl	8.00"	Economy Insulated
227	12	Fibre	7.00"	Dual-Parallel Circuit
229	12	Fibre	7.00"	Dual-Series Circuit

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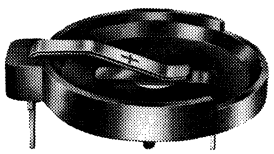
e-mail: eem@keyelco.com • WebSite: http://www.keyelco.com

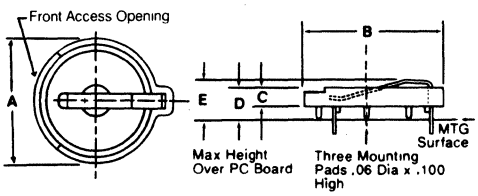
Memory Protection Devices, Inc. Battery Holders

COIN CELL SERIES

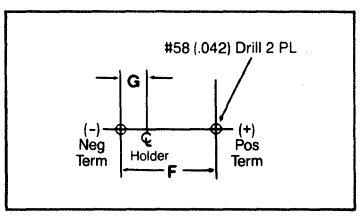
Holder: Self-extinguishing thermoplastic Polyester. VALOX® 420 SEO
Temperature Range: -55° to +140°C
Optional Range: -40°C to +245°C
Contacts: 302 spring temper stainless steel, nickel plated
Flammability Rating: UL94 V-0
Dielectric Strength: 560 volts/mil at 25°C for 5 sec.

BH906
BH800

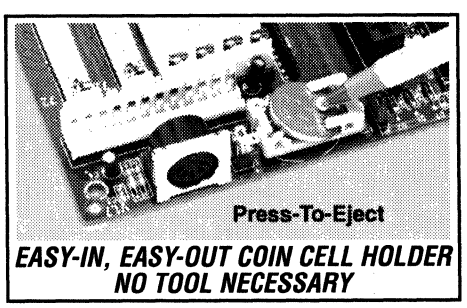




MODELS	A	B	C	D	E	F(±).015	G
BH3000	1.30	1.45	.170	.270	.370	.994	.293
BH1000	1.090	1.195	.185	.285	.326	.807	.256
BH1000-G	1.090	1.175	.300	.430	.500	.807	.256
BH1000-S	1.090	1.175	.300	.400	.430	.807	.256
BH906	1.000	1.150	.170	.270	.320	.807	.256
BH906-S	1.000	1.150	.270	.370	.420	.807	.256
BH800	.890	1.075	.200	.300	.330	.807	.256
BH600-5.8	.750	.920	.200	.300	.460	.656	.231
BH600	.750	.920	.200	.300	.330	.656	.231
BH500	.595	.755	.148	.248	.280	.393	—
BH400	.505	.739	.146	.246	.290	.423	—



Contact Mounting Hole Detail



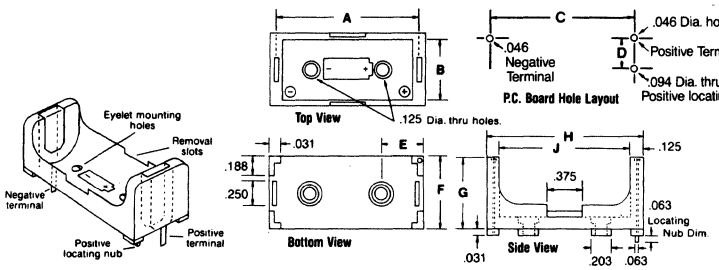
EASY-IN, EASY-OUT COIN CELL HOLDER NO TOOL NECESSARY

All dimensions in inches unless otherwise indicated.

HORIZONTAL CELL SERIES

Holder: Self-extinguishing thermoplastic Polyester. VALOX® 420 SEO
Temperature Range: -55° to +140°C
Contacts: 302 spring temper stainless steel, nickle plated
Flammability Rating: UL94 V-0
Dielectric Strength: 560 volts/mil at 25°C for 5 sec.
Weight: BH (see table), BH-T (see table)
Color: Black

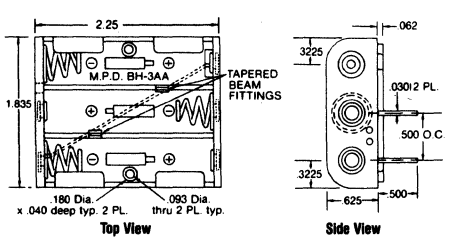
Lithium Batteries have gained wide usage for IC Memory Back-Up Systems due to long-lasting stable performance with low power consumption. Our holders feature .025" thick spring tempered stainless steel contacts to prevent any break in continuity.

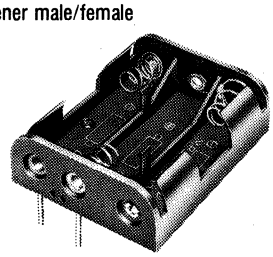


MODELS	STANDARD STYLE BATTERIES	FAST-ON-TAB	WEIGHT IN GRAMS	DIRECTION FINDER	DIMENSIONS								
					A	B	C	D	E	F	G	H	J
BH 2/3A	2/3A		7	•	1.500	.625	1.500	.328	.453	.719	.750	1.625	1.375
BH 2/3A-T	2/3A	•	7.3	•	1.500	.625	—	—	.453	.719	.750	1.625	1.375
BH 1/2 AA	1/2 AA		5.5	•	1.172	.563	1.172	.297	.344	.649	.750	1.297	1.056
BH 1/2 AA-T	1/2 AA	•	6	•	1.172	.563	—	—	.344	.649	.750	1.297	1.056
BH AA	AA		18	•	2.156	.563	2.141	.297	.469	.649	.750	2.297	2.031
BH AA-T	AA	•	19	•	2.156	.563	—	—	.469	.649	.750	2.297	2.031
BH-C	C		20	•	2.172	.969	2.172	.516	.469	1.094	1.125	2.297	2.031
BH-C-T	C	•	20.7	•	2.172	.969	—	—	.469	1.094	1.125	2.297	2.031

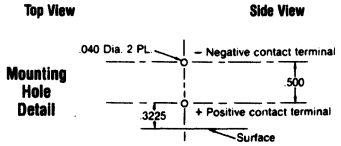
AA BATTERY PACK SERIES

Holder: Impact resistance nylon #6
Temperature Range: -40°C to +85°C
Contacts: Spring steel, nickel plated, imbedded in nylon
Flammability Rating: UL 94V-2
Terminals: Brass, nickel plated, snap fastener male/female
Spring: Spring steel, nickel plated
Color: Black





BH3AA-PC
(3 batteries)



BH2AA-PC (2 batteries)
2.25 H x 1.24 W x .625 D

BH4AA-PC (4 batteries)
2.25 H x 2.43 W x .625 D

OTHER MPD BATTERY PACKS

"D" Cells, "C" Cells, AA Holders, AAA Holders, "N" Holders, 9V Holders & Snaps and Hardware. Custom Battery Holders, too.

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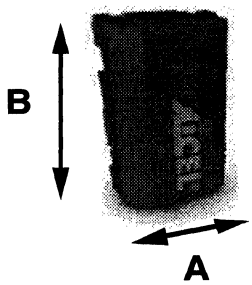
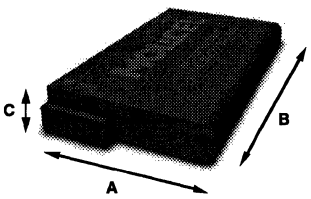
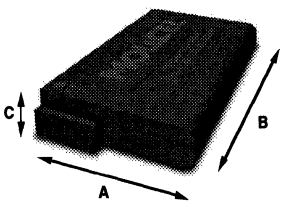
NEC Electronics Inc.
2880 Scott Blvd., Santa Clara, CA 95050-2554
Telephone: 1-800-366-9782 FAX #: 1-800-729-9288
www.nec.com

LITHIUM-ION
Rechargeable Batteries
(BATTERY PACKS)

MOLICEL® Battery Type	MCR-1821H	ME202 "SMART" BATTERY	ME210 "SMART" BATTERY
	 Includes: Two ICR-18650 cells and pack control circuitry	 Includes: Nine ICR-18650 cells and pack control circuitry	 Includes: Six ICR-18650 cells and pack control circuitry
Features	•Off the shelf •No engineering costs •Reduced design time •MQC-1821 fast charger available for turnkey system solution	•Off the shelf •Extended battery life •30% lighter than NiMH •Standard pack design •Accurate state-of-charge indication •SBS-compliant	•Off the shelf •Extended battery life •30% lighter than NiMH •Accurate state-of-charge indication •SBS-compliant
Nominal Capacity	1350 mAh	4500 mAh	3000 mAh
Nominal Voltage	7.4V	11.1V	11.1V
Operating Voltage	8.2V to 6.0V	12.6V to 9.0V	12.6V to 9.0V
Energy	10 Wh	50 Wh	33 Wh
Energy Density	176 Wh/l 100 Wh/kg	187 Wh/l 111 Wh/kg	179 Wh/l 109 Wh/kg
Operating Temperature Range Discharge: Charge:	 -20 C to 60 C 0 C to 45 C	 -20 C to 60 C 0 C to 45 C	 -20 C to 60 C 0 C to 45 C
Weight	99 grams	450 grams	306 grams
Dimensions (mm)	(A) 39 (B) 71 (C) 20.5	(A) 89.3 (B) 149.5 (C)20	(A) 89.3 (B) 113 (C) 20
Cycle Life	>500 cycles	>500 cycles	>500 cycles

* Subject to change without notice.

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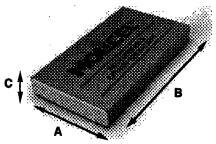
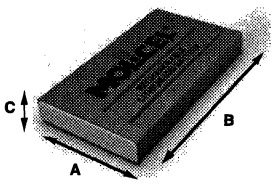
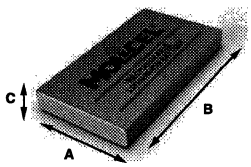
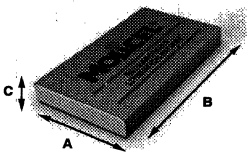
2880 Scott Blvd., Santa Clara, CA 95050-2554
Telephone: 1-800-366-9782 FAX #: 1-800-729-9288
www.nec.com

LITHIUM-ION
Rechargeable Batteries
(PRISMATIC)

MOLICEL® Battery Type	IMP-300540	IMP-300648/ IMP-300648AL		IMP-220665	IMP-340848
					
	Cathode: Manganese-dioxide Anode: Graphitic carbon	Cathode: Manganese-dioxide Anode: Graphitic carbon		Cathode: Manganese-dioxide Anode: Graphitic carbon	Cathode: Manganese-dioxide Anode: Graphitic carbon
Features	•Long cycle life •Good charge retention •High rate capability •No memory effect •No pack control circuitry required	•Long cycle life •Good charge retention •High rate capability •No memory effect •No pack control circuitry required		•Long cycle life •Good charge retention •High rate capability •No memory effect •No pack control circuitry required	•Long cycle life •Good charge retention •High rate capability •No memory effect •No pack control circuitry required
Capacity	350 mAh	600 mAh	550 mAh	600 mAh	900 mAh
Voltage	3.8V	3.8V		3.8V	3.8V
Operating Voltage	4.2V to 3.0V	4.2V to 3.0V		4.2V to 3.0V	4.2V to 3.0V
Energy	1.33 Wh	2.28 Wh	2.09 Wh	2.28 Wh	3.42 Wh
Energy Density	217 Wh/l 74 Wh/kg	244 Wh/l 91Wh/kg	231 Wh/l 110Wh/kg	253 Wh/l 88 Wh/kg	247 Wh/l 88 Wh/kg
Operating Temperature Discharge: Charge:	 -20 C to 60 C 0 C to 45 C	 -20 C to 60 C 0 C to 45 C		 -20 C to 60 C 0 C to 45 C	 -20 C to 60 C 0 C to 45 C
Weight	18 grams	25 grams	19 grams	26 grams	39 grams
Dimensions (mm)	(A) 29.4 (B) 40 (C) 5.2	(A) 29.4 (B) 48 (C) 6.4	(A) 29.4 (B) 48 (C) 6.4	(A) 22 (B) 65 (C) 6.5	(A) 33.6 (B) 48 (C) 8.6

Cells can be assembled in series/parallel configurations. Consult an NEC representative for battery pack design support.

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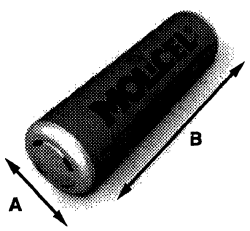
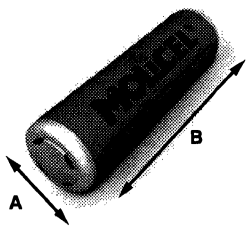
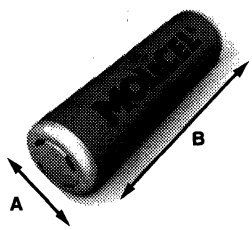
LITHIUM-ION
Rechargeable Batteries
(CYLINDRICAL)

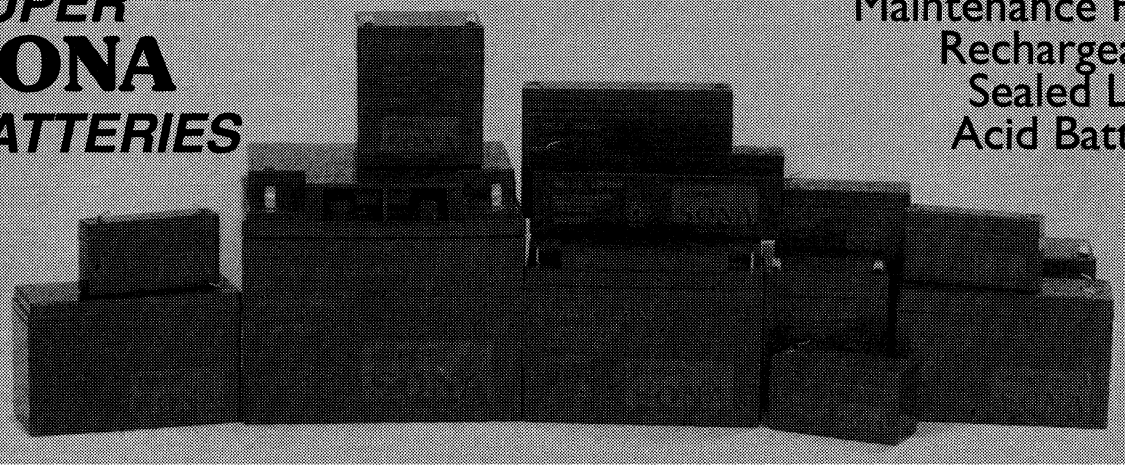
MOLICEL® Battery Type	ICR18650	ICR17670	IMR18650
	 Cathode: Lithium-cobalt Anode: Graphitic carbon	 Cathode: Lithium-cobalt Anode: Graphitic carbon	 Cathode: Manganese-dioxide Anode: Graphitic carbon
Features	•High energy density •Long cycle life •Excellent charge retention •High rate capability •No memory effect •Pack control circuitry required	•High energy density •Long cycle life •Good charge retention •High rate capability •No memory effect •Pack control circuitry required	•High energy density •Long cycle llife •Good charge retention •High rate capability •No memory effect •No pack control circuitry required
Nominal Capacity	1500 mAh	1300 mAh	1350 mAh
Nominal Voltage	3.7V	3.7V	3.8V
Operating Voltage	4.2V to 3.0V	4.2V to 3.0V	4.2V to 3.0V
Energy	5.6 Wh	4.8 Wh	5.1 Wh
Energy Density	325 Wh/l 132 Wh/kg	315 Wh/l 130 Wh/kg	310 Wh/l 122 Wh/kg
Operating Temperature Range Discharge: Charge:	 -20 C to 60 C 0 C to 45 C	 -20 C to 60 C 0 C to 45 C	 -20 C to 60 C 0 C to 45 C
Weight	42 grams	37 grams	42 grams
Dimensions (mm)	(A) 18 (B) 65	(A) 17 (B) 67	(A) 18 (B) 65
Cycle Life	>500 cycles	>500 cycles	>500 cycles

Cells can be assembled in series/parallel configurations and require pack control circuitry. Consult your NEC representative for battery pack design support.

*Subject to change without notice.

SUPER SONA BATTERIES

Maintenance Free Rechargeable Sealed Lead Acid Battery



Battery Type Number	Nominal Voltage (V)	Nominal Capacity AH (20HR)	Dimensions								Assembly Figure	Max Charing Current (A)
			Inch				Millimeter					
			L	W	H	TH	L	W	H	TH		
YP4-2	2	4	1.85	0.98	3.98	4.21	47	25	101	107		1.20
YP4.2-4	4	4.2	1.93	2.09	3.70	3.86	49	53	94	98		1.26
YP1.2-6	6	1.2	3.82	0.98	2.01	2.24	97	25	51	57		0.36
YP3-6	6	3	5.28	1.34	2.36	2.60	134	34	60	66		0.90
YP4-6	6	4	2.76	1.89	4.02	4.25	70	48	102	108		1.20
YP4-6WL	6	4	2.76	1.89	4.02	4.02	70	48	102	102		1.20
YP6-6	6	6	5.94	1.34	3.70	3.94	151	34	94	100		1.80
YP8-6	6	8	5.94	1.97	3.70	3.94	151	50	94	100		2.40
YP10-6	6	10	5.94	1.97	3.70	3.94	151	50	94	100		3.00
YP1.2-12	12	1.2	3.82	1.69	2.01	2.24	97	43	51	57		0.36
YP1.9-12	12	1.9	7.01	1.34	2.36	2.60	178	34	60	66		0.57
YP2-12	12	2	7.01	1.34	2.36	2.60	178	34	60	66		0.60
YP3-12	12	3	5.28	2.64	2.36	2.60	134	67	60	66		0.90
YP4-12	12	4	3.54	2.76	4.02	4.25	90	70	102	108		1.20
YP6.5-12	12	6.5	5.94	2.56	3.70	3.94	151	65	94	100		1.95
YP7-12	12	7	5.94	2.56	3.70	3.94	151	65	94	100		2.10
YP15-12	12	15	7.13	2.99	6.57	6.57	181	76	167	167		4.50
YP17-12	12	17	7.13	2.99	6.57	6.57	181	76	167	167		5.10
YP24-12	12	24	6.54	6.89	4.92	4.92	166	175	125	125		7.20
YP38-12	12	38	7.76	6.50	6.69	6.69	197	165	170	170		11.40

Battery Type Number	Nominal Voltage (V)	Nominal Capacity AH (20HR)	Dimensions						Assembly Figure	Max Charing Current (A)
			Inch			Millimeter				
			L	W	H	L	W	H		
YP6-3500P	6	6V3500MAH	5.75	2.28	1.34	146	58	34		1.06
YP12-2000	12	12V2000MAH	5.67	0.94	2.56	144	24	65		0.60
YP12-2000P	12	12V2000MAH	6.30	2.91	1.26	160	24	61		0.60
YP12-2300	12	12V2300MAH	7.20	0.94	2.40	183	24	61		0.69

Application-For Both Cyclic and Float (Standby) Service

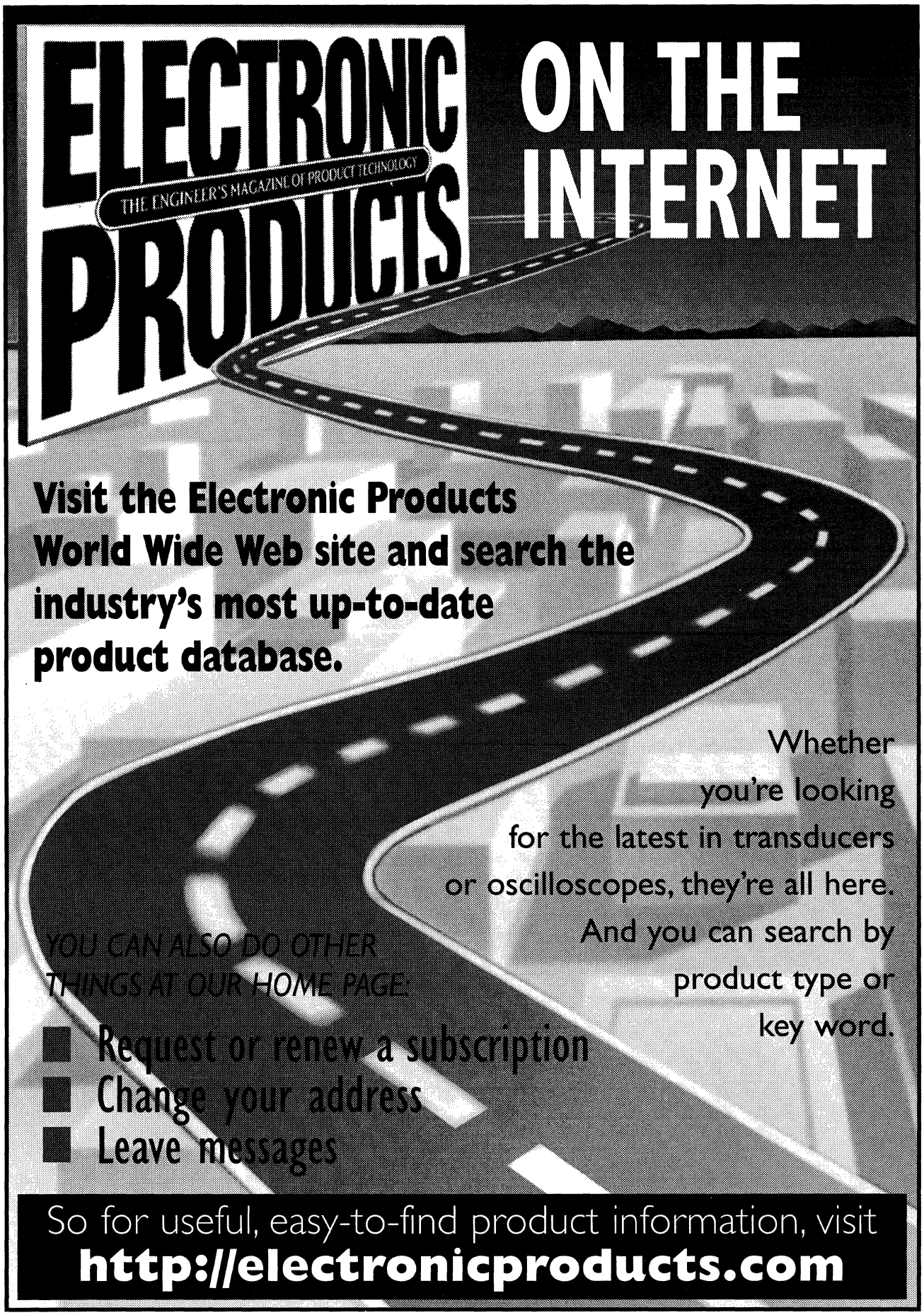
- Alarm systems
- Electric Power Wheelchairs
- Electronic Cash Register
- Electronic Test Equipment
- Emergency Lighting Systems
- Fire & Security Systems
- Fish Detectors
- Portable Cleaner
- Portable Television
- Portable Video Tape Recorders (VTR)
- Power Tools
- Rechargeable Fan
- Electronic Scale
- Telecommunications Systems
- Toys and Hobbies
- Uninterruptible Power Systems

U.S. Office

Nepo, Inc.
Tel: 562-404-2867
Fax: 562-404-3137

Factory (Taiwan)

Yacht Battery Co., Ltd.
Tel: 886-2-25782128
Fax: 886-2-25778439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PBI® Need a custom battery? You spec it—We'll make it! Plainview Batteries, Inc.

Rechargeable	Primary	Accessories
Nickel Cadmium & Nickel Metal Hydride	Alkaline Manganese	Smart Chargers
Sealed Lead Acid	Carbon-Zinc Leclanche'	Trickle Chargers
Lithium Manganese Dioxide	Lithium	Wall Plug-In Chargers
Lithium Ion	Mercury & Silver Oxide	Clips/Holders/Retainers
	Zinc-Air & Zinc Chloride	Battery Testers

How to specify a battery:

1. Type of product to be powered (meter, computer, medical, etc.)_____
2. Min/Max Operating voltage (Vdc)? Min_____ Max _____
3. Operating time: Standby _____ hrs; Normal _____ hrs; Full Load _____ hrs
4. Current (mA): Standby _____ mA; Normal _____ mA; Full Load _____ mA
   Peak Pulse:_____Amps for _____ seconds duration.
5. Type of battery desired: (__) One shot primary? (__) Rechargeable?
   If rechargeable, how much time to recharge? _____ hours.
6. User replaceable? (__) Yes. (__) No.
7. Operating temperature range? Minimum (_____) degrees C. Maximum (___) degrees C.
8. Approximate design battery size allowable.
   _____ mm long
   _____ mm tall
   _____ mm thick
9. Is this a new design? (__) Yes. (__) No.
10. If an existing design, why do you need a new battery?
    (__) Poor performance of previous battery.
    (__) Size of previous battery.
    (__) Cost of previous battery.
    (__) Short life of previous battery.
    (__) Other. What?_____
11. Is an example of the product available for Plainview Battery to test? (__) Yes. (__) No.
12. Desired physical attributes.
    (__) Soldered (welded) connections. (Permanent installation, factory or VAR replace).
    (__) Plug-in connections
    (__) Other. What? _____
13. Approximate annual volume. (_____) batteries per month.

14. Your Name_____ Title _____ e-mail_____
    Company_____ Fax _____/ _____- _____
    Tel. _____/ _____- _____
    Mailing address_____ MS _____
    City _____ State_____ ZIP _____-_____
    Country _____
    Comment _____
    _____

15. Copy this page. Complete the form and fax it to: Plainview Batteries, Inc.
    Or, call 1-800-642-2354 or 516/249-2873. • Fax: 516/249-2876
    23 Newtown Road, Plainview, NY 11803, USA • Power for the 21st Century!

PB® Batteries of every type and description for every OEM & end-user need!

Slim-Pak™ • User Replaceable • NiMH Rechargeable • Ultra-Compact

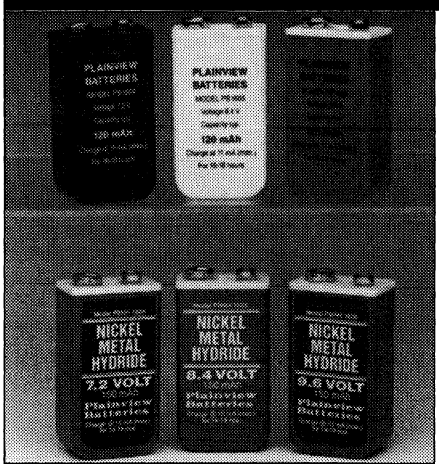
New Shape!
New Performance!

Slim-Pak™ batteries are ultra thin, light weight and rechargeable using NiMH chemistry. There are 9 standard models in 2.4 to 12 Volt ratings. Width is 7.7mm and lengths are multiples of 17mm in standard cells. All have 600 mAh capacity ratings. These cells can also be combined side-to-side for a compact 12.0V unit. A five-pack SP05X5 unit is 38.5 x 17.0 x 50.5 mm. Cells have normal pressure contacts, but can have snap connectors, wire leads, solder tabs or other special designs. Each cell weighs 12.7 grams (multiply by number of cells to get total weight). Typical continuous discharge is 2 Amps and fast recharge time is 1.2 hrs @ 580mA.

Model#	Lmm	Tmm	mAh	V
SP01	34.0	7.7	600	2.4
SP02	51.0	7.7	600	3.6
SP03	68.0	7.7	600	4.8
SP04	85.0	7.7	600	6.0
SP05	102.0	7.7	600	7.2
SP01X2	17.0	15.4	600	2.4
SP01X4	17.0	30.8	600	4.8
SP05X5	17.0	38.5	600	6.0

All have same height (50.5mm).
Std Chg: 60mA, 16h
Temp Range 0C to +45C (Charging)
-20C to +60C (Discharge)
-20C to +65C (Storage)
Self Discharge: (20C in 30 days) Max 25% of rated capacity.

Tran-Pak™ • "Transistor" • NiCd & NiMH Rechargeable • 7.2 to 9.6 Volts



Tran-Pak™ batteries by Plainview are the only true 9-Volt rechargeable batteries. The connectors fit standard non-rechargeable spaces and connectors precisely and are available in three types. PB1606 is a NiCd while PBNH1606 and PBNH1606A are NiMH offering longer life and higher capacity. These batteries are made of series-connected 1.2 (nominal) Volt cells in multiples. The three 1604 styles use 6 cells for 7.2 Volts while the 1605 series uses 7 cells for 8.4 Volt output. The NiMH units can be recharged at a faster rate than NiCd. Choose the type that best matches your application for best reliability and longest service life. See next page for 9.6V chargers.

Model#	V	mAh	I(mA)*	Wt(g)
PB1604	7.2	130	240	36
PB1605	8.4	130	240	40
PB1606	9.6	130	240	47
PBNH1604	7.2	150	260	38
PBNH1605	8.4	150	260	42
PBNH1606	9.6	150	260	46
PBNH1604A	7.2	175	320	38
PBNH1605A	8.4	175	320	42
PBNH1606A	9.6	175	320	46

* Max Cont. Discharge
Max Peak 2 Sec. Disch. = 1.5A
Min Cap. 90% Typical stated above
All units 16.3mm thick x 26mm wide x 46mm tall (plus terminals)

PowR-MaX™ • High Capacity • NiMH Rechargeable • 7.2 to 9.6 Volts

New Battery Shape for the 21st Century

Powr-MaX™ batteries by Plainview offer a new form factor for rechargeable "transistor" types. Connectors are the same as the Tran-Pak series, but batteries are round rather than rectangular in cross section. This provides twice the operating life as well as a higher discharge rate. These are NiMH batteries made of standard button cells connected (welded) in series to produce the rated output voltage. They are for new designs requiring longer service life than standard batteries. The NiMH chemistry delivers more power and greater reliability than NiCd types. Diameter is the same as the width of Tran-Pak (25.4mm) but height varies by number of cells (1 to 10) (1.2 to 12.0V).

Model#	V	mAh	I(mA)*	Wt(g)
PBNH2404	7.2	265	500	50
PBNH2405	8.4	265	500	60
PBNH2406	9.6	265	500	67
PBNH3504	7.2	385	500	72
PBNH3505	8.4	385	500	85
PBNH3506	9.6	385	500	96

* Max Cont. Discharge
Max Peak 2 Sec. Disch. = 1.5A (240X)
Max Peak 2 Sec. Disch. = 2.0A (350X)
Min Cap. 90% Typical stated above
All units = 25.4mm diam.
Length (mm) = 2404 (36.9), 2405 (42.5), 2406 (47.3), 3504 (50.4), 3505 (58.3), 3506 (65.2). Also available from 1.2 to 12.0 volts (1 to 10 cells).

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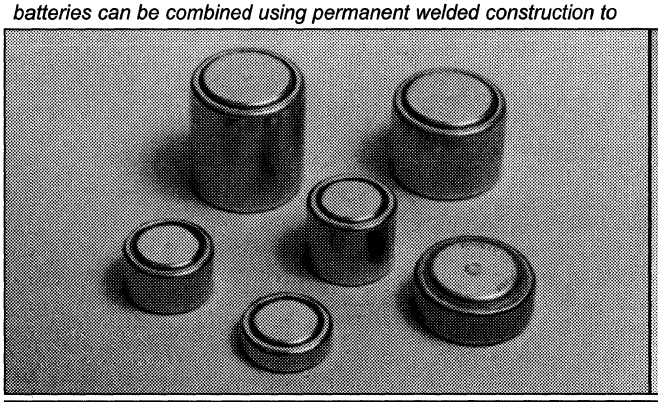
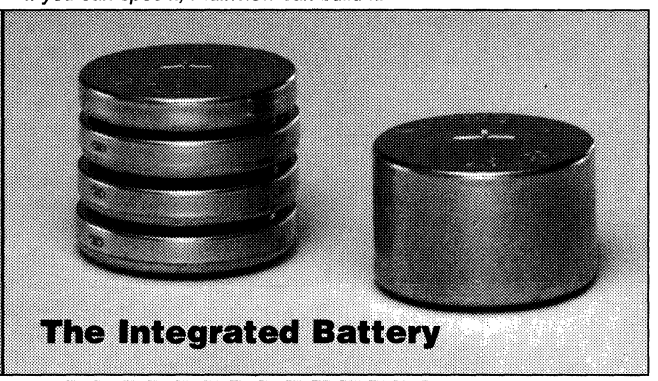
Batteries of every type and description for every OEM & end-user need!

Rechargeable Button Cell Building Blocks• NiCd & NiMH

Plainview Batteries offers the world's largest selection of Rechargeable Button Cells in both Nickel-Cadmium and Nickel-Metal Hydride chemistries. These single, double, triple and quad integrated batteries can be combined using permanent welded construction to meet any design requirement. Use the battery specification page to detail your requirements and fax (or call) Plainview to discuss the alternatives and to solve your most difficult battery design situation. If you can spec it, Plainview can build it.





NiCd • Nickel Cadmium Cells

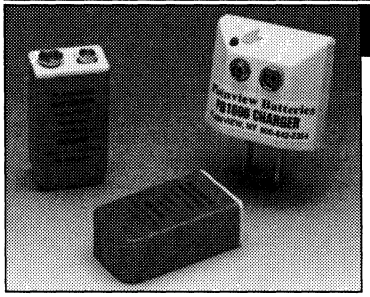
Cell Type	Part No.	Nom V	Typ mAh *	Max I mA	Max 2sec A	Imp mΩ	Dia mm	Ht mm	Wt g
1X	HA33	1.2	36	33	0.3	900	11.5	5.4	1.6
	ZA65	1.2	75	190	0.7	250	15.5	6.3	3.9
	ZA110	1.2	120	220	1.5	120	22.1	4.8	5.8
	ZA180	1.2	190	250	2.0	100	25.2	6.1	9.0
	ZA280	1.2	310	500	2.0	100	25.2	9.5	13.0
	ZA600	1.2	650	600	3.0	50	34.7	10.4	29.2
	VA600	1.2	650	1800	4.0	25	34.7	10.2	30.5
2X	Z2A65	2.4	75	150	0.7	500	15.5	12.0	7.0
	Z2A110	2.4	120	220	1.5	240	22.1	7.9	8.4
	Z2A180	2.4	190	250	2.0	200	24.9	10.0	15.3
	Z2A250	2.4	280	280	2.0	240	25.2	13.5	22.0
	Z2A280	2.4	300	300	3.5	200	25.2	14.7	21.1
	Z2A300	2.4	350	600	4.0	90	34.7	10.4	29.0
3X	Z3A65	3.6	75	150	0.7	750	15.5	17.4	10.2
	Z3A120	3.6	130	240	1.5	280	22.1	11.6	13.5
4X	Z4A120	4.8	130	240	1.5	370	22.1	15.0	17.3

1X = Single Cell; 2X = Double Cell; 3X = Triple Cell; 4X = Quad
* Min. Cap mAh = 90% of Typical mAh

NiMH • Nickel Metal Hydride Cells

Cell Type	Part No.	Nom V	Typ mAh *	Max I mA	Max 2sec A	Imp mΩ	Dia mm	Ht mm	Wt g
1X	NH42	1.2	50	42	0.3	400	11.5	5.4	1.8
	NH100	1.2	110	200	0.7	180	15.5	6.4	4.2
	NH130	1.2	145	260	1.5	120	22.1	4.8	6.6
	NH160	1.2	175	320	1.5	120	22.1	4.8	6.6
	NH240	1.2	265	500	1.5	120	25.1	5.5	10.3
	NH350	1.2	385	500	2.0	80	25.2	7.8	13.0
	NH500	1.2	550	1000	3.0	50	34.7	6.0	19.4
2x	N2H100	2.4	110	200	0.7	360	15.5	11.6	7.4
	N2H130	2.4	145	260	1.5	240	22.1	8.3	10.4
	N2H160	2.4	175	320	1.5	240	22.1	8.3	10.4
	N2H240	2.4	265	500	1.5	240	25.2	10.2	16.3
	N2H350	2.4	385	500	2.0	160	25.2	14.7	23.5
	N2H500	2.4	550	1000	3.0	100	34.7	10.8	33.2
3x	N3H100	3.6	110	200	0.7	540	15.5	17.0	10.8
	N3H130	3.6	145	260	1.5	360	22.1	11.6	15.0
	N3H160	3.6	175	320	1.5	360	22.1	11.6	15.0
	N3H500	3.6	550	1000	3.0	150	34.7	15.5	47.0
4x	N4H130	4.8	145	260	1.5	480	22.1	15.1	19.4
	N4H160	4.8	175	320	1.5	480	22.1	15.1	19.4

1X = Single Cell; 2X = Double Cell; 3X = Triple Cell; 4X = Quad
* Min. Cap mAh = 90% of Typical mAh



Recharger for 9.6V NiCd & NiMH Batteries

The Plainview PB1606 Battery Recharger is custom-designed to match the requirements of any Plainview Battery Ni-Cd or NiMH 9.6V Tran-Pak battery. The recharger plugs in to any 110Vac 60Hz convenience outlet and the rechrgeable battery snaps onto the connectors. When connected properly a red LED lights to show the recharging action is taking place correctly. The recharger is UL listed and provides a safe and simple recharging operation. Recharging time (to full charge) varies but is typically 6-7 hours for the PB1606, 7-8 hours for the PBNH1606 and 9-10 hours for the PBNH1606A. The recharger limits the charging current to prevent battery damage. However, the recharging times must be monitored and timed to prevent overcharging which can shorten battery life.

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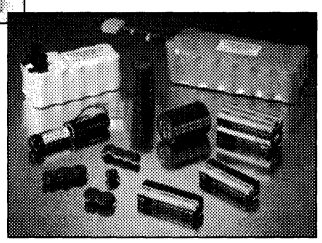
Batteries of every type and description for every OEM & end-user need!

Custom Battery Assemblies for Computers, Recorders, Cameras & Instruments

NiCd Cylindrical and Flat Cells and Custom

Plainview Battery will make any combination of NiCd cells to meet any new design or make any replacement.

Plainview's standard assemblies include welded interconnect tabs with insulation and heat-shrink encapsulation.



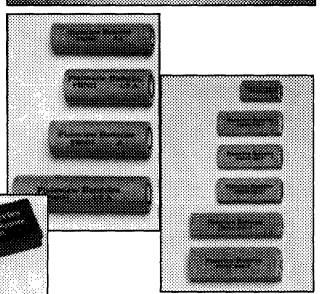
Custom Rechargeable and Primary Batteries

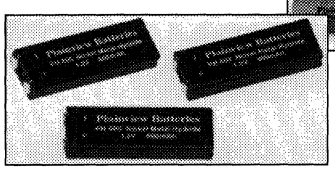
Plainview Batteries is your one-stop battery power center no matter what your requirements. Plainview offers fast technical advice and a history of reliable service. Use the specification page to describe your special needs or call for replacement advice and options.

Replacement batteries for many applications are no longer available from the original manufacturers. This can make expensive units unusable. This need not bother you. Simply call Plainview and describe your equipment. The chances are very high Plainview has a replacement battery in stock or can assemble an exact replacement. These replacements often exceed the performance of the original equipment because of major advancements in battery chemistry and technology.

NiMH Rechargeables

The world's widest selection of cylindrical, prismatic and plastic case prismatic. 300 to 7000 mAh.



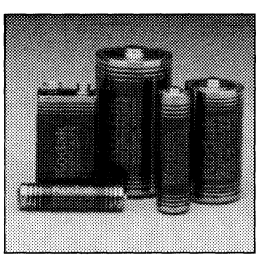


ClockMate Computer Clock Batteries

Sooner or later the central clock in every personal computer will die and need replacement. No need to panic. Plainview Batteries has the exact replacemnt available on a moment's notice and easily shipped by overnight service.

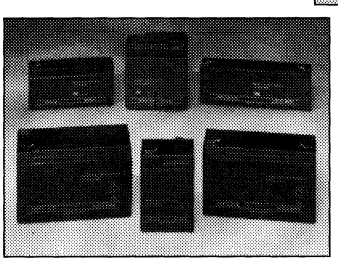
Lithium Primary Batteries

Plainview Battery supplies an exceptional array of primary litium batteries in coin cells (2 & 3V) and 5 to 1000 mAh capacity. Special 9V "Transistor" batteries are UL listed and rated for 1200 mAh life. Cylindrical cells cover the range from 2.8 to 3.6V and capacities to 35Ah. Custom assemblies and terminals are available.



Alkaline Primary Batteries

Plainview Battery is your prime source for all standard alkaline batteries from the world's major manufacturers. No matter the size, rating or configuration, you can get what you need from Plainview with fast service and reliability



Lead-Acid Batteries

Plainview Battery supplies a wide variety of maintenance free and leak proff sealed lead-acid batteries. These powerful batteries are the power source of choice for backup computer power and for emergency lighting systems. Smaller units are often used in portable equipment requiring very heavy current drains and the capability of thousands of recharging cycles. Whatever you lead-acid battery requirements, call Plainview.

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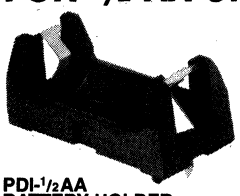
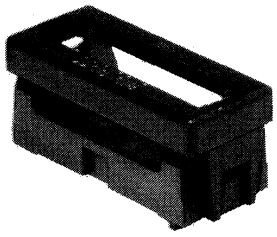
BATTERY HOLDERS

FOR 1/2 AA SIZE CELLS, BASEBOARD MOUNTING



PDI-1/2AA BATTERY HOLDER

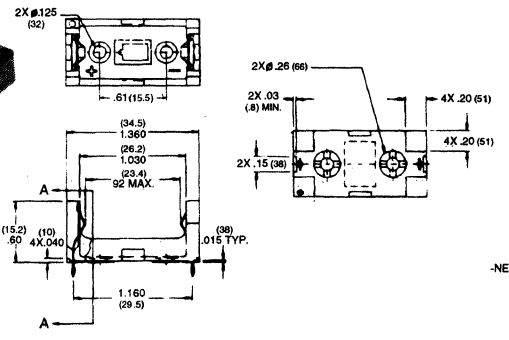
PDI-1/2AAC OPTIONAL COVER



PDI-1/2AA. A PCB Baseboard mounting battery holder for half AA cells (max. dimensions 25.1mm x 14.9mm dia.). It has dual connections either by PC tag or .110" series tabs/solder tags and two fixing holes to lock holder into the PCB or baseboard.

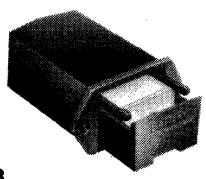
PDI-1/2AAC is an optional cover with positive locking clips to hold it firmly in place on the above holder.

PDI-1/2AA BATTERY HOLDER

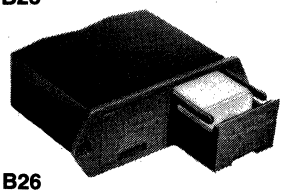


Dimensions in inches, mm in brackets

FOR 9V SIZE CELLS, PANEL MOUNTING



B23

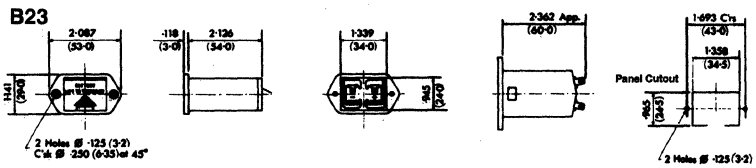


B26

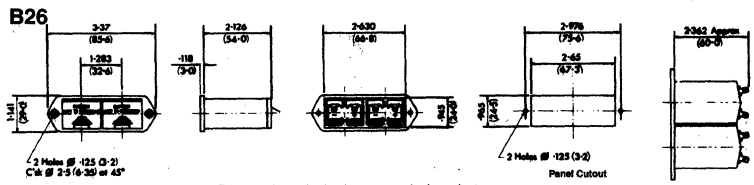
B23, B26. Two panel mounted battery holders accepting **9V** size cells (BS397, max. dimensions- W26.5 x D17.5 x H48.5mm).

- Removable loading magazines marked with polarity.
- Positive 'snap-in' location at full insertion & easy 'finger-lift' withdrawal.
- Direct self-contacting on insertion, with rear solder tag terminations.
- Contacts are self-compensating, allowing for battery terminal tolerances and variants.
- Spring compensation, allowing for battery case tolerances.

B23

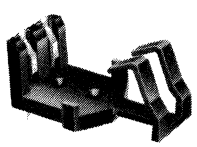


B26



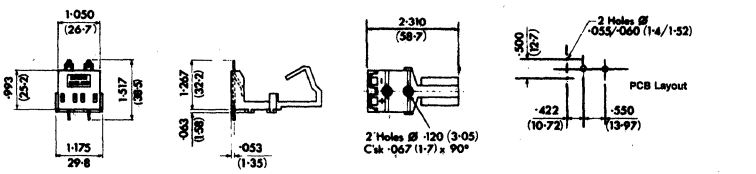
Dimensions in inches, mm in brackets

FOR 9V SIZE CELLS, BASEBOARD MOUNTING



B33

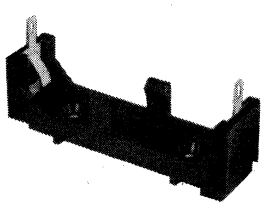
B33. A P.C.B./Baseboard mounting battery holder accepting a single **9V** size cell (BS397, max. dimensions W26.5 x D17.5 x H48.5mm). It has dual connections either by P.C.B. or .110" solder tabs and two holes to lock holder onto the P.C.B. or baseboard. Polarity is clearly marked. PC pin may be trimmed for base mounting only.



B33

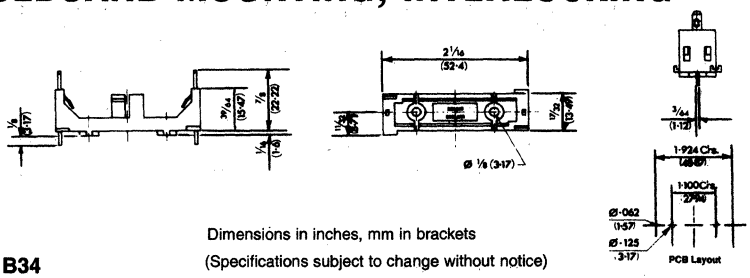
Dimensions in inches, mm in brackets

FOR AAA SIZE CELLS, PCB/BASEBOARD MOUNTING, INTERLOCKING



B34

B34. A P.C.B./Baseboard mounting battery holder accepting a single **AAA** size cell (BS397, max. dimensions 010.5mm x 44.5mm). This unit has an interlocking device allowing multiple assemblies to be constructed. It has dual connections either by P.C.B. or .110" solder tabs and has two holes to lock holder onto the P.C.B. or baseboard. Polarity is clearly marked. PC pins may be trimmed for base mounting only.



B34

Dimensions in inches, mm in brackets

(Specifications subject to change without notice)

For engineering specifications, access our Website: www.powerdynamics.com

(Other battery configurations are available, please contact us for specifications)

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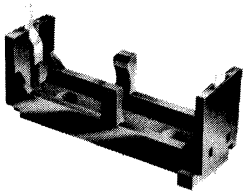
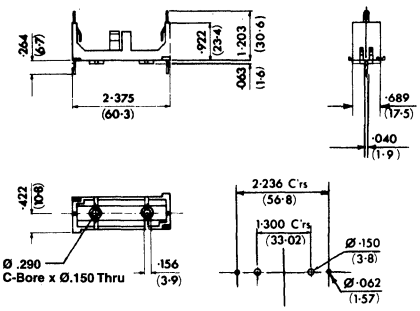
BATTERY HOLDERS

FOR AA SIZE CELLS, BASEBOARD MOUNTING, INTERLOCKING



B35

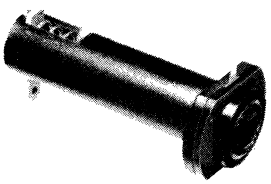
B35. A P.C.B./Baseboard mounting battery holder accepts a single **AA** size cell. This unit has an interlocking device allowing multiple assemblies to be constructed. It has dual connections either by P.C.B. or .110" solder tabs and two holes to lock holder onto the P.C.B. or baseboard.



B35

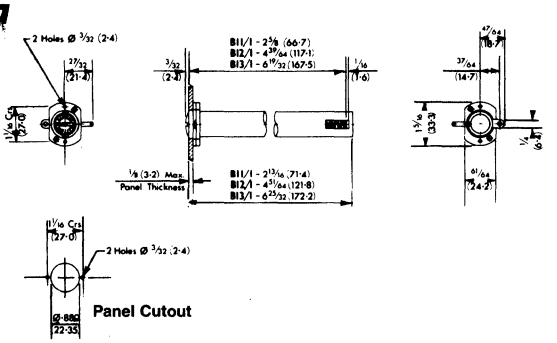
Dimensions in inches, mm in brackets

FOR AA SIZE CELLS, PANEL MOUNTING



B11/1

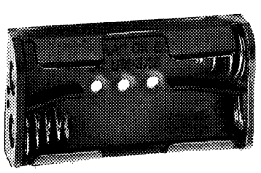
B11/1, B12/1, B13/1. Panel mounting battery holders accepts 1, 2, or 3 **AA** size cells. Flush fitting bayonet cap with coin slot is clearly marked 'Battery'.
B11/1 - 1 cell.
B12/1 - 2 cells.
B13/1 - 3 cells.



B11/1, B12/1, B13/1

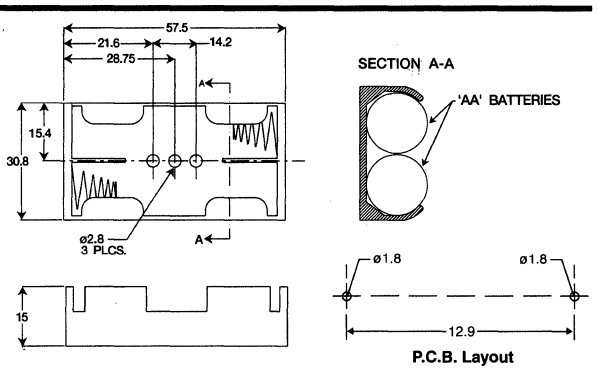
Dimensions in inches, mm in brackets

ECONOMY SERIES FOR AA SIZE CELLS



PDSN-11

PDSN-11. Accepts 2 AA size cells. Available in Wire, Snap Terminal, Solder Lug, and P.C. Pin. This unit is made of impact resistant polypropylene with a flammability rating of UL 94V-O. Contacts are nickel plated. It fits all cells types including Nickel Cadmium, Carbon-Zinc, Alkaline and Carbon and can withstand temperatures up to 105°C.



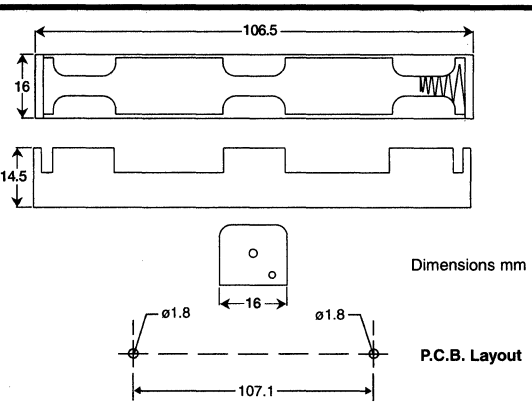
PDSN-11

Dimensions in mm

ECONOMY SERIES FOR AA SIZE CELLS

PDSN-19

PDSN-19. Accepts 2 AA size cells. Available in Wire, Solder Lug and P.C. Pin. This unit is made of impact resistant polypropylene with a flammability rating of UL 94V-0. Contacts are nickel plated. It fits all cell types including Nickel Cadmium, Carbon-Zinc, Alkaline and Carbon and can withstand temperatures up to 105°C.



PDSN-19

Dimensions mm

For engineering specifications, access our Website: www.powerdynamics.com

(Other battery configurations are available, please contact us for specifications)

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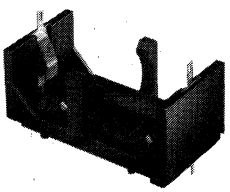
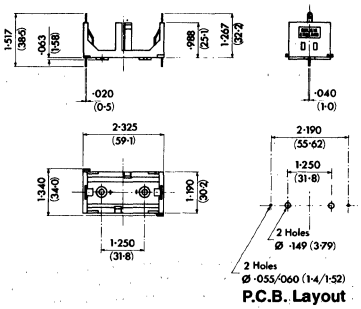
BATTERY HOLDERS

FOR C SIZE CELLS, PCB/BASEBOARD MOUNTING, INTERLOCKING



B36

B36. A P.C.B./Baseboard mounting battery holder accepts a single **C** size cell. This unit has an interlocking device allowing multiple assemblies to be constructed. It has dual connections either by P.C.B. or .110" solder tabs and two holes to lock holder onto the P.C.B. or baseboard.



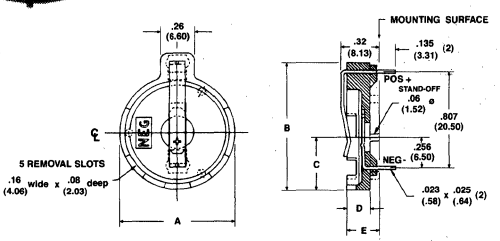
P.C.B. Layout

B36

Dimensions in inches, mm in brackets

FOR LITHIUM COIN CELLS, NEW BERYLLIUM COPPER CONTACTS

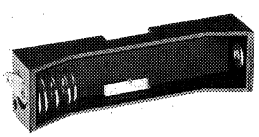
Use of fully heat-treated beryllium copper for the positive contact provides excellent electrical conductivity; non-magnetism – an important design consideration when near sensitive chips; permits high contact force with low stress relaxation.



PART NUMBER	DIMENSIONS (mm/inches)				
	A	B	C	D	E
PDI-2032-0,-1,-2	22.86/.900	27.43/1.08	11.43/.450	4.95/.195	6.86/.270
PDI-2325-0,-1	25.40/1.00	28.78/1.13	12.70/.500	4.32/.170	6.99/.275
PDI-2425-0,-1	26.67/1.050	29.46/1.16	13.34/.525	4.32/.170	6.99/.275
PDI-2450-0	27.69/1.09	29.85/1.18	13.84/.545	10.16/.400	10.67/.420

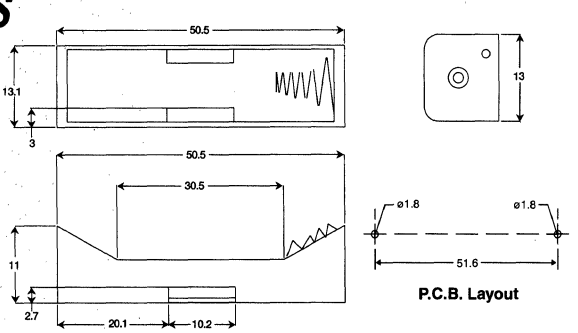
Dimensions in inches, mm in brackets

ECONOMY SERIES FOR AAA SIZE CELLS



PDSN-41-1

PDSN-41-1. Accepts 1 AAA size cell. Available in Wire,Solder Lug, and P.C. Pin. This unit is made of impact resistant polypropylene with a flammability rating of UL 94V-0. Contacts are nickel plated. It fits all cell types including Nickel Cadmium, Carbon-Zinc, Alkaline and Carbon and can withstand temperatures up to 105°C.

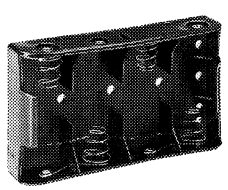


P.C.B. Layout

PDSN-41-1

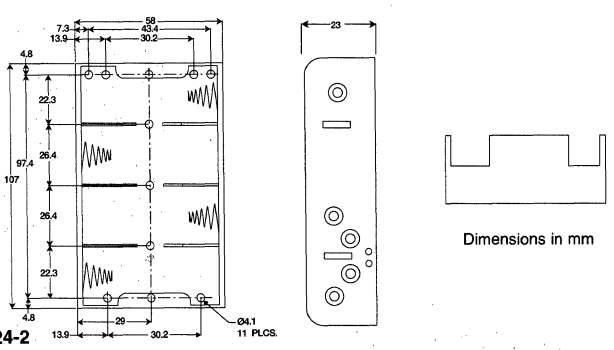
Dimensions in mm

ECONOMY SERIES FOR C SIZE CELLS



PDSN-24-2

PDSN-24-2. Accepts 4 C size cells. Available in Wire,Snap Terminal and Solder Lug. This unit is made of impact resistant polypropylene with a flammability rating of UL 94V-0. Contacts are nickel plated. It fits all cell types including Nickel Cadmium, Carbon-Zinc, Alkaline and Carbon and can withstand temperatures up to 105°C.



PDSN-24-2

Dimensions in mm

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(Other battery configurations are available, please contact us for specifications)

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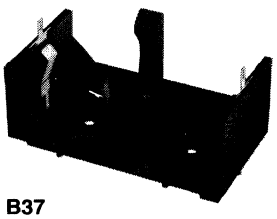
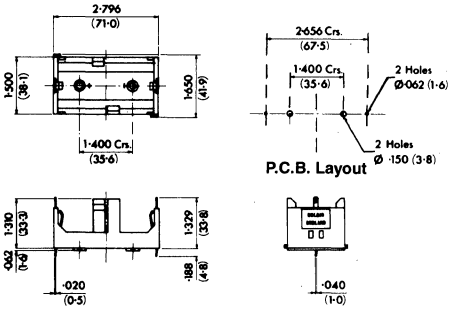
BATTERY HOLDERS

FOR D SIZE CELLS, PCB/BASEBOARD MOUNTING, INTERLOCKING



B37

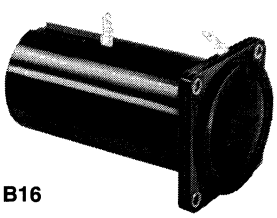
B37. A P.C.B./Baseboard mounting battery holder accepts a single **D** size cell. This unit has an interlocking device allowing multiple assemblies to be constructed. It has dual connections either by P.C.B. or .110" solder tabs and two holes to lock holder onto the P.C.B. or baseboard.



B37

Dimensions in inches, mm in brackets

FOR D SIZE CELLS, PANEL MOUNTING

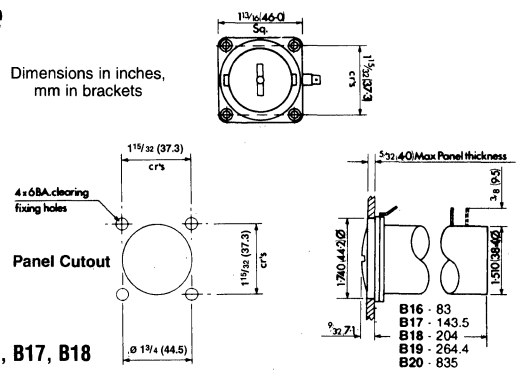


B16

B16, B17, B18, B19, B20. Accepts 1, 2, 3, 4 or 5 **D** size cells. Flush fitting bayonet cap with coin slot is clearly marked 'Battery'. Connection by .187" solder tabs.

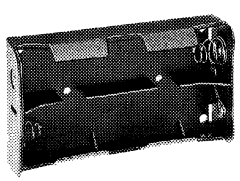
- B16 - 1 cell.
- B17 - 2 cells.
- B18 - 3 cells
- B19 - 4 cells.
- B20 - 5 cells.

Dimensions in inches, mm in brackets



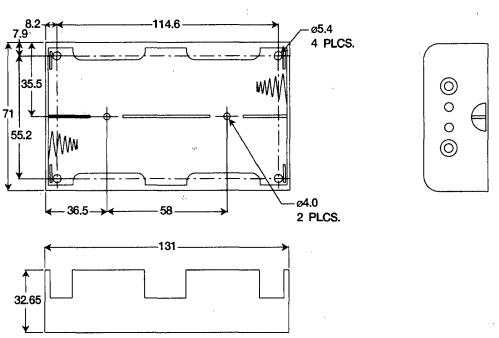
B16, B17, B18

ECONOMY SERIES FOR D SIZE CELLS



PDSN-14-1

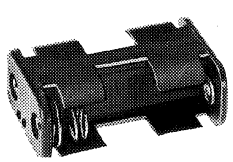
PDSN-14-1. Accepts 4 D size cells. Available in Wire, Snap Terminal and Solder Lug. This unit is made of impact resistant polypropylene with a flammability rating of UL94V-0. Contacts are nickel plated. It fits all cell types including Nickel Cadmium, Carbon-Zinc, Alkaline and Carbon and can withstand temperatures up to 105°C.



PDSN-14-1

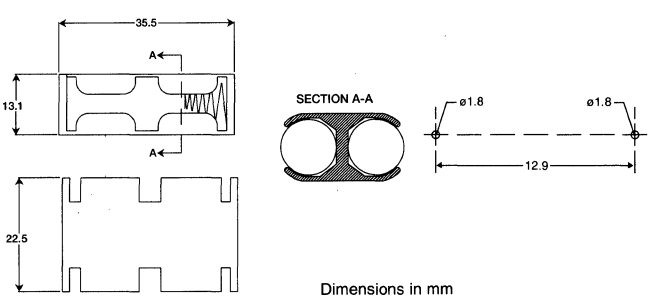
Dimensions in mm

ECONOMY SERIES FOR N SIZE CELLS



PDSN-25

PDSN-25. Accepts 2 N size cells. Available in Wire, Solder Lug and P.C. pin. This unit is made of impact resistant polypropylene with a flammability rating of UL 94V-0. Contacts are nickel plated. It fits all cell types including Nickel Cadmium, Carbon-Zinc, Alkaline and Carbon and can withstand temperatures up to 105°C.



Dimensions in mm

PDSN-25

For engineering specifications, access our Website: www.powerdynamics.com

(Other battery configurations are available, please contact us for specifications)

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Tel: (201) 288-4477 • Fax: (201) 288-1515

Engineered Assemblies Corporation
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Norcross, GA 30093
Tel: (770) 446-3135 • Fax: (770) 446-3241

House of Batteries
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Huntington Beach, CA 92647
Tel: (800) 432-3385
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Tel: (800) 231-3612 • Fax: (800) 240-4535
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TNR Technical
301 Central Park Drive
Sanford, FL 32771
Tel: (800) 346-0601
Tel: (407) 321-3011 • Fax: (407) 321-3208

SPECIFICATIONS CHANGE FREQUENTLY. CALL FOR LATEST INFORMATION.

RECHARGEABLE LITHIUM ION BATTERY RATINGS

(Cylindrical)

Product Number		UR18650	UR18500	UR14650	UR14500
Nominal Voltage (V)		3.6	3.6	3.6	3.6
Nominal Capacity* (mAh)		1350	900	750	580
Standard Charge System		1C-4.1V Constant Current-Constant Voltage (2.5 hrs.)			
Dimensions Including tube (mm)	Diameter	18.0	18.0	14.0	14.0
	Height	65.0	50.0	65.0	50.0
Weight (approx. g)		40	30	25	19

(Rectangular)

UF612248	UF812248	UF102248	UF611958	UF653048 (UNDER DEVELOPMENT)
3.6	3.6	3.6	3.6	3.6
400	600	750	400	600
1C-4.1V Constant Current-Constant Voltage (2.5 hrs.)				
6.1	8.1	10.5	6.1	6.5
22.5	22.5	22.5	19.5	30.5
48.0	48.0	48.0	58.0	48.0
15	18	24	15	20

*Charge: 1C-4.1 V (CC-CV) Discharge: 0.2C (CC) (Ev=2.75 V)

TWICELL RECHARGABLE NICKEL-METAL HYDRIDE BATTERIES

	Twicell (Cylindrical type)										Twicell SLIM (Rectangular)		
Model No.	HR-AAAU	HR-5/4AAAU	HR-5/3AAAU	HR-AAC*5	HR-3U*6	HR-AAU	HR-4/5AU	HR-AU	HR-4/3AU	HR-4/3FAU	HF-C1U	HR-B1U	HF-B2U
Voltage (V)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Typical Capacity*1 (mAh)	650	720	950	1,100	1,450	1,500	1,850	2,500	3,500 | 3,800	4,000 | 4,300	600	880	950
Minimum Capacity*2 (mAh)	590	660	870	1,000	1,300	1,400	1,700	2,300	3,200 | 3,500	3,600 | 3,900	550	810	870
Quick Charge*3 Current (mA)	650	720	950	1,100	1,450	1,500	1,850	2,500	3,000	3,000	600	880	950
Quick Charge*3 Time (hr.)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	1.6	1.2	1.2	1.2
Dimensions*4 (mm) (incl. tube)											Width (W) 17.0	Width (W) 17.0	Width (W) 17.0
Diameter (D)	10.5	10.5	10.5	14.2	14.2	14.2	17.0	17.0	17.0	18.0	Height (H) 35.5	Height (H) 48.0	Height (H) 48.0
Height (H)	44.5	50.0	67.0	50.0	50.0	50.0	43.0	50.0	67.0	67.0	Thickness (T) 6.1	Thickness (T) 6.1	Thickness (T) 8.3
Weight *4 (approx. g)	13	15	19	27	27	27	35	40	55	62	12	18	24

*1 Average capacity when a single cell is discharged at 0.2C after being charged at 0.1C for 16 hours. *2 Minimum capacity when a single cell is discharged at 0.2C after being charged at 0.1C for 16 hours. *3 Needs specific charger. *4 Including tube. *5 High durability mode (Suitable for razor, cordless telephone, etc.) *6 Suitable for Digital Still Camera , PDA, etc.

CADNICA RECHARGEABLE NICKEL-CADMIUM BATTERIES

Cadnica Slim Batteries

Model No.	Nominal Voltage (V)	Typical Capacity (mAh) @ 0.2C Rate	Outside Dimensions (With Tube) L (mm)	W (mm)	T (mm)
KF-B450	1.2V	450mAh	48.0 $^{0}_{-0.8}$	17.0 $^{0}_{-0.7}$	6.1 $^{0}_{-0.6}$
KF-A650	1.2V	650mAh	67.0 $^{0}_{-1}$	17.0 $^{0}_{-0.7}$	6.1 $^{0}_{-0.6}$
KF-A900	1.2V	900mAh	67.0 $^{0}_{-1}$	17.0 $^{0}_{-0.7}$	8.3 $^{0}_{-0.5}$
KF-A1200	1.2V	1200mAh	67.0 $^{0}_{-1}$	17.0 $^{0}_{-0.7}$	10.5 $^{0}_{-0.8}$

CHARGERS

- Nickel-Cadmium
- Nickel-Metal-Hydride
- Lithium Ion

LITHIUM BATTERIES

3V Manganese Dioxide

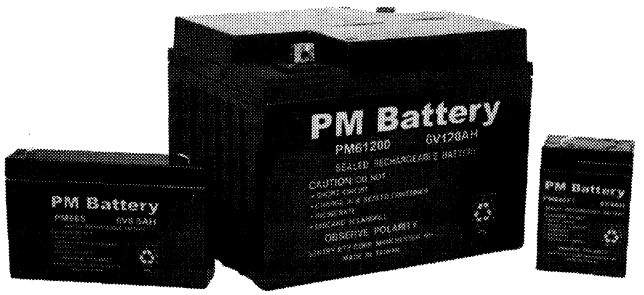
- Primary Batteries and Rechargeable Batteries
- Cylindrical and Coin Cells
- Back-Up Batteries
- Fast Charge Batteries
- Heat Resistant Batteries
- Lithium Coin Cell Battery Holders
- High-Capacity Batteries
- High-Temperature Batteries
- Standard Charge Batteries

SANYO

SANYO Energy (U.S.A.) Corporation

PM BATTERY

Maintenance Free Rechargeable Sealed Lead Acid Batteries



Terminations

F1 .187 x .032 FASTON
F2 .250 x .032 FASTON
F3 .250 x .032 Pos.; .187 x .032 Neg.
B1 Nut/Bolt .250 hole
B2 Nut/Bolt .375 hole
WP Polarized plug (AMP 1-480318-0 with 1-480319 Female Pin)
WL Wire Leads Terminated by (.250 x .032) Female Faston (Insulated)

File No. MH16982

Recommended Charge Systems

Charger		Charging Voltage (68°F)	
		Cycle Use	Float Use
Constant Voltage	6V	7.20-7.4V -15MV/°C	6.75C-6.90V -10MV/°C
	12V	14.4V-14.8V -30MV/°C	13.5V-13.8V -20MV/°C

The ***PM Series*** of maintenance free batteries is being used successfully in both cyclical and float charge applications.

Specifications

Model Number	Nominal Voltage (V)	Nominal Capacity AH 20HR Rate	Dimensions (inches)			Height Over Terminal	Terminal		Weight (lbs.)
			Length	Width	Height		STD	Option	
PM260	2	6.0	1.97	1.34	3.94	4.21	F1		.97
PM445	4	4.5	1.93	2.09	3.70	3.86	F2	F1	1.55
PM490	4	9.0	4.01	1.73	3.75	3.91	F2		2.80
PM4100	4	10.0	4.01	2.00	3.75	3.91	F2		2.95
PM610	6	1.0	2.00	1.65	2.00	2.20	F1		.60
PM612	6	1.2	3.82	0.98	2.01	2.32	F1		.70
PM620	6	2.0	2.95	2.01	2.09	2.29	FI		1.20
PM630	6	3.0	5.28	1.34	2.36	2.60	F1		1.54
PM631	6	2.8	2.56	1.25	3.82	4.10	F1		1.28
PM640	6	4.0	2.76	1.77	3.98	4.21	F1	WP	1.89
PM665	6	6.5	3.82	2.20	4.05	4.05	F3	F1	2.75
PM670	6	7.0	5.95	1.34	3.70	4.02	F1	F2	2.85
PM682	6	8.0	3.82	2.20	4.60	4.60	F1	WL	3.83
PM695	6	9.5	4.25	2.76	5.52	5.52	F3		4.40
PM695-50P (Toy)	6	9.5	4.25	2.76	5.52	5.52	Plug/Fuse		4.40
PM6100	6	10.0	5.95	1.97	3.70	4.02	F1	F2;F3	4.44
PM6120	6	12.0	4.25	2.76	5.52	5.52	F3		5.17
PM6200	6	20.0	6.18	3.27	4.92	4.92	B1		8.02
PM6360	6	36.0	6.25	3.44	6.50	6.69	F2		13.00
PM61200	6	120.0	9.49	7.01	7.20	7.20	B1		43.30
PM830	8	3.0	5.25	1.44	2.47	2.69	F1		1.27
PM1208	12	0.8	3.78	0.98	2.42		WP		.80
PM1212	12	1.2	3.82	1.69	2.02	2.32	F1		1.39
PM1219	12	1.9	7.01	1.34	2.36	2.60	F1		2.07
PM1230	12	3.0	5.28	2.63	2.40	2.64	F1		2.64
PM1240	12	4.0	3.54	2.76	4.00	4.14	F1		3.83
PM1270	12	7.0	5.95	2.56	3.70	3.90	F1		5.94
PM12100	12	10.0	5.95	3.86	3.70	3.98	F1		9.10
PM12120	12	12.0	5.95	3.86	3.70	3.98	F2		9.50
PM12180	12	18.0	7.13	2.99	6.57	6.57	B1	F2	14.32
PM12260TB1	12	26.0	6.54	4.94	6.93	6.93	B1		20.9
PM12260	12	26.0	6.54	6.89	4.92	4.92	B1	F2	18.79
PM12330U1	12	33.0	7.68	5.12	6.38	7.28	B1	B2	25.59
PM12400	12	40.0	7.75	6.50	6.69	6.69	B2		30.9

High Density Line

Model Number	Volts	Capacity	L	W	H	Ht. Term.	STD	Opt.	Wt.	Model Number	Volts	Capacity	L	W	H	Ht. Term.	STD	Opt.	Wt.
PM615	6	1.5	3.82	0.98	2.01	2.32	F1		.94	PM1255	12	5.5	3.54	2.76	4.00	4.14	F1		4.36
PM655	6	5.5	2.76	1.77	3.98	4.21	F1	WP	2.18	PM1285	12	8.5	5.95	2.56	3.70	3.90	F1		6.10
PM685	6	8.5	5.95	1.34	3.70	4.02	F1	F2;F3	2.95	PM12200	12	20.0	7.13	2.99	6.57	6.57	B1	F2	14.95
PM6121	6	12.0	5.95	1.97	3.70	4.02	F1	F2;F3	5.00	PM12300	12	30.0	6.89	6.54	4.92	4.92	B1	F2	21.72
PM1215	12	1.5	3.82	1.69	2.02	2.32	F1		1.71	PM12500	12	50.0	7.75	6.50	6.69	6.69	B1		30.75
PM1229	12	2.9	7.01	1.34	2.36	2.60	F1		2.29										

PM Battery / Sentry Battery Corp.
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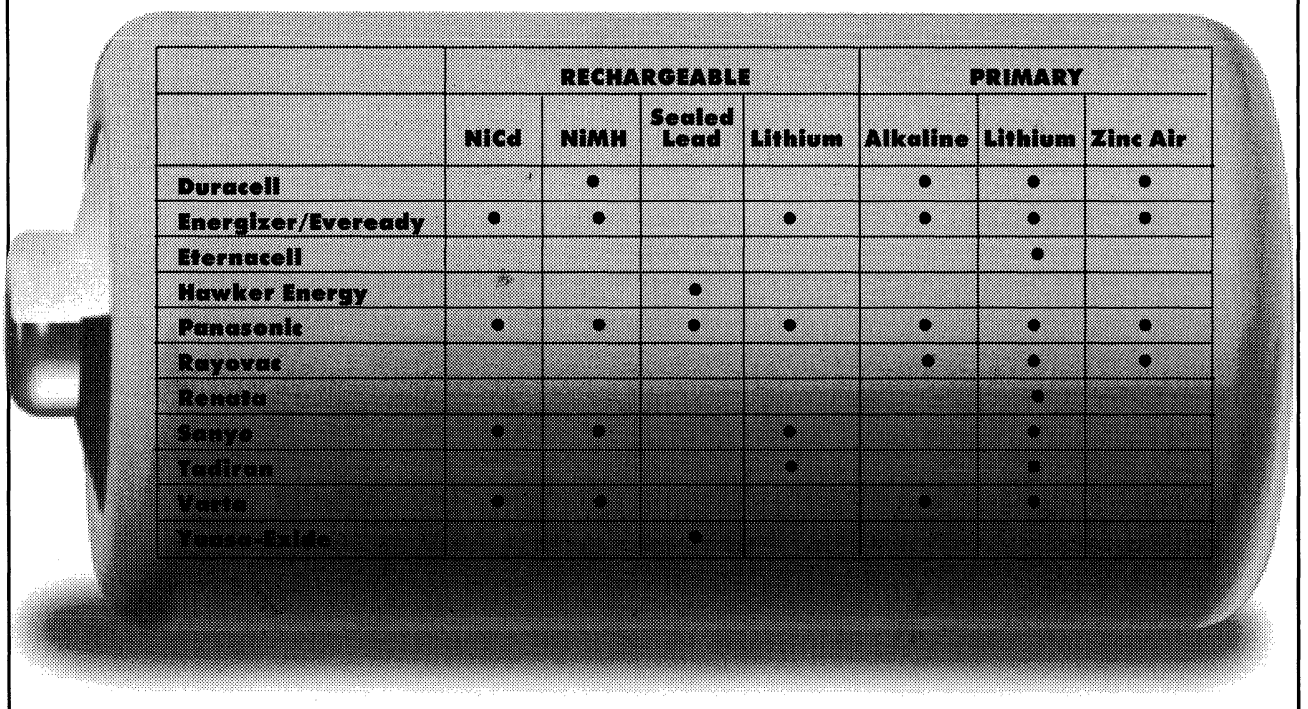

	RECHARGEABLE				PRIMARY		
	NiCd	NiMH	Sealed Lead	Lithium	Alkaline	Lithium	Zinc Air
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Energizer/Eveready	•	•		•	•	•	•
Eternacell						•	
Hawker Energy			•				
Panasonic	•	•	•	•	•	•	•
Rayovac					•	•	•
Renata						•	
Sanyo	•	•		•		•	
Tadiran				•		•	
Varta	•	•			•	•	
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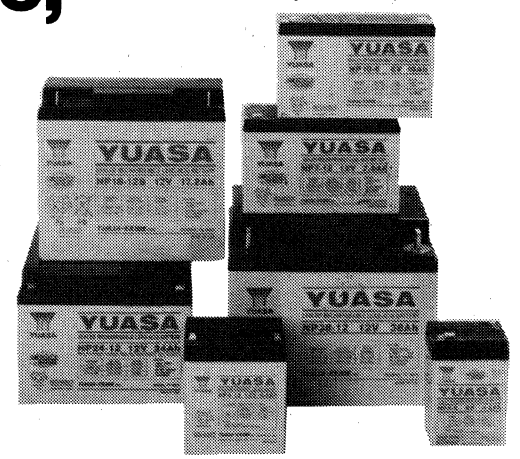

NP Series
The industry standard for reliable back-up power.

NPH
Specially engineered for high-rate discharge applications.

NPX
Next generation in UPS/back-up power batteries.

NP SERIES				
Type	Nominal Capacity (20 hr rate) (Ah)	Length Inches	Width Inches	Overall Height (Including Terminals)
4 Volt				
NP3-4	3.0	3.56	1.33	2.51
NP4.2-4H	4.4	1.89	1.40	4.68
NP10-4	10.0	4.02	1.97	3.85
6 Volt				
NP1-6	1.0	2.00	1.67	2.15
NP1.2-6	1.2	3.82	0.98	2.15
NP2.6-6	2.6	5.27	1.33	2.52
NP3-6	3.0	5.27	1.33	2.52
NP4-6	4.0	2.76	1.85	4.15
NP4-6W	4.0	2.76	1.85	4.04
NP4.2-6H	4.4	1.89	2.03	4.68
NP7-6	7.0	5.95	1.33	3.84
NP10-6	10.0	5.95	1.97	3.84
12 Volt				
NP0.8-12	0.8	3.78	0.98	2.42
NP1.2-12	1.2	3.82	1.89	2.15
NP2.3-12	2.3	7.01	1.34	2.52
NP2-12	2.0	5.91	0.79	3.35
NP2.6-12	2.6	5.27	2.64	2.52
NP4-12	4.0	3.54	2.75	4.17
NP7-12	7.0	5.95	2.56	3.84
NP12-12	12.0	5.95	3.86	3.84
NP18-12B	17.2	7.13	2.99	6.57
NP24-12	24.0	6.54	6.89	4.92
NP24-12B	24.0	6.54	6.89	4.92
NP26-12	26.0	6.54	4.92	6.89
NP38-12	38.0	7.75	6.50	6.69
NP65-12	65.0	13.78	6.53	6.85
NPX SERIES				
NPX-50	50w/cell	5.95	1.97	3.84
NPX-100	95w/cell	6.54	4.92	6.89
NPX-150	150w/cell	7.75	6.50	6.89

NPH SERIES				
Type	Nominal Capacity (20 hr rate) (Ah)	Length Inches	Width Inches	Overall Height (Including Terminals)
12 Volt				
NPH5-12	5.0	3.54	2.75	4.17
NPH-3.2-12	3.2	5.28	2.64	2.52

Selected models available that meet and exceed industry standards for flame retardancy.

Applications include:
Alarm Panels, Audio-Video Equipment, Cellular Telephones, Communications, Computers, Emergency Devices, Emergency Lighting, Instruments, Medical, Point of Sale Backup, Portable Appliances, Portable Lights, Power Tools, Security, Switching Systems, Telecommunications, Test Equipment, Toys/Hobbies, UPS

YUASA™ EXIDE, INC.

Power/Peace of Mind

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Telephone: 610-208-1991
Fax: 610-372-8613

Western Regional Office
800-423-4667
Telephone: 562-949-4266
Fax: 562-949-5527

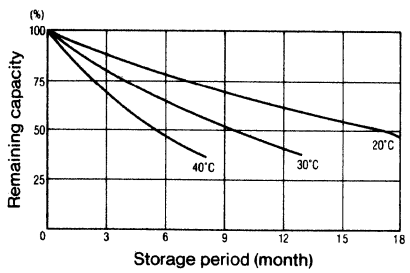
NP/NPH/NPX SERIES SEALED RECHARGEABLE LEAD ACID BATTERIES

YUASA

Important notes to prolong battery life:

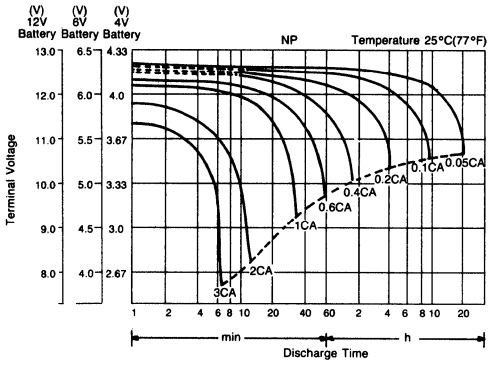
- **Charging**
  Standby use: Apply constant voltage charging at 2.275 volts per cell (or 2.25-2.30 VPC.)
  Cyclic use: Apply constant voltage charging at 2.40-2.50VPC. Initial charging current should be set at less than 0.25CA.
  Storage- 6 months- Top charge: Apply constant voltage at 2.40 volts per cell, initial charging current should be set at less than 0.1CA for 15 to 20 hours.
- **Discharge**
  Stop operation when voltage has reached the minimum permissible voltage. Recharge immediately. Do not operate at 6CA or more current continuously.
- **Storage**
  Always store battery in a fully charged condition. If battery is to be stored for a long period, apply a recovery top-charge every 6 months.
- **Temperature**
  Keep within ambient temperature of- 15°C to +50°C for both charging and discharging.
  Store batteries in a dry and cool location.
- **Incorporating battery into equipment**
  Encase battery in a well ventilated compartment.
  Avoid installing battery near heat generating units like a transformer.
  House the battery in the lowest section of the equipment enclosure or rack to prevent unnecessary battery temperature rise.
- **Others**
  Avoid terminal short circuit.
  DO NOT expose to open flame.
  Avoid setting batteries in environments which can cause direct contact to gasoline, paint thinner, organic solvents, synthetic resins, oil, etc.

SELF-DISCHARGE CHARACTERISTICS

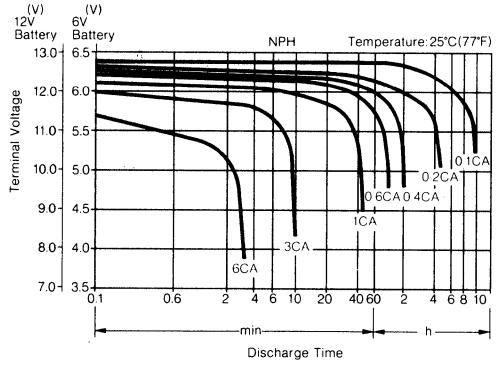


DISCHARGE CHARACTERISTICSCURVES AT 20°C (68°F)

NP SERIES

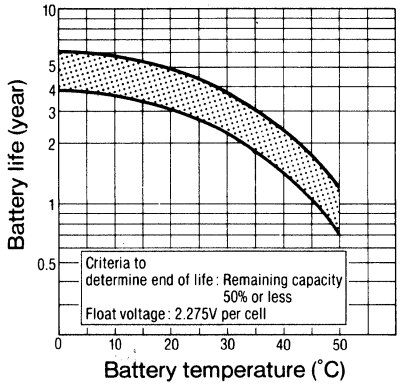


NPH SERIES



If discharge currents in excess of 3C are required, consult a Yuasa-Exide engineer prior to use.

TRICKLE (FLOAT) USE LIFE CHARACTERISTICS



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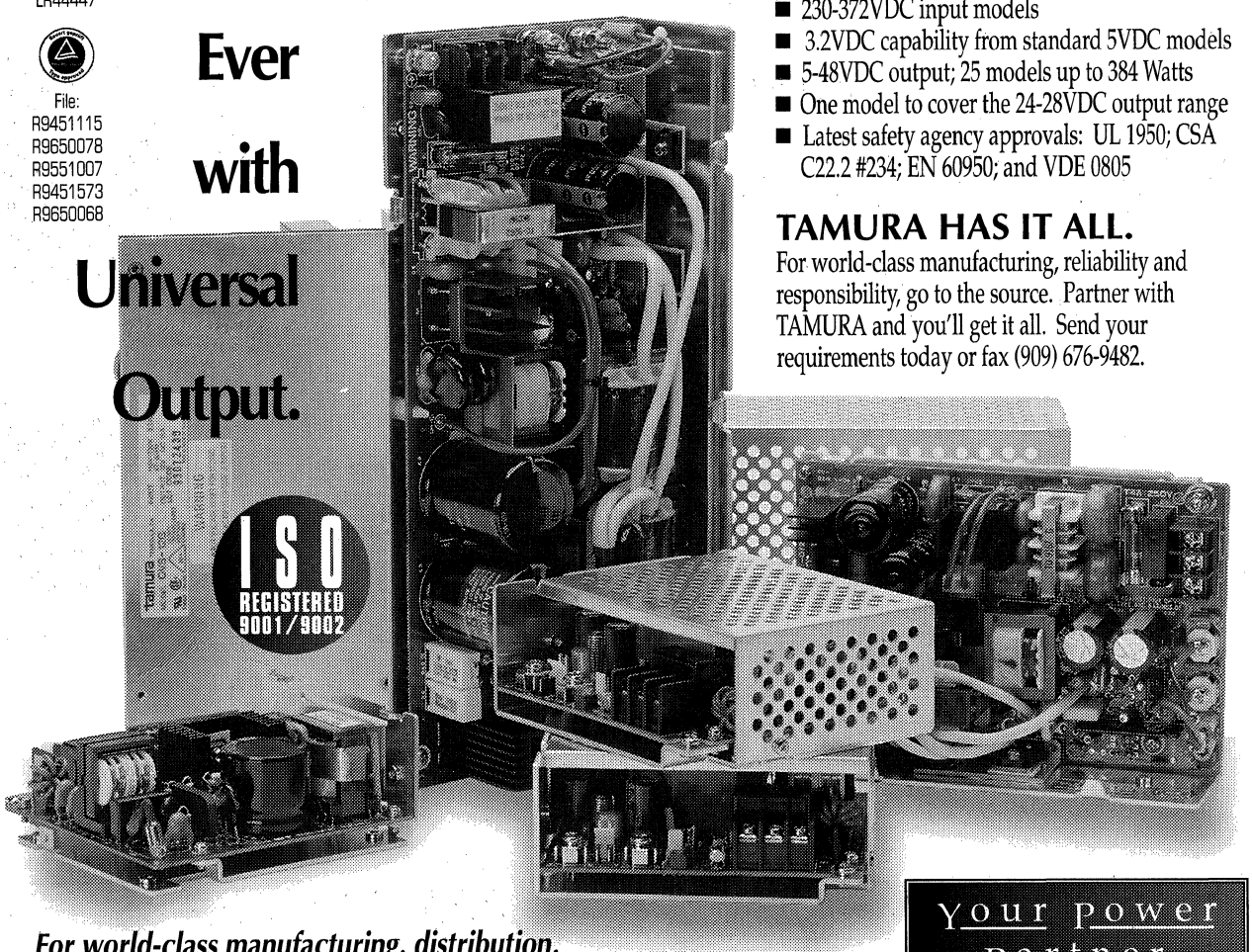

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POWER SUPPLIES, DC

Manufacturer	Starting EEM Page No.	Over 500V	<1 Watt	1 to 300 Watts	>300 Watts	Multiple Output	Programmable	Linear	Switching	Open	Enclosed	Modular	Plug-In	Lab
AAK Corp.	D•1386			√		√			√		√	√		√
Abbott Electronics	D•1399			√*		√*		√*	√*		√*	√		
Abbott Technologies, Inc.	D•1412			√*	√*	√*		√	√	√	√	√		
ACI World	D•1414		√	√*									√*	
Acopian Technical Company	D•1417		√*	√*	√	√*	√	√*	√		√*	√*		√
Adcon Electronics, Inc.	D•1450			√		√		√	√				√	
Advance Hivolt	D•1476			√	√	√		√	√			√		√*
Advance Power, Inc.	D•1444			√	√	√			√	√	√	√	√	
Advance Tektris	D•1446			√	√	√			√	√	√		√	
Advanced Power Solutions	D•1451			√		√			√	√	√		√	
AJ's Power Source, Inc.	D•1544			√	√	√	√	√	√		√	√	√	
All Shore Industries, Inc.	D•1459			√				√			√			
American Power Design, Inc.	D•1460			√			√	√	√	√	√			
American Reliance Inc.	D•1461			√	√	√	√	√	√		√			√
Applied Power Conversion	D•1466			√	√	√*		√*	√*	√*	√*		√	√
APX Technologies Inc.	D•1472			√		√		√	√				√	
Arnold Magnetics	D•1456		√*	√*	√*	√*			√*		√*	√*		
Artesyn Technologies	D•1478			√	√	√		√	√	√	√			
Astec America, Inc.	D•1486			√	√	√	√	√	√	√	√	√	√	
Ault, Inc.	D•1494			√		√		√	√		√		√	
Autec Power Systems	D•1496			√	√	√			√	√	√	√	√	
BC Systems, Inc.	D•1502			√*	√*	√*	√	√	√*		√	√*		
Bertan High Voltage Corp.	D•1503		√	√	√	√	√	√	√		√	√	√	√
Brandenburg	D•1513		√	√		√	√				√			√
Brandt Electronics, Inc.	D•1516			√*	√*	√*		√*	√*		√*	√		
Brown Applied Technology	D•1518								√	√		√		
Calex Manufacturing Company, Inc.	D•1519			√		√	√	√	√		√	√		
C & C Jetronic	D•1520			√		√			√	√				
Cell-Con, Inc.	D•1521			√									√	
CET Technology	D•1522			√		√		√	√		√		√	
Christie Electric Corp.	D•1525				√*			√*			√*			√*
Collmer Semiconductor, Inc.	D•1526								√	√				
Condor D.C. Power Supplies, Inc.	D•1527			√		√		√	√	√	√			
Cosel U.S.A. Inc.	D•1537			√	√	√			√	√	√			
Criterion Instruments, Limited	D•1540			√	√	√					√			√
CUI Stack, Inc.	D•1541		√	√					√				√	
Custom Power Systems	D•1545			√*	√*	√*		√*	√*	√*	√*	√		
D&B Power, Inc.	D•1546		√*	√		√*		√*			√*		√*	
Del Electronics Corp.	D•1548			√*	√*	√*	√*	√*	√*	√*	√*	√*	√*	√*
Digital Power	D•1561			√	√	√			√	√		√		
DPA Solutions	D•1564			√	√	√			√		√	√		
Dynage/Power & Magnetics	D•1565		√	√	√	√		√	√	√	√	√	√	
Dynapower Corp.	D•1566				√	√	√	√	√					√

*MIL Spec. §Surface Mount

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FAX: 516 231-3473**

POWER SUPPLIES, DC

Manufacturer	Starting EEM Page No.	Over 500V	>1 Watt	1 to 300 Watts	>300 Watts	Multiple Output	Programmable	Linear	Switching	Open	Enclosed	Modular	Plug-In	Lab
Eastland Electronics	D•1568		√	√		√		√	√	√	√	√	√	
EG & G Optoelectronics	D•1570			√*	√*	√*		√*	√*		√*	√		
Electromech, Inc.	D•1573							√*			√*		√*	
Electronic Measurements	D•1574			√	√		√	√	√		√			√
Elgar Electronics Corp.	D•1588			√	√	√	√	√	√		√	√		√
Emco High Voltage Company	D•1590			√		√*	√*		√*		√*			√
EOS Corporation	D•1591			√		√				√	√		√	
Epsco Inc.	D•1595		√	√	√			√*			√			√
ETA-USA	D•1596			√	√	√			√	√	√	√		
ForeSight Electronics	D•1598			√	√	√		√	√	√	√	√	√	
Gamma High Voltage Research, Inc.	D•1601			√	√		√	√	√		√	√		√
Glassman High Voltage, Inc.	D•1606			√	√		√		√		√			√
Globtek, Inc.	D•1630			√*	√*	√*		√*	√*	√*	√*	√*	√*	
Golden Pacific Electronics, Inc.	D•1636		√	√		√			√		√		√	
Huettinger Electronics, Inc.	D•1639				√									
Hyberlab Corp.	D•1640			√	√			√			√	√		√
Idec. Corp.	D•1642			√					√		√			
Instek Corp.	D•1643			√	√	√	√	√						√
Integrated Power Designs	D•1644			√		√			√	√	√	√		
International Power Sources, Inc.	D•1652			√	√	√			√	√	√	√	√	
Jerome Industries Corp.	D•1654		√	√		√		√	√	√	√	√	√	√
Kaiser Systems, Inc.	D•1657			√	√		√	√	√		√			√
Kepco Inc.	D•1660		√	√	√	√	√	√	√	√	√	√	√	√
Lambda Novatronics	D•1661			√	√	√	√		√		√			
Lien Engineering	D•1664			√		√			√	√	√	√	√	
Logitek, Inc.	D•1666			√*		√*			√*		√*			
LZR Electronics, Inc.	D•1674		√	√		√		√	√	√	√	√	√	
Magna-Power Electronics, Inc.	D•1688			√	√	√	√	√	√		√			√
Martek Power Switch	D•1404			√	√	√			√	√	√	√		
Matsusada Precision Inc.	D•1693			√*	√*		√*	√*	√*		√			√*
Maxwell Energy Products	D•1700				√				√*					
Melcher, Inc.	D•1702			√*	√	√*	√		√*	√	√*	√		
Mid-Eastern Industries	D•1704			√	√	√	√	√	√		√			√
Modular Power Systems	D•1709				√*	√*			√*					
Omega Power Systems, Inc.	D•1712				√	√			√			√		
Operating Technical Electronics (O.T.E.)	D•1715			√		√			√	√	√		√	
OPT Industries, Inc.	D•1716				√*				√*		√*			
Oram Inc.	D•1718			√	√		√*	√			√*			√*

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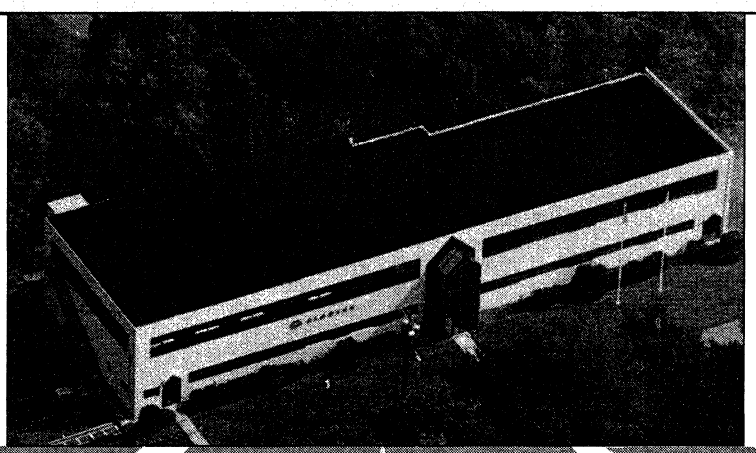
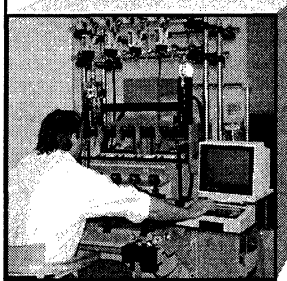
GlobTek manufactures various Power Supplies, Transformers, and Electromechanical Assemblies.

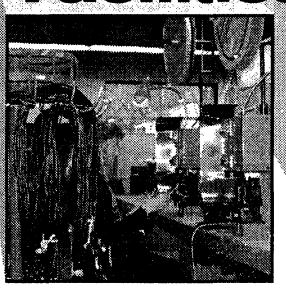
GlobTek offers Totally Identical Manufacturing in New Jersey USA

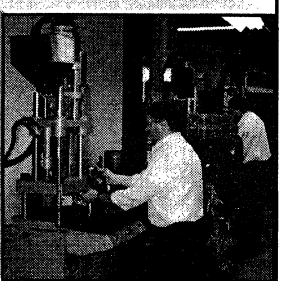


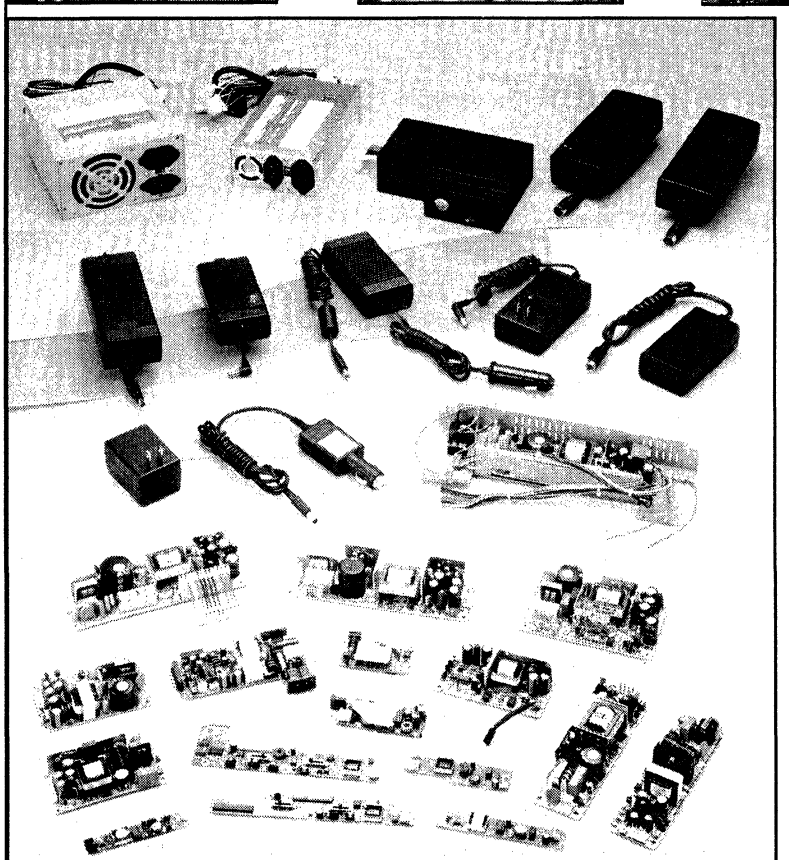
and the Far East (Taiwan, Thailand and China). Customers now have **THE CHOICE** and benefit of ordering the SAME, IDENTICAL parts made in New Jersey and/or the Far East depending on quantities, sample, prototypes runs, etc.

New Jersey Facilities









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AC-DC Table Top

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POWER SUPPLIES, DC

Manufacturer	Starting EEM Page No.	Over 500V	>1 Watt	1 to 300 Watts	>300 Watts	Multiple Output	Program-mable	Linear	Switch-ing	Open	Enclosed	Modular	Plug-In	Lab
Pacifitek	D•1719			√	√			√			√			
Peter Parts Electronics	D•1720												√	
Phihong USA	D•1721			√		√			√	√	√		√	
Pico Electronics, Inc.	D•1725			√*	√*	√*	√	√*	√*	√	√*	√		
Pillar Industries, Inc.	D•1744		√	√		√*		√*	√*			√*	√	
Pioneer Magnetics	D•1748			√	√	√			√		√	√		
Polytron Devices, Inc.	D•1749		√	√		√*		√*	√*					√*
Powerbox Inc.	D•1751		√	√	√	√		√	√	√	√	√	√	√
Power-One	D•1752			√	√	√	√	√	√	√	√			
Power Solutions, Inc.	D•1760			√	√	√			√	√	√		√	
Power Supply Concepts	D•1764			√	√	√	√	√	√	√	√			
Power Ten, Inc.	D•1766				√*	√*	√*	√	√*		√*			
Rantec Microwave and Electronics Inc.	D•1768			√*	√	√*			√	√*	√*	√		
Resonant Power Technology	D•1775			√*	√*	√*		√*	√*		√*	√		
Samsung Electro-Mechanics	D•1778											√		
Shindengan America Inc.	D•1777			√		√			√	√	√			
Skynet Electronic Company	D•1779			√		√		√	√	√	√	√	√	
Sorenson	D•1794			√*	√*	√*	√*	√*	√*		√*			√*
Spellman High Voltage Electronics Corporation	D•1796		√	√	√	√	√	√	√		√	√	√	√
Switching Systems International	D•1818			√	√	√			√	√		√		

*MIL Spec. §Surface Mount

PICO

AC-DC Power Supplies

See EEM Page D•1725-D•1743

PICO's NEW UAC SERIES

Power Factor Corrected
Universal AC Input, Regulated, Isolated
DC Output to 200 Watts in ONE Module

New

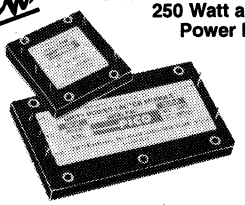
See Pages D•1726 and D•1727

- Universal Input Voltage, 85 to 265 VAC
- Power Factor Corrected, 0.99%
- Space Saving Design, One Module Replaces Two
- Special Output Voltages Available
- Regulated Output Voltage
- Made in the USA, Fully Encapsulated

Unity Power Factor Front End *for...AC-DC Applications!*

New

250 Watt and 500 Watt Models Power Factor Corrected

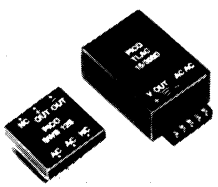


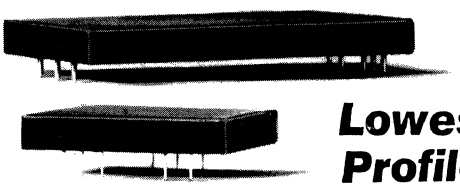
See Pages D•1727 and D•1728

New Harmonic Attenuators (PHA-I and LPHA1 Series) for use with PICO High Power DC-DC Converters for 3.3 to 100 VDC Single and Dual Outputs or 365 VDC regulated output direct from unit.

INDUSTRIAL

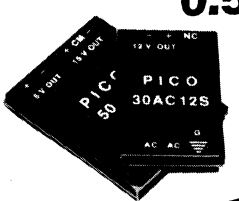
- Both Linear and Switching Models available New Switching Series .500" Tall
- Available with terminal strip or PC mount
- Single, Dual, Triple Outputs
- No Derating to 70°C
- Regulated—Isolated





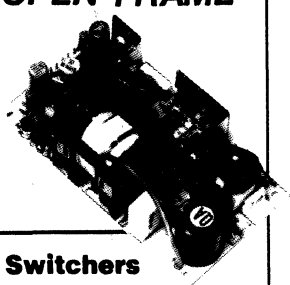
Lowest Profile 0.5" ht.

up to 500 Watts



OPEN-FRAME

- Up to 200 Watts available
- Universal AC Input 85—264V AC up to 65 Watts
- Jumper Selectable Inputs up to 200 Watts
- Short Circuit Protection
- UL-CSA-TUV Compliant
- Regulated-Isolated
- Multiple Outputs



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- *Single, Dual, Triple Outputs*
- *1200V Rms Isolation*
- *Low Isolation Capacity Available*
- *Continuous Short Circuit Protection*
- *High Efficiency*
- *Fully Regulated Voltage Outputs*
- *Operating Temperature −25°C. to +70°C. with No Heat Sink or Electrical Derating Required*
- *Expanded Operating Temperature Available (−55°C. to +85°C. ambient)*
- *Optional Environmental Screening Available*

Military Models Available to 55 Watts

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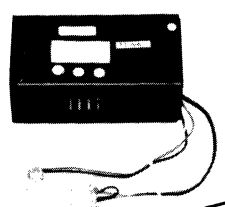

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Short Circuit Protection
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POWER SUPPLIES, DC

Manufacturer	Starting EEM Page No.	Over 500V	>1 Watt	1 to 300 Watts	>300 Watts	Multiple Output	Programmable	Linear	Switching	Open	Enclosed	Modular	Plug-In	Lab
Tamura Corp./AALTAM	D•1388		√	√	√	√		√	√	√	√	√	√	
Technical Devices of N.A., Inc.	D•1819			√		√		√	√		√		√	
Tectrol, Inc.	D•1820			√	√	√	√	√	√	√	√			
Todd Products Corp.	D•1825			√	√	√	√	√	√	√	√	√		√
Total Power International, Inc.	D•1848		√	√	√	√		√	√	√	√	√	√	
Tri-Mag, Inc.	D•1850			√	√	√*			√*	√*	√*	√	√	√
Tri Source Inc.	D•1854			√	√	√		√	√	√	√	√	√	
UltraVolt, Inc.	D•1856			√			√		√		√			
Unipower Corp.	D•1859			√	√	√			√	√	√	√		
Universal Voltronics Division	D•1864			√*	√*	√*	√*	√*	√*	√*	√*			√*
Vicor Corp.	D•1868			√*	√*	√*	√*		√*		√*	√*	√	
Volgen America, Inc.	D•1870			√		√			√		√	√		
Wall Industries	D•1871		√	√	√	√		√	√	√	√	√		
Wilmore Electronics Company, Inc.	D•1867		√	√	√	√		√	√	√	√	√		√
Xantrex Technology Inc.	D•1872			√	√	√	√	√	√		√			√
Xentek Power Systems	D•1876			√*	√*	√*	√	√*	√*	√*	√*			

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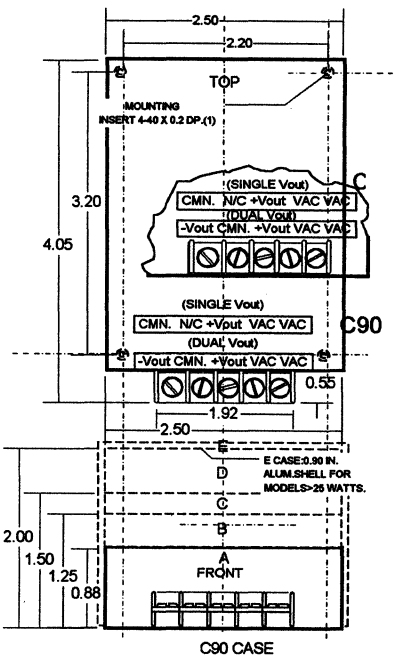
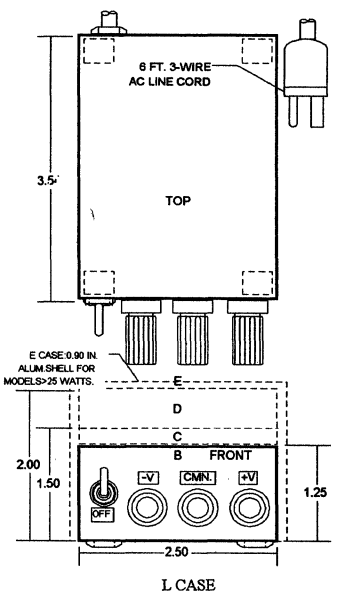
OUTPUT VOUT(VDC)	IOUT(A)	CASE	MODEL	PRICING 1-9	10-UP
*INSERT REQUIRED VOUT			PRICE INCREASE W/ >VOUT		
2 - 4	SAME SPECS AS BELOW MAX IOUT <2A				
5 - 9	SAME SPECS AS BELOW MAX IOUT <4A				
	0.1	CA	C*S.1	$38	$35
	0.2	CB	C*S.2	49	45
	0.3	CB	C*S.3	59	54
	0.5	CC	C*S.5	74	67
	0.6	CC	C*S.6	81	73
10 - 18	0.7	CD	C*S.7	88	80
	0.8	CD	C*S.8	94	85
	1.0	CD	C*S1	102	92
	1.3	CD	C*S1.3	110	98
	1.5	CE	C*S1.5	119	108
	2.0	CE	C*S2	129	119
29 - 36	SAME SPECS AS ABOVE MAX IOUT <1.3A				
37 - 43	SAME SPECS AS ABOVE MAX IOUT <1.0A				
44 - 50	SAME SPECS AS ABOVE MAX IOUT <0.6A				
					DUAL
	± 0.05	CA	C*D.05	$39	$36
	± 0.1	CA	C*D.1	47	40
	± 0.2	CB	C*D.2	64	63
	±0.3	CC	C*D.3	79	79
±2 - ±10	± 0.5	CD	C*D.5	93	87
	± 0.7	CD	C*D.7	108	104
	± 0.9	CE	C*D.9	123	113
	±1.1	CE	C*D1.1	129	117
	±1.5	CE	C*D1.5	136	121
±11-±19	SAME SPECS AS ABOVE MAX IOUT<1.2A				
±20-±28	SAME SPECS AS ABOVE MAX IOUT<1.0A				

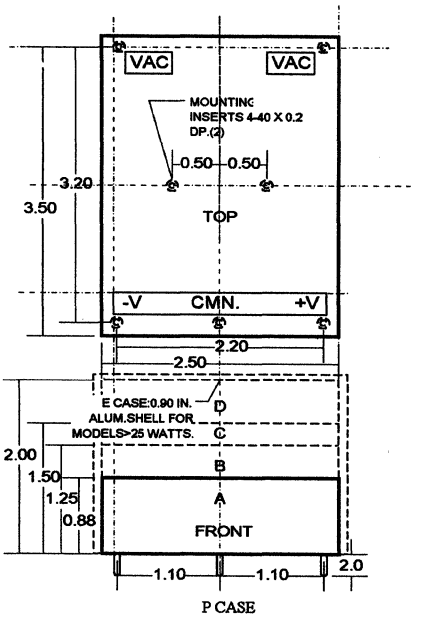
SPECIFICATIONS	
PARAMETER	**LIMIT**
VIN :	120±15VAC 47-420HZ
REGULATION LINE :	0.05%
LOAD:	0.03%(38-48VOUT)
	0.05%(< 37VOUT)
RIPPLE/NOISE:	0.05MVRMS(>24VOUT) 0.1MVRMS (<24VOUT)
VOUT ACCURACY:	1% FIXED
ISOLATION INPUT: VIN/VOUT:	50 MEG OHMS 500VDC
TEMP.COEFFICIENT:	0.015%/ C
OPERATING :	-25 TO+71 C
STORAGE :	-55 TO+85 C
SHORTCIRCUIT PROTECT: AUTO-RECOVERY	



C90 CASE



L CASE



P CASE

FOR LAB VERSION REPLACE PREFIX C WITH L

CASE E MODELS(>25 WATTS)REQUIRE EXTERNAL SINKSTHAT ADD 0.1IN. TO THE CASE PERIMETER.

OPTIONAL FEATURES

1. 220 VAC 50-440HZ INPUT ADD SUFFIX K($5.00).
2. 240 VAC 50-440HZ INPUT ADD SUFFIX UK($5.00).
3. 120/230 VAC 50-440HZ INPUT ADD SUFFIX KS($9.00).
4. ±1VOLT VARIABLE ADD SUFFIX V TO MODEL NO.($10/OUTPUT).

SEE **HTTP://AAKCORP.COM** FOR OTHER OPTIONAL FEATURES OR CALL 1-603-382-2222.

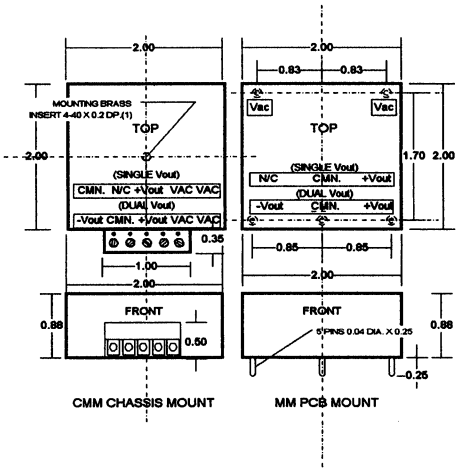
FOR PIN VERSION REPLACE PREFIX C WITH P

AAK Corporation *The Best Price/Spec Ratio in Power Sources 73 Newton Rd. Plaistow, NH 03865 • 603-382-2222 •Fax 603-382-6666*
Order Toll-Free:800-886-2225 E-Mail: AAKCO@JUNO.COM • MASTERCARD & VISA Accepted
FOR MORE INFORMATION SEE ***http://aakcorp.com***

AC/DC MM SERIES Up to 1.5Watts
MINIATURE LINEAR ISOLATED REGULATOR

OUTPUT VOUT (VDC)	IOUT (MA)	CASE	MODEL	PRICING 1-9	10-UP
SINGLE					
5	200	M	MM5.2	$37	$34
6	170	M	MM6.17	38	35
9	150	M	MM9.15	38	35
12	120	M	MM12.12	38	35
15	100	M	MM15.1	38	35
24	30	M	MM24.03	38	35
DUAL					
±5	100	M	MD5.1	43	39
±12	50	M	MD12.05	43	39
±15	30	M	MD15.03	39	38

SPECIFICATIONS	
PARAMETER	LIMIT
VIN:	120±15VAC @47-420Hz
REGULATION LINE:	0.05%
LOAD:	0.10%
RIPPLE/NOISE:	2MVRMS
VOUT ACCURACY:	1.5% FIXED
ISOLATION INPUT:	50 MEG OHMS
VIN/VOUT:	500VDC
TEMPERATURE COEFFICIENT:	0.015% / C
OPERATING:	-25 TO +71 C
STORAGE:	-55 TO +85 C
SHORT CIRCUIT PROTECT:	AUTO-RECOVERY



NOTE: FORMER 2.5 X 4.5 IN. MOUNTING DIMENSIONS AVAILABLE ON REQUEST.

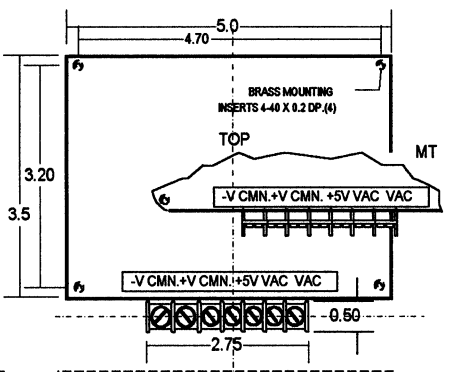
FOR TERMINAL MOUNT ADD C AND $3.00 TO PRICE.

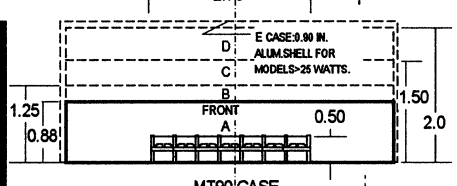
AC/DC M SERIES 10 to 50 Watts
LOW NOISE MULTI-MODULAR(MT) CHASSIS(CT)& PIN(T)

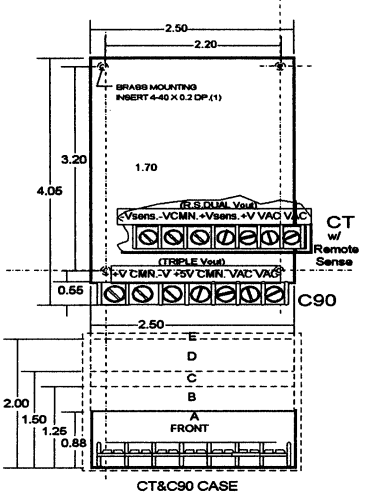
OUTPUT VOUT +VOUT IOUT+IOUT (VDC) (A)		CASE	MODEL	PRICE 1-9	10-UP
*INSERT REQUIRED VOUT MODULAR TRIPLE			PRICE INCREASE W/ >VOUT		
	0.5±0.1	A	M*T.5.1	$99	$89
	1.0±0.2	B	M*T1.2	108	97
5±12	2.0±0.3	C	M*T2.3	125	114
5±15	3.0±0.4	D	M*T3.4	139	126
5±24	3.5±0.5	E	M*T3.5.5	149	134
	4.0±0.6	E	M*T4.6	156	144
	4.5±0.7	E	M*T4.5.7	165	153

QUAD (Q)
VOLTAGE/CURRENT PREFERANCES AVAILABLE WITHIN WATTAGE SPECIFICATIONS ABOVE.

SPECIFICATIONS	
PARAMETER	LIMIT
VIN:	120±15VAC 47-420Hz
REGULATION LINE:	0.05%
LOAD:	0.1%
RIPPLE/NOISE:	0.05MVRMS(>24VOUT) 0.1MVRMS (<24VOUT)
ISOLATION INPUT:	50 MEG OHMS
VIN/VOUT:	500VDC
VOLTAGE ACCURACY:	1% FIXED
TEMPERATURE COEFFICIENT:	0.015% PER C
OPERATING:	-25 C TO +71 C
STORAGE:	-55 TO +85 C
SHORT CIRCUIT PROTECTION:	AUTO-RECOVERY







MODEL NO. STRUCTURE FOR
VOLTAGE/CURRENT NOT SHOWN ABOVE.
SAMPLE:OUTPUT: 5±12V @ 3/.8A

M 5 12 T 3 .8

SERIES
SINGLE VOUT
DUAL VOUT
NO. OF OUTPUTS
OPTION
DUAL IOUT
SINGLEIOUT

FOR PIN-MOUNT VERSION OF CT CASE OMIT C BEFORE PREFIX T.

UNIVERSAL INPUT SWITCHING POWER SUPPLIES

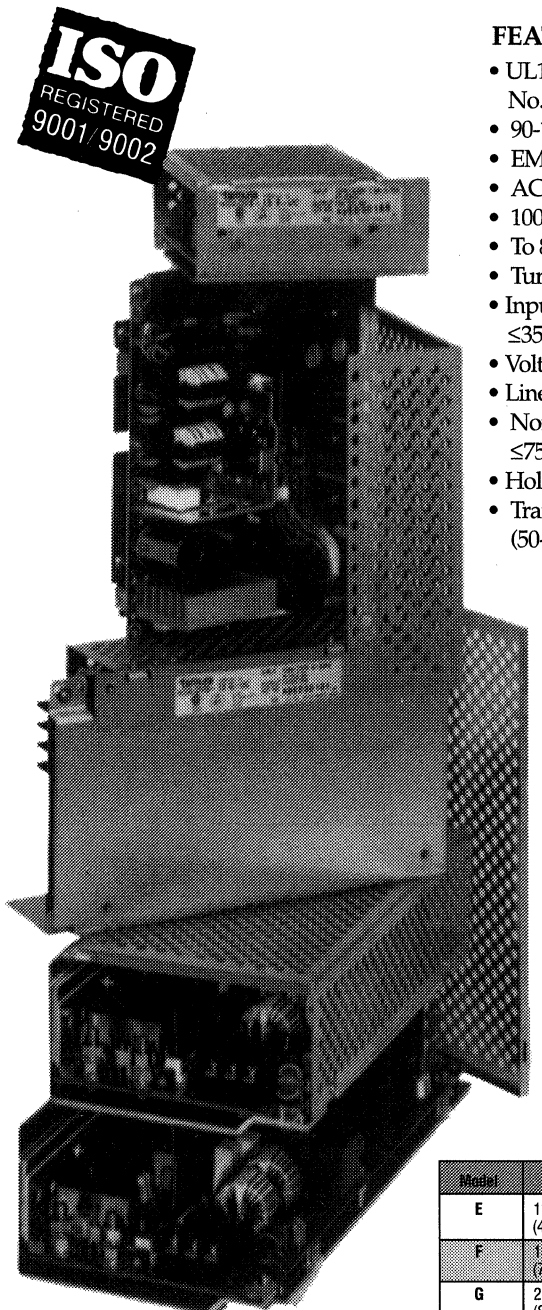
MICROTRAN.

File No. E140527

File No. LR44447

MITI approved for Japan

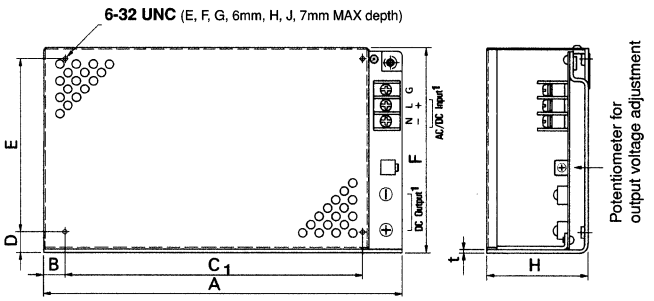
File No.s R9451115
R9451573
R9551007
R9650078
R9650068

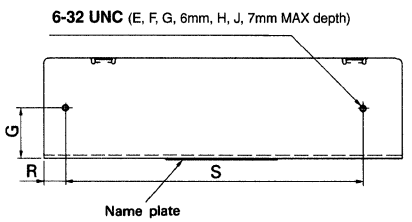


Universal Input Switching Power Supplies 60 to 384 W 90V to 264V input.

FEATURES

- UL1950, CSA1402C, CSA 22.2 No. 234 UC Series,VDE0805, EN60950.
- 90-132/180-264VAC.
- EMI Input Filter.
- AC Power Fail Signal.
- 100,000-150,000 hrs MTBF.
- To 85% Efficiency.
- Turn-On Delay:<100msec.
- Input Surge: ≤30A, cold start, ≤35A UC-E Series.
- Voltage Adj: ±10% of nominal.
- Line/Load Regulation: ±0.5%.
- Noise/Ripple: ≥20msec., ≤75mV p-p, or 0.5% max.
- Hold-Up Time: ≥20msec.
- Transient Response:≤1msec (50-100% load chg).
- Remote/Local Sensing.
- Overload/No-Load Protection.
- OVP: All outputs.
- Stability: ±0.1% for 8 hours.
- Elevated Temp Burn-In/Stress Test.
- Convection Cooled, Internal Fan H&J-UC Series.
- Storage Temp: -20°C to +85°C.
- 50°C Rated.
- Oper. Humidity: 0-95% RH.
- Temp. Coef: ±0.03%, ±0.02%/°C max.
- 24V unit can be modified for 28V output, and 5V for 3.2V.
- DC input (115-372VDC, E case/230-272VDC, F thru J case).
- Warranty: Two years.
- Removable Cover/PEM Nut Mtg.





Model	A	B	C	D	E	F	G	H	R	S	t	Weight
E	117.3 (4.62)	12.7 (0.500)	76.2 (3.000)	12.7 (0.500)	104.6 (4.120)	124 (4.88)	25.4 (1.000)	50.8 (2.00)	12.7 (0.500)	76.2 (3.00)	2.00 (0.079)	500g
F	180.3 (7.10)	38.1 (1.500)	114.3 (4.500)	12.7 (0.500)	104.6 (4.120)	124 (4.88)	30.2 (1.190)	60.2 (2.37)	38.1 (1.500)	114.3 (4.500)	2.00 (0.079)	900g
G	218.4 (8.60)	12.7 (0.500)	177.8 (7.00)	12.7 (0.500)	104.6 (4.120)	124 (4.88)	30.2 (1.190)	60.2 (2.37)	12.7 (0.500)	177.8 (7.00)	2.00 (0.079)	1200g
H	269.2 (10.60)	12.7 (0.500)	228.6 (9.000)	12.7 (0.500)	104.6 (4.120)	124 (4.88)	33.3 (1.310)	66.0 (2.60)	12.7 (0.500)	228.6 (9.000)	3.00 (0.118)	1700g
J	304.8 (12.00)	12.7 (0.500)	254.0 (10.000)	12.7 (0.500)	104.6 (4.120)	124 (4.88)	34.8 (1.370)	69.9 (2.75)	12.7 (0.500)	279.4 (11.000)	3.00 (0.118)	1900g
TOLERANCES	±1.016 (±0.04)	±0.508 (±0.02)	±0.254 (±0.01)	±0.508 (±0.02)	±0.254 (±0.01)	±1.016 (±0.04)	±0.508 (±0.02)	±1.016 (±0.04)	±0.508 (±0.02)	±0.254 (±0.01)		

Note 1: Cover extends over terminals on jumper selectable models.

DIMENSION mm(Inch)

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UNIVERSAL INPUT SWITCHING POWER SUPPLIES

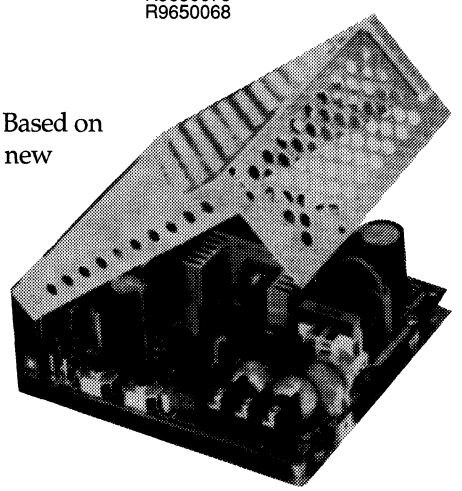
tamura
MICROTRAN.

File No. E140527

File No. LR44447

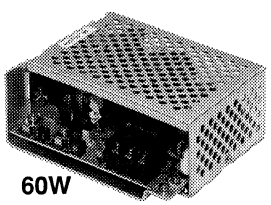
MITI approved for Japan

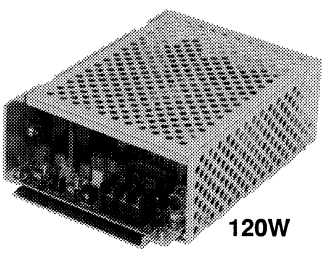
File No.s R9451115
R9451573
R9551007
R9650078
R9650068

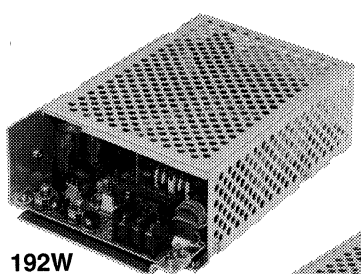


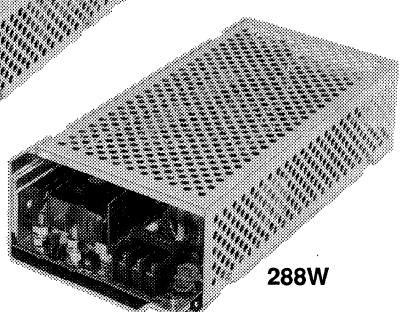
Tamura switching power supplies are now available with universal input. Based on the time tested designs of the Original OVS Jumper Selectable series, these new switching power supplies offer sound mechanical construction, excellent thermal management and fault tolerant electronic design resulting in high end-user reliability. Tooled for millions of units, they reflect true vertical manufacturing integration and are produced in a fully robotic factory.

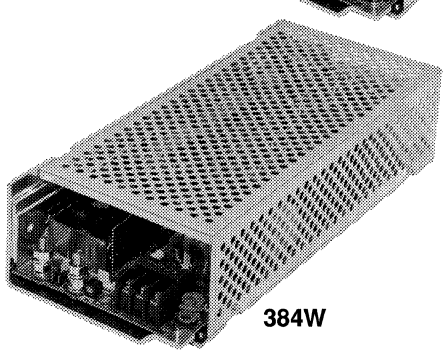
Tamura's original single output OVS series with Jumper Selectable inputs of 90V to 132V or 180V to 264V will always be available. Contact Tamura for detailed information.


60W


120W


192W


288W


384W

90V TO 264V 50/60 Hz UNIVERSAL INPUT SERIES

MODEL NO.	RATINGS VDC	RATINGS AMPS	TUV FILE	CASE SIZE
60W				
OVS-5E-UC	5V	10.0A	R9451115	E
OVS-12E-UC	12V	5.0A	R9451115	E
OVS-15E-UC	15V	4.0A	R9451115	E
OVS-24E-UC	24V	2.5A	R9451115	E
OVS-48E-UC	48V	1.2A	R9451115	E
120W				
OVS-5F-UC	5V	20.0A	R9451573	F
OVS-12F-UC	12V	10.0A	R9451573	F
OVS-15F-UC	15V	8.0A	R9451573	F
OVS-24F-UC	24V	5.0A	R9451573	F
OVS-48F-UC	48V	2.3A	R9451573	F
192W				
OVS-5G-UC	5V	30.0A	R9551007	G
OVS-12G-UC	12V	15.0A	R9551007	G
OVS-15G-UC	15V	12.0A	R9551007	G
OVS-24G-UC	24V	8.0A	R9551007	G
OVS-48G-UC	48V	3.7A	R9551007	G
288W				
OVS-5H-UC	5V	45.0A	R9650078	H
OVS-12H-UC	12V	22.0A	R9650078	H
OVS-15H-UC	15V	18.0A	R9650078	H
OVS-24H-UC	24V	12.0A	R9650078	H
OVS-48H-UC	48V	5.5A	R9650078	H
384W				
OVS-5J-UC	5V	60.0A	R9650068	J
OVS-12J-UC	12V	30.0A	R9650068	J
OVS-15J-UC	15V	25.0A	R9650068	J
OVS-24J-UC	24V	16.0A	R9650068	J
OVS-48J-UC	48V	7.3A	R9650068	J

See Opposite Page for Dimensions

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UNIVERSAL INPUT TRIPLE OUTPUT LOW PROFILE SWITCHING POWER SUPPLIES

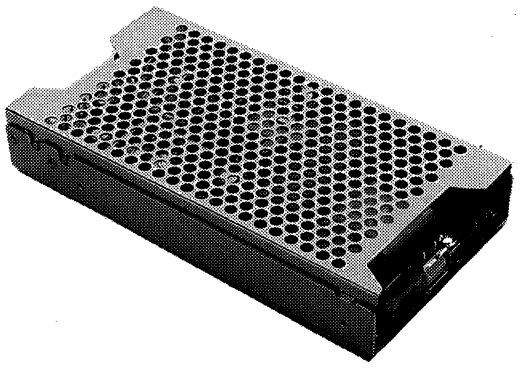
MICROTRAN.

File No. E133370
E132244

File No. LR44447

File No. 3817
4312
72936

MITI approved for Japan



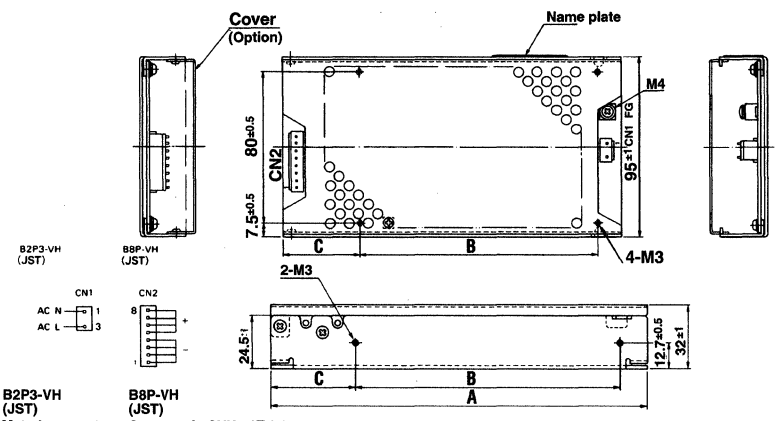
FEM SERIES - WITH PIN TYPE CONNECTORS

	MODEL NO.		RATED OUTPUT VOLTAGE (V)	RATED OUTPUT CURRENT (A)	MAX. OUTPUT CURRENT (A)	MIN. OUTPUT CURRENT (A)	MAX. RIPPLE NOISE (mVp-p)	TYPICAL OVP SETPOINT (V)	TYPICAL OCP SETPOINT (A)
30W	FEM-301	V1	+5	3.00	5.00	1.0	100	6.0~7.5	~4.5
		V2	+12	0.90	1.20	0.0	150	N/A	~3.0
		V3	-12	0.35	0.50	0.0	150	N/A	~1.5
	FEM-302	V1	+5	5.00	5.00	1.0	100	6.0~7.5	~4.5
		V2	+15	0.70	1.20	0.0	150	N/A	~3.0
		V3	-15	0.30	0.50	0.0	150	N/A	~3.0
	FEM-303	V1	+5	3.00	5.00	1.0	100	6.0~7.5	~4.5
		V2	+12	1.10	1.20	0.0	150	N/A	~3.0
		V3	-5	0.35	0.50	0.0	100	N/A	~1.5
50W	FEM-501	V1	+5	4.00	7.00	1.5	100	6.0~7.5	~7.5
		V2	+12	1.50	1.50	0.0	150	N/A	~3.0
		V3	-12	1.00	1.00	0.0	150	N/A	~3.0
	FEM-502	V1	+5	2.50	7.00	1.5	100	6.0~7.5	~6.0
		V2	+15	1.50	1.50	0.0	150	N/A	~3.0
		V3	-15	1.00	1.00	0.0	150	N/A	~3.0
	FEM-503	V1	+5	5.40	7.00	1.5	100	6.0~7.5	~9.0
		V2	+12	1.50	1.50	0.0	150	N/A	~3.0
		V3	-5	1.00	1.00	0.0	150	N/A	~3.0

FEM SERIES

Shown with optional cover

FE SERIES MECHANICAL



B2P3-VH (JST)
Mated connector CN1 VHR-3N
CN2 VHR-8N

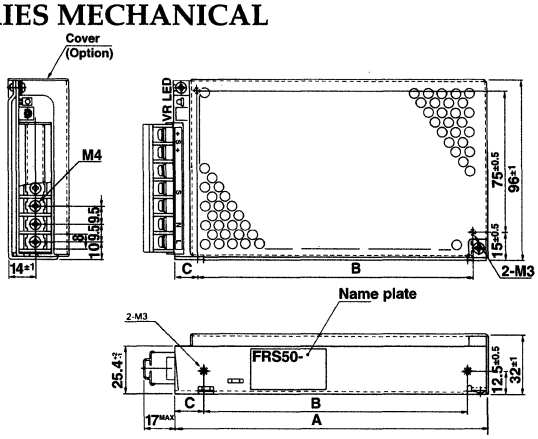
B8P-VH (JST)
Contact pin SVH-21T-1.1 or SVH-21T1.1

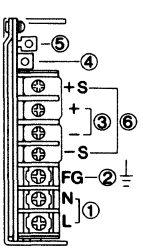
DIMENSIONS (mm)

	FEM 30	FEM 50	FES 50
A	140	180	180
B	110	127	127
C	15	40	40
Weight (g)*	320	480	480

*without cover

FR SERIES MECHANICAL





DIMENSIONS (mm)

	FRS 30	FRS 50	FRS† 100
A	140	180	201
B	110	127	170
C	15	40	15
Weight (g)*	320	480	620

*without cover
† FRS100 has 4 mounting screws on the side

①. **A.C. Input Terminal (L,N)** This terminal is connected to 100-120 VAC or 200-240VAC Input line.
②. **Frame Grounding Terminal** This terminal is connected to the earth (grounding) conductor.
③. **D.C. Output Terminal (+,-)** This terminal is connected to the load leads.
④. **Output Voltage Adjusting Trimmer** This trimmer adjusts the output voltage.
⑤. **Output display LED** When power supply operates, LED is ON.
⑥. **Remote Sensing Terminal (+S, -S)** For remote sensing, remove metal chip and make required wiring.*
*Not provided on 30W model FRS

See Opposite Page for Additional Features

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UNIVERSAL INPUT SINGLE OUTPUT LOW PROFILE SWITCHING POWER SUPPLIES

File No. E133370
E132244

File No. LR44447

File No. 3817
4312
72936

MITI approved for Japan

tamura
MICROTRAN

Features

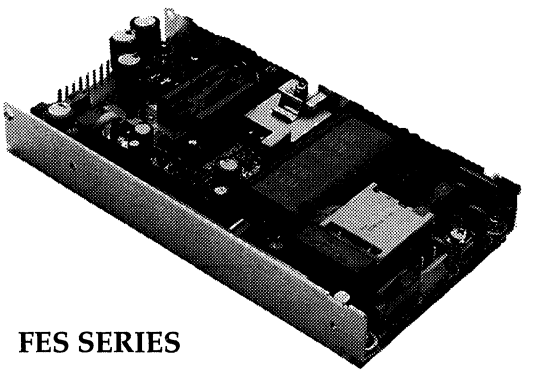
- Input: World Wide 85-264VAC.
- EMI: FCC part 15J Class B; VDE 0871 Class B. (FRS100 Class A, FCC &VDE)
- UL 1950.
- CSA 1402C.
- VDE (EN60950).
- Hybrid Integrating Control (HIC).
- Operating Frequency: 150-200kHz.
- Surge: 20/40A @ 120/220VAC.
- Line Regulation: <1%
- Load Regulation: <2%, NL to FL.
- Voltage Adjustment ±5% (FEM +5% only)
- Output Overshoot: None.
- Hold Up Time: 20msec typ (100VAC).
- OVP: ALL FES; FEMV1 only.
- Temp. Coef: ±0.005%/°C; others, ±0.03%/°C.
- Stability: 0.1%; others 0.2%.
- Efficiency: 70% typ (120VAC).
- Convection Cooled.
- Operating Temp: Up to 60°C ambient.
- Operating Humidity: 30-90% RH
- Leakage Current: 1.0ma rms max.
- Insulation Resistance: ≥100MΩ at 500VDC
- Vibration: 10-55Hz, 2G (all axis, 1 hr).
- Shock: 20msec, 20G (all axis, 3x ea).
- Elevated Temp. Burn-In/Stress Test.
- Warranty: 2 years
- Optional Cover

* Specifications may refer to all FES singles output and main FEM output (V1) except as noted.

FES SERIES WITH PIN TYPE CONNECTORS

	MODEL NO.	RATED OUTPUT VOLTAGE (V)	MAX. OUTPUT CURRENT (A)	MAX. RIPPLE NOISE (mVp-p)	TYPICAL OVP SETPOINT (V)	TYPICAL OCP SETPOINT (A)
50W	FES-501	5	10.0	100	6.0~7.5	~12.0
	FES-502	12	4.2	100	14.4~17.0	~5.1
	FES-503	15	3.3	100	18.0~22.0	~4.0
	FES-504	24	2.1	150	28.8~33.0	~2.6
	FES-505	48	1.1	200	54.0~62.0	~1.4

See Opposite Page for Dimensions

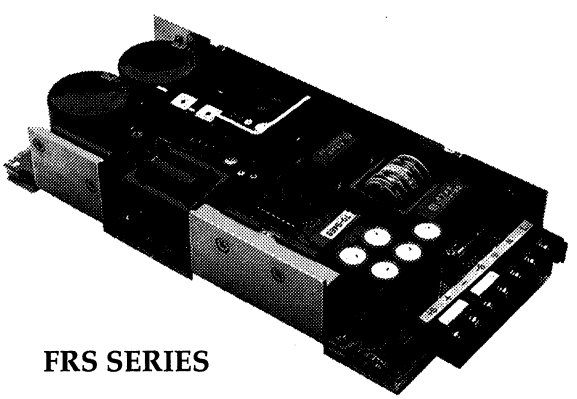


FES SERIES

FRS SERIES WITH SCREW TERMINAL CONNECTORS

	MODEL NO.	RATED OUTPUT VOLTAGE (V)	MAX. OUTPUT CURRENT (A)	MAX. RIPPLE NOISE (mVp-p)	TYPICAL OVP SETPOINT (V)	TYPICAL OCP SETPOINT (A)
30W	FRS30-5	5	6.0	100	6.0~7.5	~7.2
	FRS30-12	12	2.5	100	14.4~17.0	~3.0
	FRS30-15	15	2.0	100	18.0~22.0	~2.4
	FRS30-24	24	1.3	150	28.8~33.0	~1.6
	FRS30-48	48	0.63	200	54.0~62.0	~0.8
50W	FRS50-5	5	10.0	100	6.0~7.5	~12.0
	FRS50-12	12	4.2	100	14.4~17.0	~5.1
	FRS50-15	15	3.3	100	18.0~22.0	~4.0
	FRS50-24	24	2.1	150	28.8~33.0	~2.6
	FRS50-48	48	1.1	200	54.0~62.0	~1.4
100W	FRS100-5	5	20.0	150	6.0~7.5	~22.0
	FRS100-12	12	8.4	200	14.4~17.0	~9.3
	FRS100-15	15	6.7	220	18.0~22.0	~7.4
	FRS100-24	24	4.2	330	28.8~33.0	~4.7
	FRS100-48	48	2.1	530	54.0~62.0	~2.4

See Opposite Page for Dimensions



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SINGLE AND MULTIPLE OUTPUT LINEAR POWER SUPPLIES

MICROTRAN.

File No. E140527 File No. LR69809

File No.s 3206, 3208, 3210, 3216, 3218, 3257, 3212, 3214, 3257, 3259, 3261

SPECIFICATIONS

AC INPUT

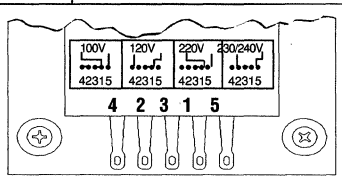
User-selectable for 100/120/220/230-240 VAC, 47-63 Hz. Factory set at 120 VAC. Tolerances are: +10% and -13% for 100, 120, 220 and 240 VAC input; + 15% and -10% for 230 VAC input. Derate output current 10% for 50 Hz operation. Input must be fused. See fuse rating and jumper information table

AC INPUT FUSE RATINGS

Case Size	100 VAC	120 VAC	220 VAC	240 VAC
B	0.63A	0.5A	0.35A	0.25A
OLS-24B	1.0A	0.8A	0.5A	0.35A
C	1.6A	1.0A	0.8A	0.5A
N	2.0A	2.0A	1.0A	1.0A
D	2.5A	2.0A	1.25A	1.0A
131	3.0A	3.0A	1.6A	1.6A
AA	0.63A	0.5A	0.35A	0.25A
OLD-24AA	1.0A	0.8A	0.5A	0.35A
OLT-522AA	1.0A	0.8A	0.5A	0.35A
BB	1.6A	1.0A	0.8A	0.5A
CC	2.5A	2.0A	1.25A	1.0A

AC INPUT JUMPER INFORMATION

AC Input For use at VAC	(47 to 63 Hz) 100 VAC	120 VAC	220 VAC	230/240
Jumper		1 & 3	1 & 3	
	2 & 4	2 & 4	2 & 3	2 & 3
Apply AC	1 & 5	4 & 1	1 & 5	4 & 1



DC OUTPUT

See power output ratings for specific models. Adjustable range ±5% minimum. See voltage adjust specifications.

VOLTAGE ADJUST

Adjustable range ±5% minimum on fixed output models. Voltage adjustable over range indicated (±5%) for wide range models. Voltage non-adjustable on models OLD-122B and OLD-15B. Models OLD-24AA, OLD-24BB and OLD-24CC are factory set at 24V. Adding jumper allows 18 to 20V adjustable output.

EMI/RFI

Inherently low conducted and radiated noise levels.

LINE REGULATION

±0.05% for a 10% line change. ±1.0% for models OLD-12B and OLD-15B.

LOAD REGULATION

±0.05% for a 50% load change. ±1.0% for models OLD-12B and OLD-15B.

TRANSIENT RESPONSE

Less than 50 µ sec for a 50% load change at ±2% of nominal output voltage.

SHORT CIRCUIT & OVERLOAD PROTECTION

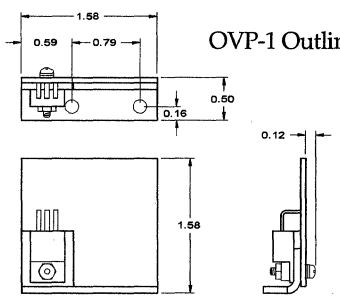
Automatic current limit/foldback. Output recovers upon removal of fault condition.

OVERVOLTAGE PROTECTION

Built-in on all main 5V outputs. Factory set at 6.2V ±0.4V. Other outputs use optional overvoltage protection module, OVP-1.

OPTIONAL OVERVOLTAGE PROTECTION

OVP module, model OVP-1, may be used with any output not supplied with factory built-in OVP. Adjustable range, 6.4 to 34V. Maximum current



OVP-1 Outline

rating 8.0A. Module may be used to protect dual outputs (±12 or ±15). Recommended trip point is 115 to 133% of output voltage.

NOISE AND RIPPLE

5V through 15V models: 5.0 mV p-p max. OLD-12B and OLD-15B: 0.2% of output voltage p-p max. 24V models: 3 mV p-p plus 0.2% of output voltage max.

REMOTE SENSING

Provided on most outputs. Open sense lead protection built-in. Exceptions are noted with an "*".

See output power rating table for specific model.

STABILITY

±0.3% for 24-hour period after 1-hour warm-up.

MTBF

Per MIL-HDBK-217D at 100% load, 120 VAC line and 250C ambient temperature.

CASE SIZE MTBF RATINGS

Case	# Outputs	MTBF hrs
B	1	300,000
B	2	460,000
C	1	300,000
N	1	260,000
N	2	150,000
D	1	250,000
D	3	120,000
AA	2	175,000
AA	3	140,000
BB	2	160,000
CC	2	155,000
131	3	120,000

TEMPERATURE RATINGS

Operating: 0°C to +50°C full-rated load.
Derate to 40% at 70°C.
Storage: -40°C to +85°C.

TEMPERATURE COEFFICIENT

±0.03%/0C maximum.

EFFICIENCY

Typical efficiency: 5V output, 45%; 12 and 15V output, 55%; 24V to 250V outputs:60%.

VIBRATION

Per MIL-STD-810C, Method 514, Procedure X CAT. G-1.

SHOCK

Per MIL-STD-810C, Method 516, Procedure V.

DIMENSIONS AND WEIGHT

See dimensional drawings.

SAFETY

Compliance to int'l safety regulations for power supply specs. UL recognized, file #E102103. CSA certfied, cert. #LR69809. VDE registered: OLS-B, file #3212; OLS-C, #3208; OLS-N, #3210; OLS-D, #3214; OLD-B, #3218; OLT-F, #3206; OLD-24AA & 24BB, #3216; OLD-5AA, 512AA, 12/15AA & OLT-522A, #3257; OLD-5BB, 12/15BB & 512BB, #3259; OLD-5CC, 24CC, 12/15CC & 512CC, #3261.

OUTPUT TAP AND PCB VOLTAGE CHANGES

——— Original Connection
------- Move To Change Output Voltage

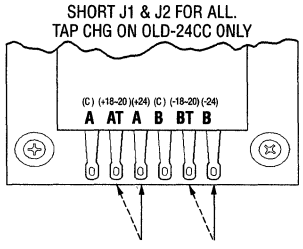


Fig. 1 Models OLD-24AA, 24BB, 24CC

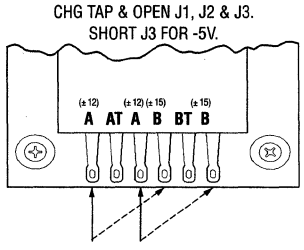


Fig. 2 Models OLD-12/15AA, 12/15BB

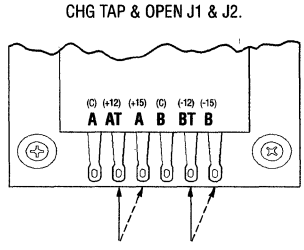


Fig. 3 Models OLD-12/15CC

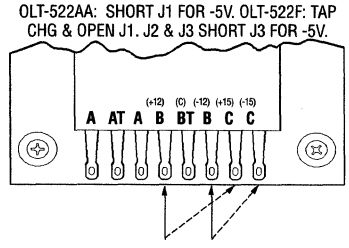


Fig.4 Models OLT-522AA, 522F

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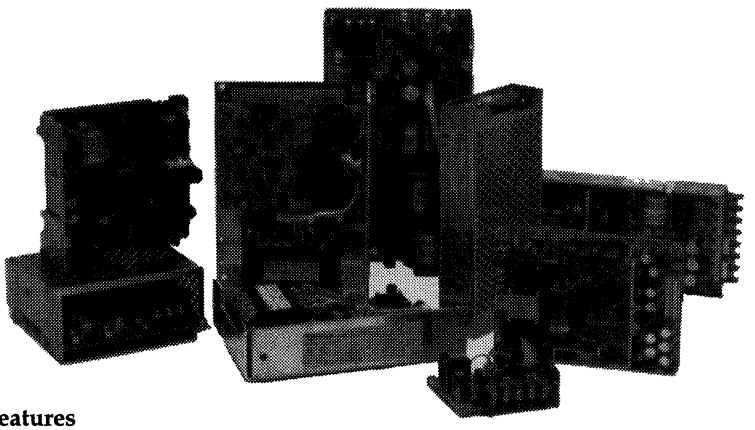
SINGLE AND MULTIPLE OUTPUT LINEAR POWER SUPPLIES

tamura MICROTRAN

File No. E140527 File No. LR69809 File No.s 3206,3208, 3210, 3216, 3218, 3257, 3212, 3214,3257, 3259, 3261

Tamura has set reliability standards through component upgrade design. Critical specs such as temperature, voltage and current have been derated so that, for example, 105°C instead of 85°C electrolytic caps are used. The result is the highest available MTBF as calculated by MIL-HDBK-217D at full load, 120VAC and 25°C.

UL544 for MEDICAL & DENTAL



DUAL OUTPUT MODELS

MODEL No.[1]	POWER-ONE TYPE	VOLTAGE, CURRENT[2,*] OUTPUT 1	OUTPUT 2	CASE SIZE
±5VOLTS				
OLD-5AAV	HAA5-1.5/OVP-A	5V,1.5A*	-5V,1.5A*	AA
OLD-5BBV	HBB5-3/OVP-A	5V,3.0A*	-5V,3.0A*	BB
OLD-5CCV	HCC5-6/OVP-A	5V,6.0A	-5V,6.0A	CC
±12 or 15 VOLTS				
OLD-12B	HAD12-0.4-A	12V, 0.4A*	-12V,0.4A*	B
OLD-15B	HAD15-0.4-A	15V, 0.4A*	-15V,0.4A*	B
±12/15 VOLTS				
OLD-12/15AA	HAA15-0.8-A	12V, 1.0A jumper chg: 15V,0.8A	-12V,1.0A -15V,0.8A or -5V, 0.4A	AA
OLD-12/15BB	HBB15-1.5-A	12V, 1.7A jumper chg: 15V, 1.5A	-12V, 1.7A -15V, 1.5A or -5V, 0.7A	BB
OLD-12/15CC	HCC15-3-A	12V, 3.4A jumper chg: 15V, 3.0A	-12V, 3.4A -15V, 3.0A	CC
±24 or 18 to 20 VOLTS				
OLD-24AA	HAA24-0.6-A	24V, 0.6A* jumper chg: 18≤20V, 0.4A	-24V,0.6A* -18≤20V, 0.4A	AA
OLD-24BB	HBB24-1.2-A	24V,1.2A* jumper chg: 18≤20,0.9A	-24V,1.2A* -18≤20V,0.9A	BB
OLD-24CC	HCC24-2.4-A	24V,2.4A jumper chg: 18≤20V,1.8A	-24V,2.4A -18≤20V,1.8A	CC
5 & 12 to 15 VOLTS				
OLD-512AA	HAA512-A	5V,2.0A*	+12≤15V,0.5A*	AA
OLD-512BB	HBB512-A	5V,3.0A	+12≤15V,1.25A	BB
OLD-512CC	HCC512-A	5V,6.0A	+12≤15V,2.5A	CC

TRIPLE OUTPUT MODELS

MODEL No.[1]	POWER-ONE TYPE	VOLTAGE, CURRENT[2,*] OUTPUT 1	OUTPUT 2	OUTPUT 3	CASE SIZE
5 & ±12 TO 15 VOLTS					
OLT-522AA	HTAA-16W-A	5V,2.0A* jumper chg:	12≤15V,0.4A*	-(12≤15)V,0.4A* -5V,0.4A	AA
OLT-522F	CP131-A	5V,8.0A jumper chg:	12V, 1.7A 15V, 1.5A	-12V, 1.7A -15V, 1.5A -or- 5V, 0.7A	131

Features

- MTBF to 460,000 Hrs.
- UL 1950, UL544, CSA 1402C,
- VDE 0805, EN60 950.
- 100/120/220/230/240VAC inputs.
- Remote Sensing.
- 2 Year Warranty.
- 5V OVP Built-in.
- Optional OVP Module.
- Short Circuit Protection.
- Overload Protection
- Burn-in.
- Voltage Adjust: ±5% min.
- Line/Load Reg: ±0.05% typ.
- Noise/Ripple:≤5.0mVp-p typ.
- Transient Response: ≤50µsec (50% load chg.)
- Stability: ±0.3%for 24 hours.
- 50°C Rated Full Load.
- Temp coef: ±0.3%/°C max.
- Vibration: MIL-STD-810C.
- Shock: MIL-STD-810C.

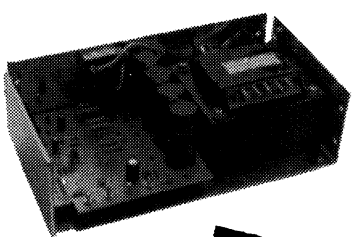
MECHANICAL DIMENSIONS

CASE SIZE	DIMENSIONS (L"X W"X H")	WT (LBS)
B	4.87X4.00X2.07	2
C	5.26X4.87X2.95	4
D	9.00X4.87X3.28	7.5
N	7.00X4.87X3.20	6
AA	6.50X4.00X2.07	2
BB	7.00X4.78X2.95	4
CC	9.38X4.87X3.28	7
OVP-1	1.58X1.58X0.50	

Note 1: OVP built-in on main 5V output of multiple output units. Use OVP-1 module (up to 34V combined for other outputs).
Note 2: Other industry standard output voltages available on a special order.
Note 3: * indicates remote sense not provided.

SINGLE OUTPUT MODELS

MODEL NO.	POWER-ONE TYPE	VOLTAGE, CURRENT	CASE SIZE
5 VOLTS			
OLS-5BV	HB5-3/OVP-A	5V, 3.0A	B
OLS-5CV	HC5-6/OVP-A	5V, 6.0A	C
OLS-5NV	HN5-9/OVP-A	5V, 9.0A	N
OLS-5DV	HD5-12/OVP-A	5V, 12.0A	D
12 VOLTS			
OLS-12B	HB12-1.7-A	12V, 1.7A	B
OLS-12C	HC12-3.4-A	12V, 3.4A	C
OLS-12N	HN12-5.1-A	12V, 5.1A	N
OLS-12D	HD12-6.8-A	12V, 6.8A	D
15 VOLTS			
OLS-15B	HB15-1.5-A	15V, 1.5A	B
OLS-15C	HC15-3-A	15V, 3.0A	C
OLS-15N	HN15-4.5-A	15V, 4.5A	N
OLS-15D	HD15-6-A	15V, 6.0A	D
24 VOLTS			
OLS-24B	HB24-1.2-A	24V, 1.2A	B
OLS-24C	HC24-2.4-A	24V, 2.4A	C
OLS-24N	HN24-3.6-A	24V, 3.6A	N
OLS-24D	HD24-4.8-A	24V, 4.8A	D
OVP MODULE			
OVP-1	OVP-12	6.4V≤34V	OVP



ISO REGISTERED 9001 9002

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File: E82180

File: LR38236 LR65893 LR44447

File: E132244

File: 7969-3330 7969-3331 7969-3336

Take the power supply out of your product and you'll have smaller, lighter, easier-to-build product that runs cooler. Your safety agency solutions are covered by TAMURA.

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- AC and DC output from 2.5 to 48V, regulated or unregulated
- Single and multiple outputs
- UL, CSA, VDE, MITI, CEE and SAA agency approvals
- Switch-mode and linear models

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For applications requiring greater external power, TAMURA offers direct plug-in and desktop models with output ratings from 2.0VA to 60VA.

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15 to 60 WATT SWITCH-MODE REGULATED DC POWER SOURCES

Wall Plug-In and Table Top Models.

tamura MICROTRAN

File# LR65893 LR44447 | File# 7969-3336 | File# E13224 | File# E132244, E82180 | CALL FOR MITI MODELS

For applications requiring more power from an external power source, Tamura offers 15, 20, 30, 40 and 60 watt output ratings in compact, light weight, wall plug-in and table top cases for world wide use.

FEATURES

- World Wide AC input 40/60W.
- UL 1310 Listed: 15/20/30W.
- UL 1950 Recognized: 40/60W.
- No Minimum Load.
- Input Surge: ≤50A; ≤20A, 20/30W.
- Efficiency: 65%-70% typ.
- Hold-Up:≥10msec; ≥5msec, 15W.
- Overload Protection: ≥110% FL.
- Ripple/Noise(p-p): 100mV-20/30W +5-6V 40/60W 200mV-15W +19-17.5V 40/60W
- Operating Temp: 0°C to +40°C.
- Storage Temp: -10°C to +70°C.
- Operating Humidity: 10-90% RH.
- Storage Humidity: 5-95% RH.
- hi-pot: 1.5kVrms: VDE , 3kVrms.
- Insulation Resistance: ≥50MΩ @ 500VDC.
- EMI: FCC part 15J Class B; VDE 0871 Class B.
- AC Input Connector: IEC type #320 receptacle (40/60W)

FIG. 1 UL/CSA

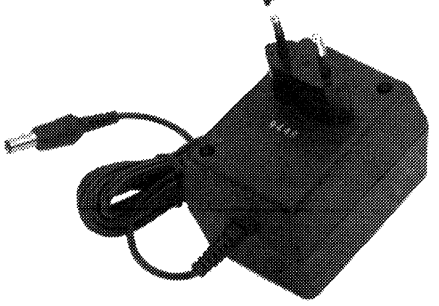


FIG. 2 VDE

FIG. 3 40W & 60W

15, 20 & 30 WATT MODELS: 90-132VAC, 47-63Hz. FOR UL/CSA TYPE WALL PLUG

MODEL NO	CASE SIZE	RATED VDC	DC AMP	LINE REG	TYP V OUT @ SFL		PLUG
					VDC	AMP	
SWA-0502	20W	5	3.5	±0.1	5.20	1.75	I
SWA-0503	30W	5	4.0	±0.1	5.20	2.00	I
SWA-0601	15W	6	2.0	±0.2	6.60	1.00	I
SWA-0602	20W	6	3.5	±0.1	6.20	1.75	I
SWA-0603	30W	6	4.0	±0.1	6.20	2.00	I
SWA-0701	15W	7	1.7	±0.2	7.70	0.85	I
SWA-0901	15W	9	1.5	±0.3	9.50	0.75	I
SWA-0902	20W	9	2.5	±0.1	9.15	1.25	I
SWA-0903	30W	9	3.0	±0.1	9.15	1.50	I
SWA-1201	15W	12	1.3	±0.4	12.40	0.65	I
SWA-1202	20W	12	2.0	±0.1	12.10	1.00	I
SWA-1203	30W	12	2.5	±0.1	12.10	1.25	I
SWA-1501	15W	15	1.0	±0.4	15.50	0.50	I
SWA-1502	20W	15	1.6	±0.1	15.10	0.80	I
SWA-1503	30W	15	2.0	±0.1	15.10	1.00	I
SWA-1702	20W	17	1.25	±0.1	17.15	0.63	I

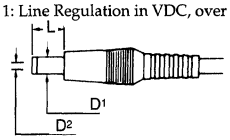
40 & 60 WATT TABLE-TOP MODELS: WORLD WIDE 90-264VAC, 47-63 Hz. WITH IEC 320 INPUT PLUG.

SWA-0504W	40W	5	5.0	±0.2	5.30	2.50	I
SWA-0506W	60W	5	7.5	±0.2	5.35	3.75	I
SWA-0604W	40W	6	4.2	±0.2	6.25	2.10	I
SWA-0606W	60W	6	6.3	±0.2	6.30	3.15	I
SWA-0904W	40W	9	3.0	±0.2	9.20	1.50	I
SWA-0906W	60W	9	4.5	±0.2	9.25	2.25	I
SWA-1204W	40W	12	3.0	±0.2	12.20	1.50	I
SWA-1206W	60W	12	4.5	±0.2	12.25	2.25	I
SWA-1504W	40W	15	2.5	±0.2	15.20	1.25	I
SWA-1506W	60W	15	4.0	±0.2	15.25	2.00	I
SWA-1704W	40W	17.5	2.3	±0.2	17.65	1.15	I
SWA-1706W	60W	17.5	3.5	±0.2	17.70	1.75	I

15 WATT VDE WALL MODELS: 198-264VAC, 47-63HZ. FOR EUROPEAN WALL PLUG

SWA-0601AE	15W	6	2.0	±0.2	6.60	1.00	I
SWA-0901AE	15W	9	1.5	±0.2	9.55	0.75	I
SWA-1201AE	15W	12	1.3	±0.2	12.50	0.65	I
SWA-1501AE	15W	15	1.0	±0.2	15.50	0.50	I

Note 1: Line Regulation in VDC, over rated VAC input.



O.D = 5.50mm
I.D. = 2.10mm
L = 9.5mm
Tip = (-)

FIG. 4 OUTPUT CONNECTOR Plug I

MECHANICAL DIMENSION TABLE

CASE SIZE	LENGTH (L) mm (inch)	WIDTH(W) mm (inch)	HEIGHT (H) mm (inch)	WEIGHT gm (oz)	FIG. No.
15W	94 (3.70)	67 (2.64)	41 (1.61)	283 (10)	1
15E (VDE)	102 (4.02)	70 (2.76)	50 (1.97)	340 (12)	2
20W	107 (4.21)	71 (2.80)	44 (1.73)	368 (13)	1
30W	120 (4.72)	76 (2.99)	46 (1.81)	425 (15)	1
40W	160 (6.30)	80 (3.15)	65 (2.56)	680 (24)	3
60W	200 (7.87)	100 (3.94)	66 (2.60)	851 (30)	3

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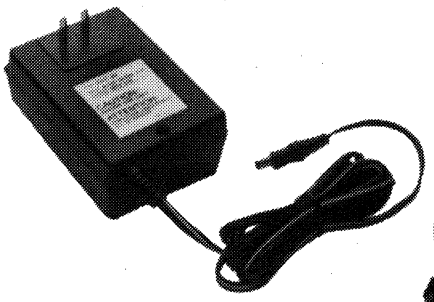

FIG. 1 UL/CSA

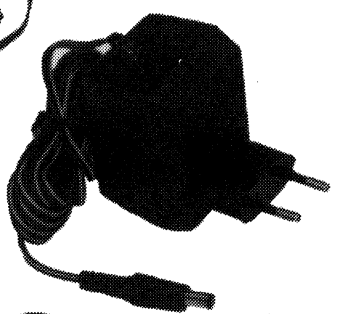

FIG. 3 VDE

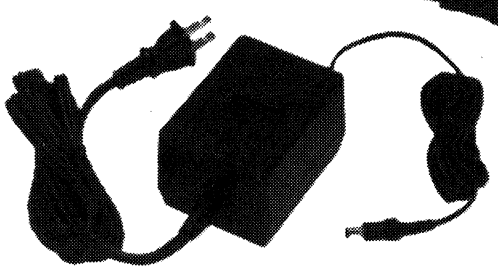

FIG. 2 PLUG TO PLUG
UL/CSA /VDE

Note: VDE models have European input plug

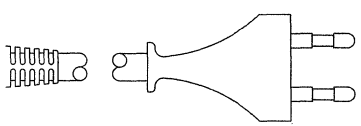

FIG. 2A VDE INPUT PLUG

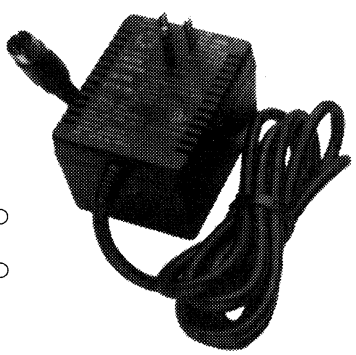

FIG. 4 UL/CSA

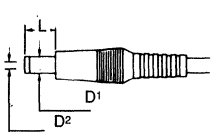

FIG. 5 FEMALE

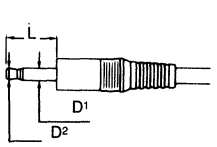

FIG. 6 MALE

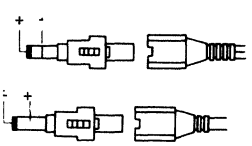

FIG. 7 "U" PLUG

FEATURES

- VDE Licensed.
  Input: 230VAC±10%, 50Hz.
- EMI: Meets VDE 0871, Class B.
- Short Circuit Protection.
- Thermal Protection.
- 100% Testing.
- Temp Range: 0 to +40°C.
- Case Temp Rise: 35°C.
- Oper Humidity: 10-90% RH.
- Mat'l: Black ABS resin/UL 94-V0.
- No Audible Noise.

REGULATED MODELS

- Load Reg: Spec'd for ±20% chg from 80% FL.
- Line Reg: At FL, 10% line chg.
- Ripple: 10mVrms typ.

See Opposite Page for Dimensions

DC OUTPUT UNREGULATED-WITH VDE

VDE MODEL NO.	RATED OUTPUT VOLTS DC	RATED OUTPUT ma DC	RATED VDC 100% FL 198VAC	RATED VDC 100%FL 242VAC	RATED VDC 10%FL 242VAC	PLUG TYPE
818F4225	6.0	400	5.40	7.20	8.70	I
525F4421	6.0	1200	5.20	7.20	9.50	I
818F4120	9.0	500	7.90	10.60	13.90	I
818F4124	12.0	500	10.40	14.00	19.10	O
525F4425	12.0	1000	10.20	13.50	18.10	I

Note 1: Typical output voltage for % load (FL) and line (VAC) indicated.
Note 2: For mechanical dimensions see table on next page.

DC OUTPUT REGULATED-WITH VDE

VDE MODEL NO.	RATED OUTPUT VOLTS DC	RATED OUTPUT ma DC	RATED VDC LINE VDC	RATED VDC LOAD VDC	PLUG TYPE
818FR4104	6.0	400	±0.10	±0.15	I
818FR4107	9.0	300	±0.10	±0.15	I
818FR4109	12.0	250	±0.10	±0.15	I

Note: For mechanical dimensions see table on next page.

OUTPUT PLUG DIMENSIONS

PLUG TYPE	D1 (mm)	D2 (mm)	L (mm)	GENDER	TIP (+/-)	FIG. No.
I	5.5	2.10	9.5	FEMALE	-	5
F	5.0	2.50	11.5	FEMALE	-	5
L	5.5	2.10	16.0	FEMALE	+	5
O	5.5	2.55	12.40	FEMALE	-	5
S	5 pin DIN connector				N/A	
U	Universal/Reversible Connector				REV	7
Y	3.5	3.00	14.0	MALE	+	6

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DC OUTPUT UNREGULATED-WITH UL & CSA

UL/CSA MODEL NO.	RATED OUTPUT VOLTS DC	RATED OUTPUT ma DC	RATED VDC 100% FL 108VAC	RATED VDC 100%FL 132VAC	RATED VDC 70%FL 132VAC	UL[2]	CSA[3]	PLUG[4]
318A2212	3.0	500	2.60	3.70	5.40	UL*	L	I
212A2220	4.5	150	3.80	5.20	7.35	UL*C	L	Y
216A4222	4.5	350	3.50	5.20	8.70	UL*C	C	F
416A2219	4.5	600	4.10	5.60	7.40	UL*C	L	I
310A2223	6.0	200	5.00	6.90	10.40	UL*	L	I
318A2226	6.0	300	4.35	6.30	8.60	UL*	L	I
318A4227	6.0	400	5.10	7.10	9.60	UL*	L	I
416A2226	6.0	600	5.10	7.00	10.20	UL*C	L	I
820A4660	6.0	1200	5.10	7.00	9.40	UL	C	I
825A2617	6.0	2000	5.10	6.80	9.70	ULC	C	I
521A4316	7.0	1200	6.50	8.60	10.40	UL	C	I
310A2223	7.0	100	6.50	8.50	11.00	UL*	L	I
318A2138	7.0	300	5.80	7.90	12.00	UL*	L	I
420A2128	7.0	500	6.60	8.80	12.30	UL*	L	I
318A4248	8.5	100	7.50	9.70	11.10	UL*	L	I
310A2223	9.0	50	7.50	9.50	11.20	UL*	L	I
212A2136	9.0	100	7.40	10.60	16.20	UL*C	L	I
318A2138	9.0	150	7.90	10.20	12.40	UL*	L	I
420A2128	9.0	300	7.70	10.00	12.60	UL*	L	I
416A4136	9.0	500	7.90	10.60	14.40	UL*	L	I
820A4465	9.0	900	7.80	10.10	13.40	UL	C	I
521A4312	9.0	1200	7.10	10.00	12.40	UL	L	I
825A4620G	9.0	1200	7.80	10.40	13.70	ULC	L	I
420A4246	10.0	500	8.80	11.70	14.40	UL*	L	I
318A2045	12.0	150	10.50	13.80	17.80	UL*	L	I
318A4146	12.0	200	10.30	13.50	17.60	UL*C	L	L
416A2141	12.0	300	10.30	13.60	19.10	UL*C	L	F
420A4141	12.0	500	10.20	13.60	17.40	UL*	L	I
820A4470	12.0	700	10.40	13.70	17.50	UL	C	I
825A4425G	12.0	900	10.40	13.80	17.00	UL*C	L	I
521A4317	12.0	1000	10.20	13.80	17.10	UL	L	I
630A4304	12.0	1700	10.15	14.20	17.40	UL	L	I
630A4402	13.5	1500	11.70	15.80	18.50	UL	L	I
318A2045	13.8	70	11.10	15.60	18.10	UL*	L	I
420A2249	14.0	350	12.10	15.80	12.20	UL*	L	I
820A4276G	14.0	700	12.20	16.10	21.60	ULC	L	I
416A2081	15.0	90	11.70	15.90	17.80	UL*C	L	I
825A4429	15.0	800	13.00	17.35	21.40	UL*C	L	I
630A4703	15.2	1500	12.50	18.00	22.00	UL	L	I
820A4279G	16.0	400	13.90	18.10	21.70	ULC	L	I
420A4151	17.5	310	14.50	20.15	24.05	UL*C	L	I
416A2045	18.0	100	16.10	20.30	24.10	UL*C	C	I
820A4080G	18.0	500	15.30	21.00	24.90	ULC	L	I
420A4143	20.0	280	17.30	22.40	27.30	UL*	L	I
630A4201	23.0	1100	20.00	26.40	30.40	UL	L	I
318A4049	24.0	50	21.40	27.10	30.30	UL*	L	I
811A4214	3-9[5]	300	4.60	6.25	8.10	UL*C	L	U

SINGLE & TRIPLE OUTPUT DC REGULATED-WITH UL & CSA

UL/CSA MODEL NO.	RATED OUTPUT VOLTS DC	RATED OUTPUT ma DC	REGULATION LINE VDC	REGULATION LOAD VDC	UL[2]	CSA[3]	PLUG[4]
420AR4301	3.0	400	±0.10	+0.18	UL*	L	I
420AR4203	5.0	350	±0.15	+0.15	UL*	C	I
816AR4201	5.0	600	±0.10	+0.15	UL	C	I
420AR4207	6.0	400	±0.10	+0.15	UL*C	C	I
816AR4103	9.0	400	±0.10	+0.15	UL*	L	I
420AR4106	12.0	200	±0.18	+0.20	UL*	C	I
816AR4104	12.0	300	±0.10	+0.15	UL	C	I
825AR2401G	5.0 +12.0 -12.0	800 100 100	±0.10 ±0.10 ±0.10	+0.20 +0.15 +0.15	UL	L	S

FEATURES

- Input 120VAC±10%, 60Hz.
- EMI: Meets FCC Part 15 Class B.
- Short Circuit Protection.
- Thermal Protection Built-in.
- Transformer: 3 Flange Bobbin.
- 100% Testing.
- US 3- Blade Ground Plug Avail.
- Temp Range: 0 to +40°C.
- Case Temp Rise: ≤35°C.
- Oper Humidity: 10-90% RH.
- Mat'l: ABS resin/UL 94-V0.
- Color: Black.
- No Audible Noise.

REGULATED MODELS

- Load Reg: Spec'd for ±20% chg from 80% FL.
- Line Reg: At FL, 10% line chg.
- Ripple: 10mVrms typ.

See Opposite Page for Figures

MECHANICAL DIMENSION TABLE

SERIES PREFIX	LENGTH(L) mm(inch)	WIDTH(W) mm (inch)	HEIGHT(H) mm(inch)	WEIGHT gm(oz.)	FIG. No.
212A	53 (2.09)	36 (1.42)	35 (1.38)	120 (4.23)	1
216A	53 (2.09)	36 (1.42)	38 (1.50)	140 (4.94)	1
310A	60 (2.36)	45 (1.77)	35 (1.38)	150 (5.29)	1
310F	58 (2.28)	45 (1.77)	39 (1.54)	190 (6.70)	3
318A	60 (2.36)	45 (1.77)	42 (1.65)	190 (6.70)	1
416A	61 (2.40)	55 (2.17)	41 (1.59)	230 (8.11)	1
420A	61 (2.40)	55 (2.17)	41 (1.59)	270 (9.52)	1
420AR	61 (2.40)	55 (2.17)	41 (1.59)	270 (9.52)	1
521A	85 (3.35)	63 (2.48)	52 (2.05)	520 (18.34)	2
525F	100 (3.94)	68 (2.68)	62 (2.44)	610 (21.52)	2A
630A	114 (4.49)	75 (2.96)	61 (2.40)	1134 (40.00)	2
811A	84 (3.31)	56 (2.20)	35 (1.38)	260 (9.17)	1
816A,AR	81 (3.19)	59 (2.32)	52 (2.03)	297 (10.48)	1
818F,FR	75 (2.95)	55 (2.17)	50 (1.97)	370 (13.05)	3
820A	82 (3.23)	60 (2.36)	50 (1.97)	420 (14.81)	1
820A-G	82 (3.23)	60 (2.36)	55 (2.17)	420 (14.81)	1
825A	82 (3.23)	60 (2.36)	50 (1.97)	490 (17.28)	1
825A-G	82 (3.23)	60 (2.36)	55 (2.17)	490 (17.28)	1
825AR-G	86 (3.39)	69 (2.90)	57 (2.24)	630 (22.22)	4

Note 1: Typical output voltage for % load (FL) and line (VAC) indicated.
Note 2: UL: UL1310 LISTED
UL*: UL1310 LISTING WITH UL1411
C: UL Approved for battery charger ckts (contact battery mfgr for recommended volt.)
Note 3: Complies (C) with or is listed (L) to CSA C22.2, No. 223.66
Note 4: See output plug table on previous page for dimensions, gender and polarity.
Note 5: Five switched output voltages of 3.0, 6.0, 7.5 & 9.0VDC with universal, polarity reversing, output plugs. Ratings are for 6.0VDC setting.

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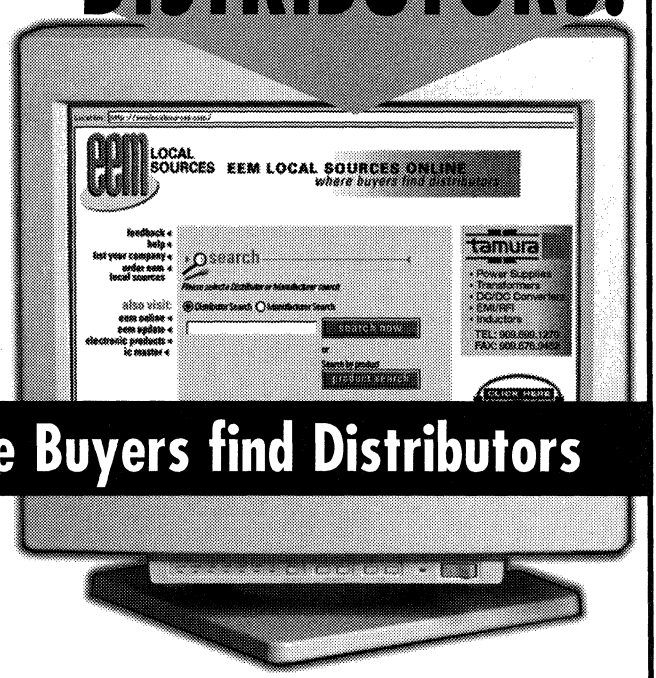

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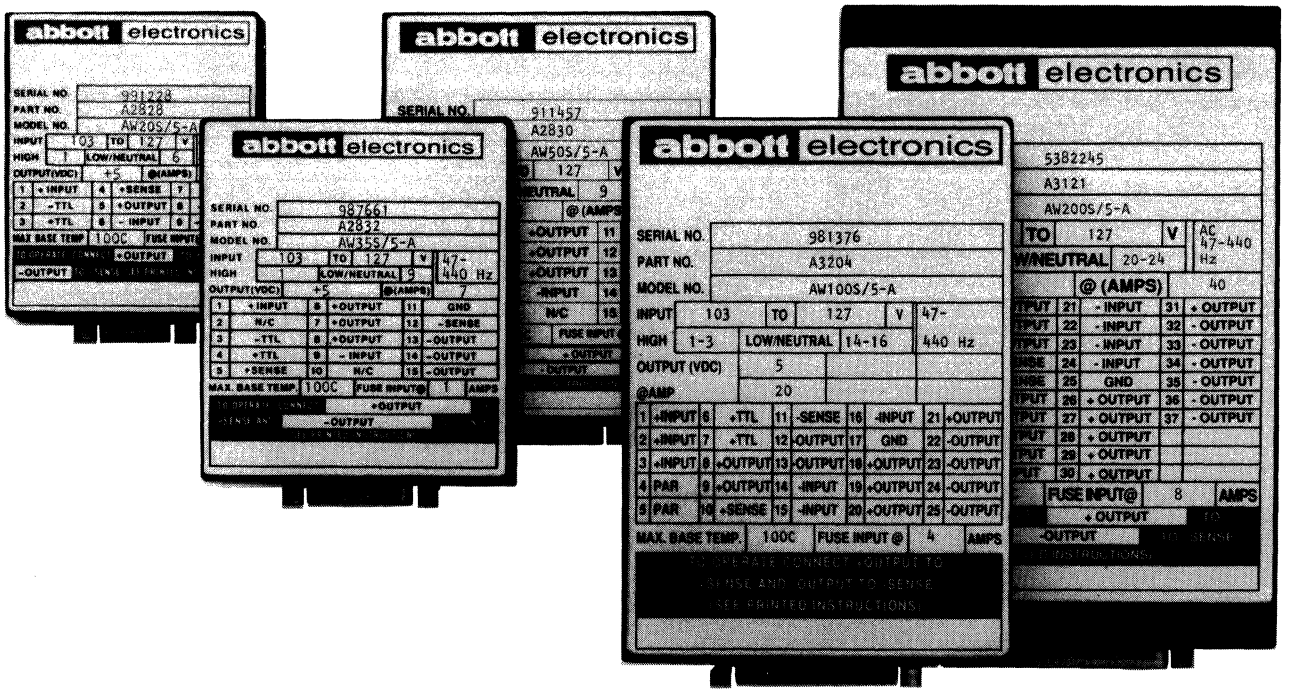

SPECIFICATIONS

Input:
103 to127 V rms; 47-440 Hz
Single Phase and 90 to 160 V dc.

Efficiency:
65% minimum. Typically 70-80% (nominal input, full load, room ambient).

Line Regulation:
0.1% or 10 mV, whichever is greater, for each output with input change from low line to high line at constant load.

Load Regulation:
10 mV or 0.1%, whichever is greater. (Each output from no load to full load at constant line).

Pard (Noise and Ripple):
25 mV rms, 100 mV P-P for 5 V output, 50 mV rms, 200 mV P-P for other voltages; measured at 25 MHz bandwidth over temperature range.

Isolation Voltage:
700 Vdc, input to output;
500 Vdc, input to case;
200 Vdc, output to case.

Insulation Resistance:
50 megohms between input and output, input and case, output and case, when measured at 50 Vdc.

Temperature Range:
Operating: -55°C to +100°C maximum, at center of the baseplate. Storage: -55°C to +125°C, ambient.

Temperature Coefficient:
0.01%/°C maximum over entire temperature range.

Input Transient Protection:
Unit will provide normal regulated output and withstand 180 V ac for 0.1 second, in accordance with MIL-STD-704A (under AC input operating mode).

Load Transient Recovery:
Output voltage returns to regulation limits within 0.5 milliseconds after 50% change in load current.

Load Transient Overshoot:
0.5 V maximum from nominal voltage set point.

Short Circuit Protection:
Each output is independently protected against a short circuit of any duration and automatically restores to normal when overload is removed.

Remote Sensing:
Compensates up to 0.5 volt drop in output leads.

Remote Inhibit:
Provides for remote turn on/off with TTL logic signal. Application of TTL Signal (logic 1) will inhibit the output.

Parallelability:
The 100 watt and 200 watt units allow for multiple unit current sharing without the need for external components, via a single pin connection on each unit.

Electromagnetic Interference:
Units, when tested in accordance with MIL-STD-462, meet the majority of the requirements of MIL-STD-461C for conducted and radiated, emission and susceptibility, for Class A1, A2 and A3 equipment for input power leads. For further details regarding levels and extent of compliance in each class or requirement, consult your nearest sales office.

Reliability:
The Mean Time Between Failure (MTBF) is calculated per MIL-HDBK-217E at 50°C baseplate temperature with maximum operating input voltage and maximum rated output power.

The MTBF for AW20S at ground benign environment is 199,209 hours. With the MIL-STD-2000 option, MTBF was calculated to be 288,278 hours of ground benign. The standard AW200S at ground benign and naval sheltered is 100,000 and 15,000 hours, respectively. Please consult the local sales office for additional environments and models.

Environment:
Units meet MIL-STD-810C, altitude, shock, acceleration, vibration and MIL-S-901C high-impact shock requirements. For information, please consult factory.

Hook Up:
Via D-Subminiature Connectors.

Options

The following standard options are available on the AW Series power supplies.

Enhanced Reliability:
-ER Option provides increased reliability by using higher levels of military grade components. (To order, add "-ER" after model number, i.e., AW200S/15-A-ER).

MIL-STD-2000:
Workmanship standard, MIL-STD-2000 version of each unit is available. This option includes "-ER" option as a standard feature. Case size will increase, consult sales office for dimensions and availability.

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MARTEK POWER ABBOTT

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High Density AC / DC Power Supplies

AW

SINGLE OUTPUT*

Nominal Output Voltage	Output Current (Amps)	Weight[1] (Oz.)	Weight[1] (Grams)	Model Number
5	4.00	7	198	AW20S/5-A
	7.00	9	255	AW35S/5-A
	10.00	12	326	AW50S/5-A
	20.00	21	600	AW100S/5-A
	40.00	32	900	AW200S/5-A
5.2	3.85	7	198	AW20S/5.2-A
	6.73	9	255	AW35S/5.2-A
	9.62	12	326	AW50S/5.2-A
	19.23	21	600	AW100S/5.2-A
	38.46	32	900	AW200S/5.2-A
12	1.66	7	198	AW20S/12-A
	2.91	9	255	AW35S/12-A
	4.16	12	326	AW50S/12-A
	8.33	21	600	AW100S/12-A
	16.67	32	900	AW200S/12-A

Nominal Output Voltage	Output Current (Amps)	Weight[1] (Oz.)	Weight[1] (Grams)	Model Number
15	1.33	7	198	AW20S/15-A
	2.33	9	255	AW35S/15-A
	3.33	12	326	AW50S/15-A
	6.66	21	600	AW100S/15-A
	13.33	32	900	AW200S/15-A
24	.83	7	198	AW20S/24-A
	1.45	9	255	AW35S/24-A
	2.08	12	326	AW50S/24-A
	4.16	21	600	AW100S/24-A
	8.33	32	900	AW200S/24-A
28	.71	7	198	AW20S/28-A
	1.25	9	255	AW35S/28-A
	1.78	12	326	AW50S/28-A
	3.57	21	600	AW100S/28-A
	7.14	32	900	AW200S/28-A

* 2 and 3.3 VDC now available, consult factory.

DUAL OUTPUT*

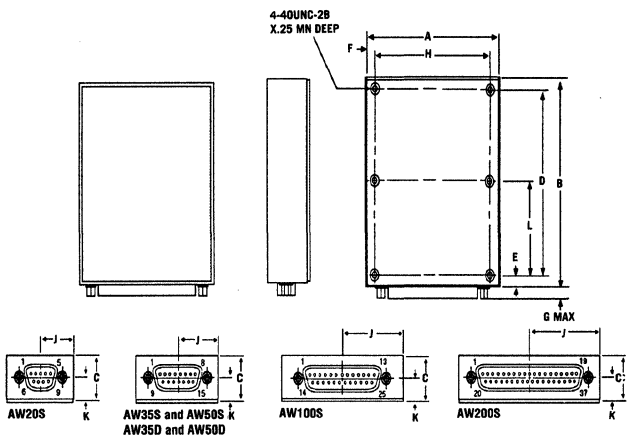
Nominal Output Voltage	Output Current (Amps)	Weight[1] (Oz.)	Weight[1] (Grams)	Model Number
±5	1.50	9.25	259	AW35D/5-A
	2.10	11.75	329	AW50D/5-A
±12	1.46	9.25	259	AW35D/12-A
	2.08	11.75	329	AW50D/12-A
±15	1.17	9.25	259	AW35D/15-A
	1.67	11.75	329	AW50D/15-A

* Each output is independent and isolated, which may be connected in a ±configuration.
[1] Maximum estimated weight, not including options.
* Maximum output power for dual ±5 is 21 watts, or 10.5 watts per channel.

Dimensions											
Model	A	B	C	D	E	F	G	H	J	K	L
AW20S	Inches 2.50	3.00	.85	2.600	.20	.20	.25	2.100	1.25	.46	N/A
	mm 63.5	76.2	21.6	66.04	5.1	5.1	6.4	53.34	31.8	11.7	
AW35S AW35D	3.00	3.50	.85	3.100	.20	.20	.25	2.600	1.50	.46	N/A
	76.2	88.9	21.6	78.74	5.1	5.1	6.4	66.04	38.1	11.7	
AW50S AW50D	3.25	4.00	.85	3.600	.20	.20	.25	2.850	1.63	.46	N/A
	82.6	101.6	21.6	91.44	5.1	5.1	6.4	72.39	41.4	11.7	
AW100S	3.75	5.25	.85	4.850	.20	.20	.25	3.350	1.87	.46	2.425
	95.3	133.4	21.6	123.19	5.1	5.1	6.4	85.09	47.5	11.7	61.60
AW200S	4.50	6.50	.85	6.100	.20	.20	.25	4.100	2.25	.46	3.050
	114.30	165.10	21.57	154.94	5.1	5.1	6.4	104.14	57.15	11.7	77.47

Tolerances: Inches - .xxx = ±0.015 or .xx = ±0.4 or x = ±0.8.
Material: Base - For AW100 and AW200, 6061-T6. For the others, 5052-H32. Case for all models - Steel.
Finish: black flat lacquer per FED-STD-595, Color 37038.
Mounting: 4-40 THD inserts 1/4" minimum depth are provided in baseplate. Steel 4-40 bolts American Standard, unified national coarse series, slotted studs are supplied with each unit. Metric hardware and inserts available as a special order.
Metric: M3 inserts and hardware.

MECHANICAL DRAWINGS



* Number of mounting holes: 4 places for all other models.

PIN DESIGNATIONS

Model: AW20S AW20S-M
Connector: DEMME9PF M24308/24 Type
Mate: DEMM9S M24308/1-1 Type

1. +Input	4. +Sense	7. Ground
2. -TTL	5. +Output	8. -Sense
3. +TTL	6. -Input	9. -Output

Model: AW35S and AW50S AW35S-M and AW50S-M
Connector: DAMME15PF M24308/24 Type
Mate: DAMM15S M24308/1-2 Type

1. +Input	6. +Output	11. Ground
2. N/C	7. +Output	12. -Sense
3. -TTL	8. +Output	13. -Output
4. +TTL	9. -Input	14. -Output
5. +Sense	10. N/C	15. -Output

Model: AW35D and AW50D AW35D-M and AW50D-M
Connector: DAMME15PF M24308/24 Type
Mate: DAMM15S M24308/1-2 Type

1. +Input	6. +Output 1	11. Ground
2. N/C	7. +Sense 2	12. -Sense 1
3. -TTL	8. +Output 2	13. -Output 1
4. +TTL	9. -Input	14. -Sense 2
5. +Sense 1	10. N/C	15. -Output 2

Model: AW100S
Connector: DBMME25PF
Mate: DBMME25S

1. +Input	10. +Sense	18. +Output
2. +Input	11. -Sense	19. +Output
3. +Input	12. -Output	20. +Output
4. Parallel[1]	13. -Output	21. +Output
5. Parallel[1]	14. -Input	22. -Output
6. +TTL	15. -Input	23. -Output
7. -TTL	16. -Input	24. -Output
8. +Output	17. Ground	25. -Output
9 +Output		

Model: AW200S
Connector: DCMME37PF
Mate: DCMM37S

1. +Input	8. +TTL	14. +Sense	20. -Input	26. +Output	32. -Output
2. +Input	9. -TTL	15. -Sense	21. -Input	27. +Output	33. -Output
3. +Input	10. +Output	16. -Output	22. -Input	28. +Output	34. -Output
4. +Input	11. +Output	17. -Output	23. -Input	29. +Output	35. -Output
5. +Input	12. +Output	18. -Output	24. -Input	30. +Output	36. -Output
6. Parallel[1]	13. +Output	19. -Output	25. Ground	31. +Output	37. -Output
7. Parallel[1]					

[1]Parallel pins are internally connected and redundant. Either pin can be used for single pin parallelability or either pin can be left open and unused.

MODEL NUMBERING SYSTEM

Model Series	Total Output Power	Number of Outputs	Slash	Output Voltage	Dash	Header Type	Dash	Options
AW	35	D	/	12	–	A	–	M
AW	100	S	/	12	–	A	–	ER

INPUT CURRENT (Typical Amps)

Model	Output Load	Low Line	High Line
AW20S	50%	0.21	0.17
	100%	0.39	0.32
AW35S	50%	0.34	0.28
	100%	0.69	0.56
AW35D	50%	0.4	0.32
	100%	0.74	0.60
AW50S	50%	0.65	0.5
	100%	1.1	0.88
AW50D	50%	0.69	0.54
	100%	1.20	.95
AW100S	50%	1	0.8
	100%	2.1	1.7
AW200S	50%	2.0	1.6
	100%	4.2	3.4

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MARTEK POWER ABBOTT

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High Density AC / DC Power Supplies

AM

SPECIFICATIONS

Input:
Inputs for 50 watt model:
"U" input ranges:
90-130 Vac; 47-440 Hz, Single Phase or Three Phase (Delta, WYE).
180-260 Vac. 47-440 Hz, Single Phase or Three Phase (Delta). 200-300 Vdc. For these input ranges, add (U) to model number AM50S/5-A(U).
"S" input ranges:
100-200 Vdc. For this input range, add (S) to model number AM50S/5-A(S).

Inputs for 100 watt model:
103-127 Vac; 47-440 Hz, Single Phase.
206-254 Vac, 47-440 Hz, Single Phase.
200 to 300 Vdc.

Efficiency:
65% min. Typically 75%. (Full load room ambient).

Line Regulation:
Single or main: 0.1% or 10mV, whichever is greater. Auxiliaries: ±15V: 100 mV maximum; ±12V: 60 mV maximum.

Load Regulation:
Single or Main: 10 mV or 0.1%, whichever is greater. Auxiliary outputs: 150 mV maximum.

Pard (Noise and Ripple):
25 mV rms, 100 mV P-P for 5 V dc output and 50 mV rms, 200 mV P-P for other voltages; measured at 25 MHz bandwidth over temperature range.

Isolation Voltage:
1,000 V dc, input to output;
1,000 V dc, input to case;
200 V dc, output to case for 50 watt unit and 500 V dc, output to case for 100 watt unit.

Parallelability:
The 100 watt unit allows for multiple unit current sharing without the need for external component, via a single pin connection on each unit.

Insulation Resistance:
50 megohms minimum between input and outputs, input and case, outputs and case, when measured at 50 V dc.

Temperature Range:
Operating: -55°C to +100°C maximum, at center of the baseplate.
Storage: -55°C to +125°C ambient.

Temperature Coefficient:
0.01%/°C maximum over entire temperature range.

Input Transient Protection:
Unit will not be damaged or exhibit degradation of performance when subjected to input transients in accordance with MIL-STD-704A, MIL-STD-704D and MIL-STD-1399, as applicable to corresponding input configurations. Consult your nearest sales offfice if further details are needed.

Remote Sensing:
Compensates for up to 0.5 volt drop in output leads. (Single and main output only).

Preload Requirements:
For triple output only. A one amp minimum load is required on the main for full load capabilities on the auxiliaries.

Load Transient Recovery:
Main output voltage returns to regulation limits within 0.5 milliseconds after 50% change in load current.

Load Transient Overshoot:
0.5 V from nominal voltage set point, single and triple outputs.

Short Circuit Protection:
All outputs are completely protected against a short circuit of any duration. Outputs automatically restore to normal when overload is removed.

Electromagnetic Interference:
Units, when tested in accordance with MIL-STD-462, meets or minimizes the majority of the requirements of MIL-STD-461C for conducted and radiated, emission and susceptibility, for Part 2.

Class A1b equipment for input power leads; with different levels of compliance under each input configuration. For further details regarding levels and extent of compliance in each class, input configuration, or requirement, consult your nearest sales office.

Remote Inhibit:
Provides for remote turn on/off with TTL logic signal. Application of TTL Signal (logic 1) will inhibit the outputs.

Reliability:
The Mean Time Between Failure (MTBF) is calculated per MIL-HDBK-217E at 50°C baseplate temperature with maximum operating input voltage and maximum rated output power.

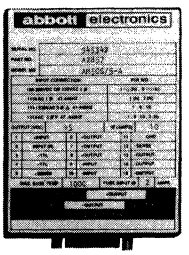
The MTBF for AM50S at ground benign environment is 160,300 hours and 20,200 for naval sheltered environment. With the -ER option, MTBF was calculated to be 240,000 hours at gound benign and 25,000 for naval sheltered. Please consult the local sales office for additional environments and models.

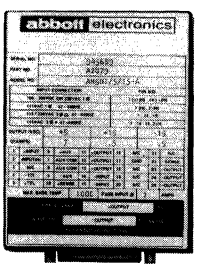
Environment:
Units meet MIL-STD-810D, altitude, shock, acceleration, vibration and MIL-S-901C high-impact shock requirements. For information, please consult factory.

Hook Up:
Via D-Subminiature Connectors.

Options

Enhanced Reliability:
-ER Option provides increased reliability by using higher levels of military grade components. (To order add "-ER" after model number, i.e., AM50S/5-A-ER).





- **Customer Selectable, Multi-Inputs**
- **NAVMAT Guidelines**
- **Wireless Submodular Construction for High Reliability**
- **Current Mode Control**

PRODUCT SELECTION GUIDE

Single Output

Nominal Output Voltage	Output Current (Amps)	Weight[1] (Oz.)	Weight[1] (Grams)	Model Number
5	10.00	12	340	AM50S/5-A
	20.00	28	775	AM100S/5-A
5.2	9.62	12	340	AM50S/5.2-A
	19.23	28	775	AM100S/5.2-A
12	4.17	12	340	AM50S/12-A
	8.33	28	775	AM100S/12-A
15	3.33	12	340	AM50S/15-A
	6.67	28	775	AM100S/15-A
24	2.08	12	340	AM50S/24-A
	4.17	28	775	AM100S/24-A
28	1.79	12	340	AM50S/28-A
	3.57	28	775	AM100S/28-A

Triple Output

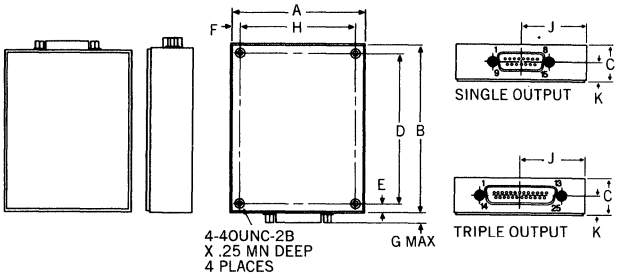
Nominal Output (Main)	Output Current (Main)	Output Voltage (Aux)	Output Current (Aux)	Weight[1] (Oz.)	Weight[1] (Gram)	Model Number
5	7.0	±12	0.63	15	410	AM50T/5/12-A
	7.0	±15	0.5	15	410	AM50T/5/15-A

[1]Maximum weight, not including -ER options

MODEL NUMBERING SYSTEM

Model Series	Total Output Power	No. of Outputs	Slash	Main Output Voltage	Slash	Aux. Output Voltage	Dash	Header Type	Input Variation	Dash	Options
AM	50	T	/	5	/	12	–	A	(U)	–	ER

CASE DRAWINGS



Dimensions

Model		A	B	C	D	E	F	G	H	J	K	L
AM50S	IN.	3.25	4.25	.85	3.850	.20	.20	.25	2.850	1.63	.46	N/A
	MM	82.6	108.0	21.6	97.79	5.1	5.1	6.4	72.39	41.4	11.7	
AM50T	IN.	3.50	4.50	.85	4.100	.20	.20	.25	3.100	1.75	.46	N/A
	MM	88.9	114.3	21.6	104.14	5.1	5.1	6.4	78.74	44.5	11.7	
AM100S	IN.	4.25	6.00	.85	5.600	.20	.20	.25	3.850	2.13	.46	2.800
	MM	108.0	152.4	21.6	142.24	5.1	5.1	6.4	97.79	54.0	11.7	71.12

Tolerances: Inches - .xxx = ±0.010 or .xx = ±0.020; MM - .xx = ±0.4 or .x = ±0.8. Angles ±30°
Material: Base - Aluminum 5052-H32, Case - Steel.
Finish: black flat lacquer per FED-STD-595, Color 37038.
Mounting: 4-40 THD inserts 1/4" minimum depth are provided in baseplate. Steel 4-40 bolts American Standard, unified national coarse series, slotted studs are supplied with each unit. Metric hardware and inserts available as a special order.
Metric: M3 inserts and hardware.

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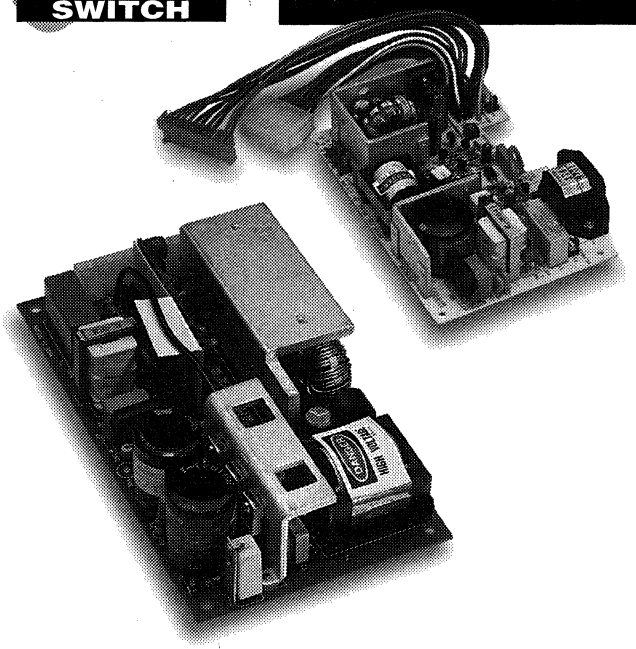
MARTEK POWER SWITCH

PVI Universal Automatic AC Input Series:
Single and Multiple Outputs

ISO 9002



Features:

- Universal AC input 90-264 VAC
- Over 100 standard models
- 10 watts through 400 watts
- Single, dual, and multiple outputs
- Low profile models
- Disk and tape drive models including new 10,033 RPM drives
- AC/DC input models w/battery backup
- EMI tested to FCC and EN55022 level "B"
- UL recognized, CSA certified, TUV licensed, CE approvals
- Modified and custom designs available

CE COMPLIANT

Parameter	Conditions	Limits
Output Power	Refer to wattage and rating tables	
Input Voltage	Wide range and universal input	90-264 VAC
Input Frequency		47-63 Hz*
Input Surge Current	Peak (cold start)	20A (115 VAC), 40A (230 VAC) typical
Efficiency	Nominal AC input, full rated load	75% typical
Hold-up Time	Nominal AC input, full rated load	20 msec., typical
Line Regulation	Over input range, V1 thru V4	±0.5%, typical
Load Regulation	V1: 20%-100% max. rated load V2 thru V4: 20%-100% max. rated load For auxiliary with post regulator	±1% max.* ±3.5% max. ±1% max.
Cross Regulation	V1: Change V2 - V4 load 50%-100% V2 thru V4: change V1 load 50%-100% For auxiliary with post regulator	±1% max. ±3% max. ±1% max.
Ripple and Noise	Full load: 5 volt output V2-V4	50 mV Pk-Pk 1% max.
Transient Response	50% load change	2% max. deviation returns to initial condition in 1 msec max.
Temperature Coefficient	V1 - V4	0.02% typical
Long Term Stability	For 8 hours, following 20 min. warm-up	0.1%
Overshoot	At turn-on, turn-off, power failure	None
Temperature Range	Operating (derate linearly to 50% at 71°C)	0°C to 50°C
Storage (nonoperating)	-20°C to +85°C	
Cooling	Convection and fan cooled, see tables	
Overvoltage Protection	5 volt output only	6.2 V ±0.4 V*
Overcurrent Protection	Power limiting, auto recovery	125% rated load
Short Circuit Protection	Will withstand continuous short without damage	Auto recovery
No Load Operation	No damage to supply when operated to no load	

***Options available. Contact factory.**

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E-mail: pwrswitch@aol.com • Web Site: www.powerswitch.com

MARTEK POWER SWITCH

PVI Series: Single and Multiple Outputs

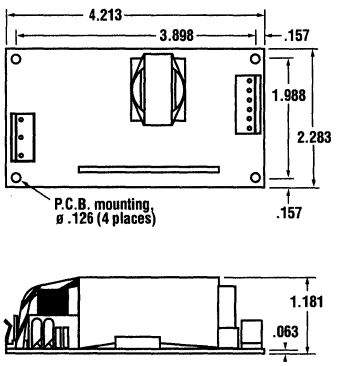
Voltage/Current Rating Charts

ISO 9002

PVI-10 Series

10 watts maximum output power convection cooled.

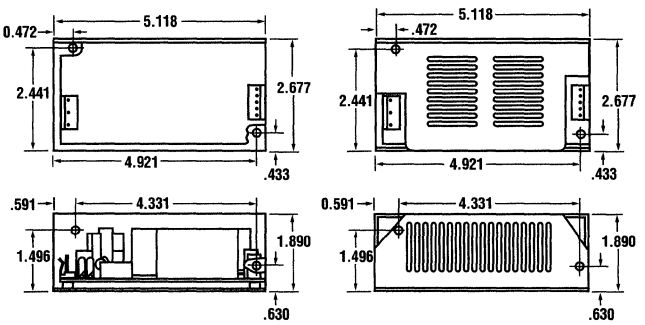
Model Number	Main Output	Auxiliary 1 Avg.	Peak	Aux 2	Aux 3
PVI-10-10	+5 @ 2.0	–	–	–	
PVI-10-11	+12 @ 1.0	–	–	–	
PVI-10-12	+15 @ 0.7	–	–	–	
PVI-10-13	+24 @ 0.5	–	–	–	
PVI-10-20	+5 @ 1.7	-5 @ 0.3	1.0	–	–
PVI-10-21	+5 @ 1.0	+12 @ 0.5	1.0	–	–
PVI-10-22	+5 @ 1.0	+15 @0.4	1.0	–	–
PVI-10-23	+5 @ 1.0	+24 @ 0.2	1.0	–	–



PVI-21 Series

20 watts maximum output power convection cooled.

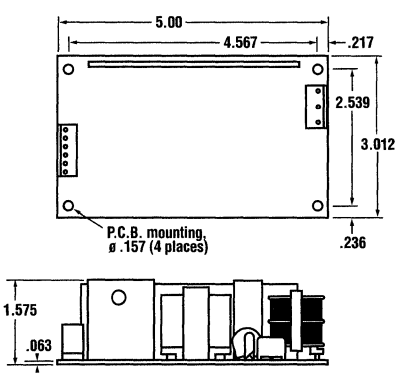
Model Number	Main Output	Auxiliary 1 Avg.	Peak	Aux 2	Aux 3
PVI-21-20	+5 @ 3.0	-5 @ 1.0	1.0	–	–
PVI-21-21	+5 @ 3.0	+12 @ 0.5	1.0	–	–
PVI-21-22	+5 @ 3.0	+15 @ 0.5	1.0	–	–
PVI-21-23	+5 @ 2.0	+24 @ 0.5	1.0	–	–
PVI-21-30	+5 @ 2.0	+12 @ 0.5	1.0	12 @ 0.5	–
PVI-21-31	+5 @ 2.0	+12 @ 0.5	1.0	5 @ 1.0	–
PVI-21-32	+5 @ 2.0	+24 @ 0.2	1.0	12 @ 0.5	–
PVI-21-33	+5 @ 2.0	+15 @ 0.5	1.0	15 @ 0.5	–
PVI-21-34	+5 @ 2.0	+24 @ 0.2	1.0	5 @ 1.0	–



PVI-30 Series

40 watts maximum output power convection cooled.

Model Number	Main Output	Auxiliary 1 Avg.	Peak	Aux 2	Aux 3
PVI-30-10	+5 @ 8.0	–		–	–
PVI-30-11	+12 @ 3.3	–	–	–	
PVI-30-12	+15 @ 2.6	–	–	–	
PVI-30-13	+24 @ 1.6	–	–	–	
PVI-30-20	+5 @ 3.0	-5 @ 2.5	4.0	–	–
PVI-30-21	+5 @ 3.0	+12 @ 2.5	4.0	–	–
PVI-30-23	+5 @ 3.0	+24 @ 1.5	2.0	–	–
PVI-30-30	+5 @ 3.0	+12 @ 2.5	4.0	12 @ 1.0	–
PVI-30-32	+5 @ 3.0	+24 @ 1.5	2.0	12 @ 1.0	–
PVI-30-34	+5 @ 3.0	+15 @ 2.0	3.0	15 @ 1.0	–
PVI-30-21TA	+5 @ 3.0	+12 @ 3.0	5.5	–	



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MARTEK POWER SWITCH

PVI Series: Single and Multiple Outputs

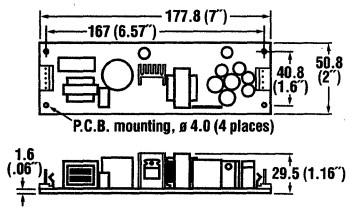
Voltage/Current Rating Charts

ISO 9002

PVI-40 Low Profile Series

40 watts maximum output power with 10 CFM forced air cooling.

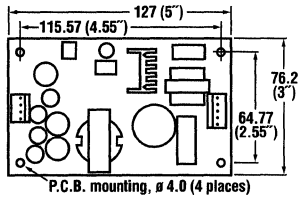
Model Number	Main Output	Auxiliary 1 Avg.	Auxiliary 1 Peak	Aux 2	Aux 3
PVI-40-21TA	+5 @ 3.0	+12 @ 2.0	4.5	–	–
PVI-40-22	+5 @ 3.0	+15 @ 1.6	–	–	–
PVI-40-23	+5 @ 3.0	+24 @ 1.0	–	–	–



PVI-50 Series

50 watts maximum output power with 10 CFM forced air cooling.

Model Number	Main Output	Auxiliary 1 Avg.	Auxiliary 1 Peak	Aux 2	Aux 3
PVI-50-21TA	+5 @ 3.0	+12 @ 3.0	5.5	–	–
PVI-50-23	+5 @ 3.0	+15 @ 2.4	–	–	–
PVI-50-24	+5 @ 3.0	+24 @ 1.5	–	–	–

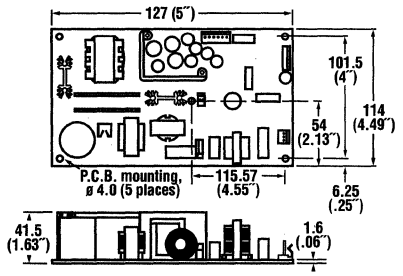


PVI-50 BU Series

Battery backup*; 50 watts maximum output power with 12 CFM forced air cooling.

Model Number	Main Output	Auxiliary 1 Avg.	Auxiliary 1 Peak	Aux 2	Aux 3
PVI-50-30BU	+5 @ 5.5	+12 @ 1.5	–	-12 @ 0.5	–
PVI-50-46BUA	+5 @ 5.5	+3.6 @ 2.5	–	+12 @ 800 mA	-12 @ 500 mA

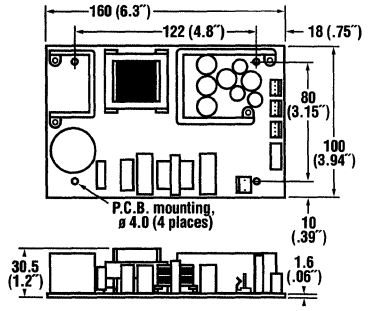
*Designed to operate with/from 10.8-15 VDC input from a 12 VDC battery.



PVI-65 Low Profile Series

65 watts maximum output power with 10 CFM forced air cooling.

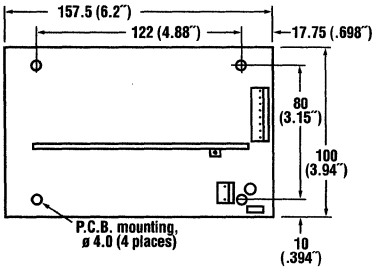
Model Number	Main Output	Auxiliary 1 Avg.	Auxiliary 1 Peak	Aux 2	Aux 3
PVI-65-30X	+5 @ 5.0	+12 @ 2.0	–	-12 @ 1.5	–
PVI-65-31	+5 @ 5.0	+12 @ 2.0	–	-5 @ 1.5	–
PVI-65-32	+5 @ 5.0	+24 @ 1.0	–	-12 @ 1.5	–
PVI-65-33	+5 @ 5.0	+15 @ 1.6	–	-15 @ 1.2	–



PVI-80 Series

80 watts maximum output power with 12 CFM forced air cooling.

Model Number	Main Output	Auxiliary 1 Avg.	Auxiliary 1 Peak	Aux 2
PVI-80-21	+5 @ 6.0	+12 @ 6.0	13.0	
PVI-80-30	+5 @ 8.0	+12 @ 2.0	4.0	-12 @ 2.0
PVI-80-32	+5 @ 8.0	+24 @ 1.5	3.0	-12 @ 1.0
PVI-80-33	+5 @ 8.0	+12 @ 2.0	4.0	+24 @ 1.5
PVI-80-34	+5 @ 8.0	+15 @ 1.5	3.0	-15 @ 1.5



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MARTEK POWER SWITCH

PVI Series: Single and Multiple Outputs

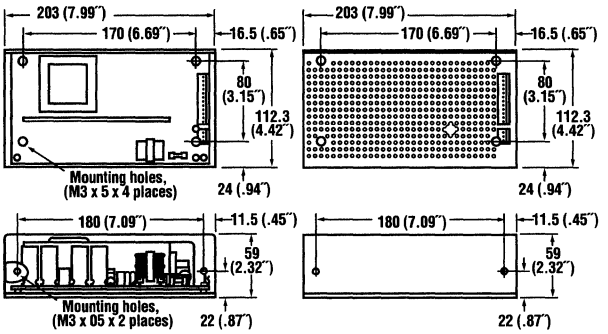
Voltage/Current Rating Charts

ISO 9002

PVI-90 Series

90 watts maximum convection cooled 110 watts with 12 CFM forced air cooling.

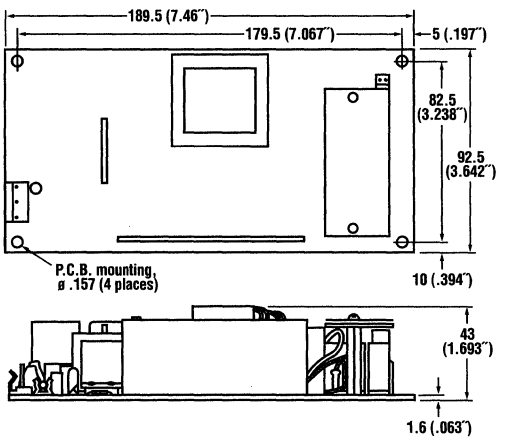
Model Number	Main Output	Auxiliary 1 Avg.	Peak	Aux 2	Aux 3
PVI-90-30	+5 @ 10	+12 @ 3.0	4	-12 @ 1.5	–
PVI-90-32	+5 @ 10	+24 @ 1.5	3	-12 @ 1.5	–
PVI-90-33	+5 @ 10	+24 @ 1.5	3	+12 @ 1.5	–
PVI-90-34	+5 @ 10	+15 @ 2.0	4	-15 @ 1.6	–
PVI-90-40	+5 @ 10	+12 @ 2.0	3	-12 @1.5	-5 @ 1.5
PVI-90-42	+5 @ 10	+24 @ -1.5	3	+12 @ -1.5	-12 @ 1
PVI-90-43	+5 @ 10	+15 @ 2.5	4	-15 @ -1.5	-5 @ 1.5
PVI-90-44	+5 @ 10	+12 @ 3.0	4	+12 @ 1.5	-12 @ 1



PVI-110 Series

110 watts maximum output power with 12 CFM forced air cooling.

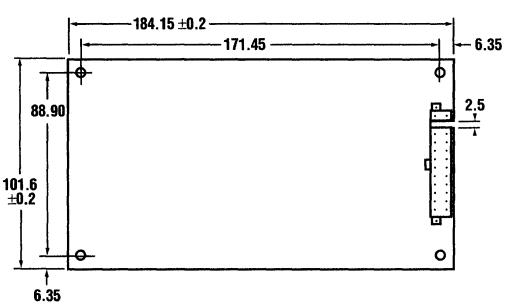
Model Number	Main Output	Auxiliary 1 Avg.	Peak	Auxiliary 2
PVI-110-31T	+5 @ 14.0	+12 @ 3.0	3.0	-12 @ 0.5
PVI-110-30	+5 @ 10.0	+12 @ 3.0	4.0	-12 @ 1.5
PVI-110-32	+5 @ 10.0	+24 @ 1.5	3.0	-12 @ 1.5
PVI-110-33	+5 @ 10.0	+24 @ 1.5	3.0	+12 @ 1.5
PVI-110-34	+15 @ 2.0	+15 @ 2.0	4.0	-15 @ 1.5
PVI-110-29	+24 @ 4 pk 10.0	+5 @ 1.5		–



PVI-150 Series

150 watts maximum output with 20 CFM forced air cooling.

Model Number	Main Output	Secondary Avg.	Peak	Features
PVI-150-13	+24 @ 6.25A	–	–	0
PVI-150-20	+5 @ 15.0	+12 @ 6.25	12.0	0
PVI-150-21	+5 @ 15.0	+12 @ 6.25	12.0	1
PVI-150-21RS	+5 @ 15.0	+12 @ 6.25	12.0	2
PVI-150-21RSE	+5 @ 15.0	+12 @ 6.25	12.0	2
PVI-150-32	+5 @ 15.0	+12 @ 6.25	12.0	2 24V @ 100 mA
PVI-150-39	+5 @ 8.0	+12 @ 8.0	12.0	0 300 VAC @ 600 mA



0 – No Features,
1 – Redundant, active current share, fan outlets, power fail.
2 – Same as 1 plus power factor EN61000.

Modified standard and custom designs available.

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MARTEK POWER SWITCH

PVI Universal Input

ISO 9002

Disk/Tape Drive Models & New Designs

Disk/Tape Drive Models

Model Number	Max. Output (watts)	Main Output	Auxiliary 1 Avg.	Auxiliary 1 Peak	Cooling	Additional Features
PVI-10-21	10	+5 @ 1.0	+12 @ 0.5	1.0	Convection	2x4x1.8 Size
PVI-21-21	20	+5 @ 3.0	+12 @ 0.5	1.0	Convection	PCB or Case/Cover
PVI-18-21	25	+5 @ 2.5	+12 @ 2.0	2.5	Convection	2x5.6x1.10 Size
PVI-33-21	30	+5 @ 4.0	+12 @ 1.0	1.5	Convection	Low Profile
PVI-30-21TA	40	+5 @ 3.0	+12 @ 3.0	5.5	Convection	3x5 Standard
PVI-40-21TA	40	+5 @ 3.0	+12 @ 2.5	4.5	10 CFM	2x7 Low Profile
PVI-50-21TA	50	+5 @ 3.0	+12 @ 3.0	5.5	10 CFM	3x5 Standard
PVI-70-21T	70	+5 @ 6.0	+12 @ 5.0	8.0	10 CFM	Diode Isolated
PVI-80-21	80	+5 @ 6.0	+12 @ 6.0	13.0	12 CFM	3x6 Size
PVI-90-27	90	+5 @ 15.0	+12 @ 2.0	3.0	12 CFM	PCB or Case/Cover
PVI-110-21T	110	+5 @ 10.0	+12 @ 8.0	11.0	12 CFM	3.6x7.5 Size
PVI-150-21T	150	+5 @ 16.0	+12 @ 12.0	18.0	8 CFM	4.0x7.25x1.7 Size
PVI-150-21T	200	+5 @ 15.0	+12 @ 12.0	18.0	20 CFM	4.0x7.25x1.7 Size
PVI-180-21C[1]	180	+5 @ 16.0	+12 @ 8.8	12.1	20 CFM	4.0GB 7,200 RPM Drives
PVI-150-21RS[2]	150	+5 @ 25.0	+12 @ 4.0	8.0	20 CFM	4.55GB 10,333 Drives
PVD-150-21H/VB[2]	150	+5 @ 25.0	+12 @ 4.0	8.0	20 CFM	48 VDC Input
PF-150-21RS[3]	150	+5 @ 20.0	+12 @ 4.0	8.0	20 CFM	4.55GB 7,200 Drives
PF-175-21RS[3]	175	+5 @ 25.0	+12 @ 4.0	8.0	20 CFM	4.55GB 10,033 Drives
PF-350-21[3]	365	+5 @ 50.0	+12 @ 6.0	12.0	30 CFM	Power Factor, N+1
PF-350-28[3]	365	+12 @ 25.0	+5 @ 30.0	–	30 CFM	Power Factor, N+1
PF-350-29[3]	365	+5 @ 30.0	+12 @ 25.0A	–	30 CFM	9.1GB 10,033 Drives

1 – Power Factor. 2 – Power Factor & Parallel. 3 – Power Factor, Parallel & Current Share.
Refer to PVI pages for outlines. Contact factory for complete specifications.

PVI Series New Designs

Model Number	Max. Output (watts)	Main Output	Aux. 1	Aux. 2	Additional Features
PVI-40-21RS	40	+5 @ 7.5	+12 @ 0.8	–	Redundant Diode Or'd, 3x6x1.25 Size
PVI-50-17	50	+13.8 @ 3.8	–	–	Constant Current, 3x5x1.1.5 Battery Charger
PVI-50-30BU	50	+5 @ 5.5	+12 @ 1.5	-12 @ 0.5	12 VDC Battery Input and Charger 4.5x8x1.6 Size
PVI-65BU	65	+5 @ 8	+12 @ 1.5	-12/-5 @ 0.5	12 VDC Input and Charger 2.2x7.7x1.2 Size
PVI-70-37	90	+5 @ 10	+12 @ 3.0	-12 @ 0.5	10 CFM Air 3.5x5.5x1.1 Size
PF-85-21	85	+5 @ 5	+12 @ 5.05	–	3.8x5.8x1.8 Size
PVI-90-21RS	90	+5 @ 17	+12 @ 0.36	–	Redundant Diode Or'd, 4.5x6.2x1.5 Size
PVI-90-21RSA	90	+5 @ 17	+12 @ 0.35	–	T100 Application 4x6.2x1.5 Size
PVI-90-24M	90	+28 @ 2.5	+30 @ 0.5	–	AC/DC Input (100-240/12) L/A Battery Charger
PVI-80-52M	80	+12 @ 3.8	+5 @ 3.0	+3.5 @ 1.0	5 outputs total 6x8x1.16 Size
PVI-100-30	100	+5 @ 15	+12 @ 2.0	-12 @ 1.0	10 CFM Air 4x6x1.5 Size
PF-135-39P	135	+3.3 @ 30	+5 @ 2.0	+12 @ 2.0	PFC 4.2x1.5x7 Size
PVI-150-13	150	+24 @ 6.25	–	–	4.4x8x2.3 Size
PVI-169-29PFC	170	+24 @ 6/10pk	+5 @ 5.0	–	0.99 Power Factor
PSSP-175-21	175	+5 @ 25	+12 @ 6 pk	–	PFC, redundant

Modified standard and custom designs available.

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MARTEK POWER SWITCH

PS-Standard/ "Baby" AT Series

ISO 9002

Features:

- UL recognized, CSA certified, and TUV approved
- EMI/RFI within limits of VDE 0871/6.78 and FCC Part 15, subpart J
- Operates on 115 or 230 VAC
- OVP on +5 VDC output
- Full *one year warranty*
- 200-325 Watts
- Custom options available
- Tight regulation on all output available
- Automatic current limit
- Short circuit protection
- MTBF greater than 50,000 hours
- Power Factor to EN61000 models available

PS-AT-200E (BABY AT)

DC Output Voltage	Rated Loads Min.	Typical	Max.
+5V	10A	20.0A	22.5A
+12V	1A	6.0A	8A
–12V	0A	0.5A	1.0A
–5V	0A	0.5A	1.0A

PS-AT-200 (BABY AT)

DC Output Voltage	Rated Loads Min.	Typical	Max.
+5V	2A	20.0A	22.5A
+12V	1A	6.0A	8.0A
–12V	0A	0.5A	1.0A
–5V	0A	0.5A	1.0A

PS-AT-270

DC Output Voltage	Rated Loads Min.	Typical	Max.
+5V	3.0A	30.0A	33.0A
+12V	2.0A	8.0A	10.0A
–12V	0A	0.5A	1.0A
–5V	0A	0.5A	1.0A

PS-AT-300PFC (230 Watts) 0.99 Power Factor

DC Output Voltage	Rated Loads Min.	Typical	Max.
+5V	2.0A	40.0A	40.0A
+12V	–	10.0A	15.0A
–12V	–	2.0A	2.0A
–5V	–	2.0A	2.0A

PVD-AT-230-48 VDC Input

DC Output Voltage	Rated Loads Min.	Typical	Max.
+5V	2.0A	40.0A	40.0
+12V	–	10.0A	15.0
–12V	–	2.0A	2.0
–5V	–	2.0A	2.0

PS-AT-325

DC Output Voltage	Rated Loads Min.	Typical	Max.
+5V	3.0A	40.0A	42.0A
+12V	2.0A	10.0A	11.0A
–12V	0A	0.5A	1.0A
–5V	0A	0.5A	1.0A

Battery Backup Option

The "Standard" PS-AT Series is now available with a battery backup module to give you uninterruptible power source capabilities. Operation in the backup mode is a function of the ampere hours rating of the external (customer supplied) batteries. Add suffix BU to model number.

Features:

- No outage at switch over
- 85% efficiency
- Battery charging circuit avilable
- Low battery voltage signal
- Automatic switch-off for low batteries
- Automatic switch-over from batteries when AC returns

Modified standard and custom designs available.

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MARTEK POWER SWITCH

PES AC/DC Automatic Desktop Series

ISO 9002

Features:

- Universal AC input 90-264 VAC
- FCC "B" and EN55022 "B" EMI
- Standard and custom cables
- Single, dual, and triple outputs
- Custom outputs available
- 20-40-60 watt models
- UL/CSA/TUV approvals
- Ease of end product agency approval

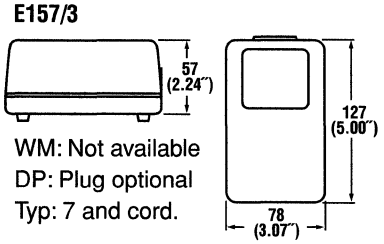
CE COMPLIANT

Specifications

Parameter	Conditions	Limits
DC Outputs	Refer to wattage and rating tables	
Input Voltage	Universal input	90-264 VAC
AC Input Frequency	47-63 Hz	Options available
Input Surge Current	PES-20 & PES-40 PES-61	20A peak cold start (25°C), 115 VAC 25A peak cold start (25°C), 115 VAC
Output Adjustment	Main output factory set	4.5V to OVP trip point
Hold-Up Time	Full load, nominal input	20 msec min.
Line Regulation	Over input range	Main output 0.1%, V2-V3 ±1.5%
Load Regulation	20%-100% load change	5% at end of 6 foot output cable connector
Dielectric Withstand	Meets VDE 0806 for 1 minute	3,750 VAC output/input 1,500 VAC input/ground 500 VAC output/ground
Ripple and Noise	Measured at full load	1% peak to peak, typical
Temperature Range	Operating	0°C to 40°C
Storage	Nonoperating	-40°C to +85°C
Cooling	Convection	
Overvoltage Protection	Main output only	124% ±8%
Overcurrent Protection	Power limiting, auto recovery	125 to 150% max. load
Short Circuit Protection	All outputs	Auto recovery
MTBF	MIL-HDK-217E	100,000 hours minimum
Case	Impact resistant thermoplastic	Flame rating 94V-1 for UL, 94V-0 for CSA
Input Connector	IEC 320 inlet connector	

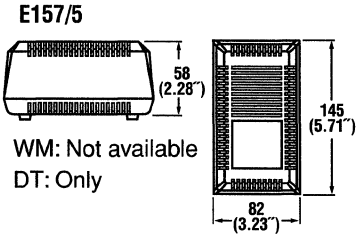
Drawings

E157/3



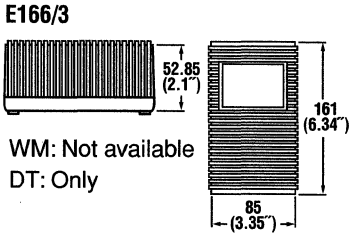
WM: Not available
DP: Plug optional
Typ: 7 and cord.

E157/5



WM: Not available
DT: Only

E166/3



WM: Not available
DT: Only

***Options available. Contact factory.**

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MARTEK POWER SWITCH

PES Series
Voltage/Current Ratings

ISO 9002

PES-20 Series

Model Number	Main Output	+V2	–V3	Max. Output (watts)	Case Size
PES-20-10	+5 @ 4.0	–	–	20	EI57/3
PES-20-11	+12 @ 1.66	–	–	20	EI57/3
PES-20-12	+15 @ 1.33	–	–	20	EI57/3
PES-20-13	+24 @ 0.83	–	–	20	EI57/3
PES-20-20	+5 @ 3.0	-5 @ 1.0	–	20	EI57/3
PES-20-21	+5 @ 3.0	-12 @ 0.5	–	20	EI57/3
PES-20-22	+5 @ 3.0	-15 @ 0.5	–	20	EI57/3
PES-20-23	+5 @ 2.0	-24 @ 0.5	–	20	EI57/3
PES-20-30	+5 @ 2.0	+12 @ 0.6	-12 @ 0.25	20	EI57/3
PES-20-31	+5 @ 2.0	+12 @ 0.5	-5 @ 0.8	20	EI57/3
PES-20-32	+5 @ 2.0	+24 @ 0.2	-12 @ 0.5	20	EI57/3
PES-20-33	+5 @ 2.0	+15 @ 0.5	-5 @ 1.0	20	EI57/3

PES-40 Series

Model Number	Main Output	+V2	-V3	Max. Output (watts)	Case Size
PES-40-10	+5 @ 6.0	–	–	40	EI57/5
PES-40-11	+12 @ 2.5	–	–	40	EI57/5
PES-40-12	+15 @ 2.0	–	–	40	EI57/5
PES-40-13	+24 @ 1.25	–	–	40	EI57/5
PES-40-20	+5 @ 6.0	-5 @ 1.0	–	40	EI57/5
PES-40-21	+5 @ 6.0	-12 @ 1.0	–	40	EI57/5
PES-40-22	+5 @ 5.0	-15 @ 1.0	–	40	EI57/5
PES-40-23	+5 @ 4.0	-24 @ 1.0	–	40	EI57/5
PES-40-30	+5 @ 4.0	+12 @ 1.5	-12 @ 1.0	40	EI57/5
PES-40-31	+5 @ 4.0	+12 @ 1.5	-5 @ 1.0	40	EI57/5
PES-40-32	+5 @ 4.0	+24 @ 1.0	-12 @ 1.0	40	EI57/5
PES-40-33	+5 @ 4.0	+15 @ 1.5	-5 @ 1.0	40	EI57/5

PES-61 Series

Model Number	Main Output	+V2	-V3	Max. Output (watts)	Case Size
PES-61-10	+5 @ 10.0	–	–	60	EI66/3
PES-61-11	+12 @ 4.15	–	–	60	EI66/3
PES-61-11	+13.2 @ 4.0A	–		60	EI66/3
PES-61-12	+15 @ 3.3	–	–	60	EI66/3
PES-61-13	24 @ 2.1	–	–	60	EI66/3
PES-61-20	+5 @ 9.0	-5 @ 0.75	–	60	EI66/3
PES-61-21	+5 @ 5.0	-12 @ 2.0	–	60	EI66/3
PES-61-22	+5 @ 5.0	-15 @ 1.5	–	60	EI66/3
PES-61-23	+5 @ 5.0	-24 @ 1.0	–	60	EI66/3
PES-61-30	+5 @ 5.0	+12 @ 1.5	-12 @ 0.5	60	EI66/3
PES-61-31	+5 @ 5.0	+12 @ 1.5	-5 @ 0.75	60	EI66/3
PES-61-32	+5 @ 5.0	+24 @ 0.75	-12 @ 0.5	60	EI66/3
PES-61-33	+5 @ 5.0	+15 @ 1.5	-5 @ 0.5	60	EI66/3

Other voltage and currents available.

17 Vreeland Ave., Lodi, NJ 07644 • 973-478-0300 • FAX: 973-478-4650
E-mail: pwrswitch@aol.com • Web Site: www.powerswitch.com

Abbott TECHNOLOGIES, INC.

AC-DC Military Power Supplies

Abbott Technologies standard power supplies have been designed to provide clean and quiet DC power while complying with the rigorous conditions imposed by today's defense and aerospace environment. They have been designed, tested, and qualified in advance to a variety of key specifications thereby simplifying the task of system compliance. These models are available in different grades depending on the temperature and reliability requirements of your application, providing you with an optimal cost/performance solution. We can accomodate requests for modifications to units quickly, often for a nominal charge. We can also provide special testing, documentation, extended burn-in, and Environmental Stress Screening (ESS) upon request.

Military-Off-The-Shelf (MOTS) AC-DC Switchers

Model Family	Input	Output Power	Number of Outputs	Output Voltages	Dimensions (in inches)
AS100	90-140VAC 57-400HZ	100Watts	1	3.0-28.5	7 x 1.5 x 1
AT100	90-140VAC 57-400HZ	100Watts	2-4	3.0-28.5	7 x 3 x 1
AS200	90-140VAC 57-400HZ	200Watts	1	3.0-28.5	7 x 2 x 1.8
AT200	90-140VAC 57-400HZ	200Watts	2-8	3.0-28.5	7 x 3.5 x 1.8
AS500	90-140VAC 57-400HZ	500Watts	1	3.0-28.5	7 x 5 x 1.8
AT500	90-140VAC 57-400HZ	500Watts	2-10	3.0-28.5	7 x 5 x 1.8
AS1000	90-140VAC 57-400HZ	1000Watts	1	3.0-28.5	7 x 10 x 1.8
AT1000	90-140VAC 57-400HZ	1000Watts	2-10	3.0-28.5	7 x 10 x 1.8

Standard features include:
-Power Factor Correction
-EMI Filtering per **MIL-STD-461D**, CE101, CE102 CS101
-EMI Filtering per **DO160C**, Cat. B.
-Baseplate Temperature Range: -40 to +85 deg.C (Wider temperature range is available)

-Screening per **MIL-P4855-1A**

Environment:
-**MIL-S-901** Shock (> 100gs., impulse)
-**MIL-STD-810E** method 516.4 (shock) (20gs, 9msec.)
method 514.4-.8(vibration) ($4g^2$/hz, 30-1000 Hz)

-Redundant Outputs Available

3-Phase AC to Bulk DC Converters (Inherent Harmonic Suppression)

Input	Output Voltages	Output Power	Input MIL-SPEC	Model Family
120-480 VAC 60 Hz Delta or Wye	24-300 VDC	1000-15000 Watts	**MIL-STD-1399** Sec. 300A, type 1	AR10000(60)
115-200 VAC 400 Hz Delta or Wye	24-300 VDC	500-10000 Watts	**MIL-STD-461D** CE101, CE102	AR10000(400)

Abbott Technologies also specializes in the design and manufacture of custom power supplies for aerospace, defense and other related applications. Please see the next page for a description of our capabilities.

Call us toll-free at **1-800-367-8200**

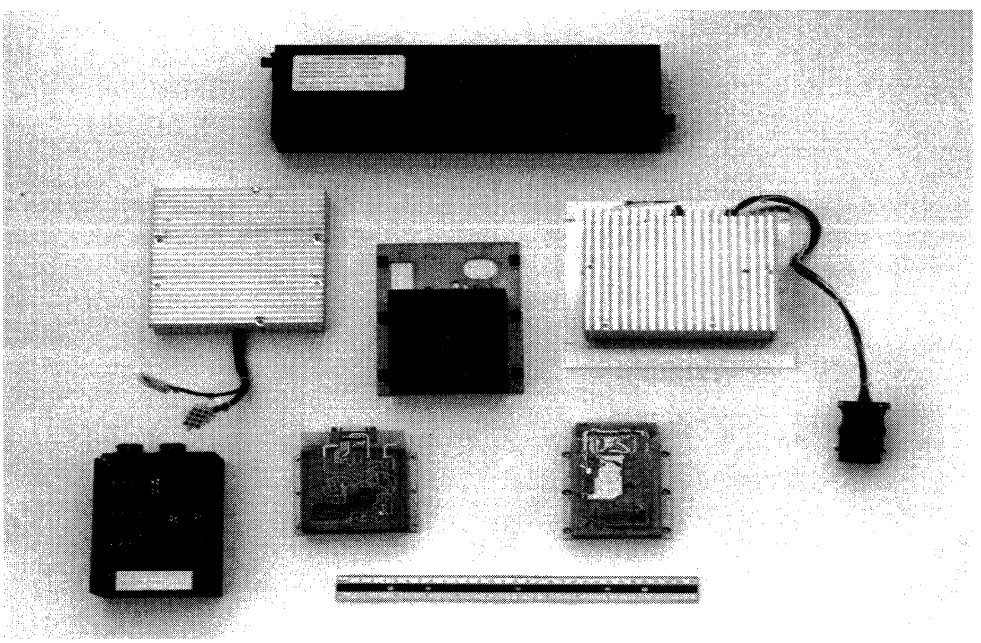
MAIN OFFICE:
8203 Vineland Avenue, Sun Valley, CA 91352 - (818) 504-0644 - FAX: (818)367-8200
Visit our website at www.abbott-tech.com and on line quote form at wayne.lovett@abbott-tech.com.

Abbott TECHNOLOGIES, INC.

Custom Military Power Supplies

Abbott Technologies designs custom power supplies for a wide variety of applications where environmental, electrical, dimensional, functional, or reliability issues preclude the use of a standard or modified standard unit. In these instances, our design team works with your staff from design concept through first article approval to insure that our custom unit is compliant to all specifications called out in your statement of work.

Our capabilities include:
-AC to DC, DC to DC, DC to AC, and AC to AC Switching Converters from 25 W to 3000W
-Linear Power Supplies from 10W to 500W
-Single, Multiple Outputs
-Single, Multiple Inputs
-3 Phase AC to Bulk DC Front-End Converters
-Switcher Features can include:
- -Power Factor Correction
- -EMI Filtering Complience to Mil-Specs and Commercial Aviation Specs
- -Ruggedization for Extreme Environments
- -Established Reliability Parts for Enhanced Reliability(MTBF)
- -Custom Input Configuration, (Input Transient Protection, Soft-Start, etc.)
- -Custom Output Configuration, (Remote Sense, Remote Inhibit, etc.)



Some recent applications for our custom power supplies include:

-Army Vehicle Communication System
-Army Helicopter Night-Vision System
-Submarine Based Shipboard Communication System
-Battlefield Radar System
-Commercial Aircraft Cockpit Instruments
-Railway System Controls
-Fighter Aircraft Target Drones

We would be please to provide a quote for your special requirements.

Call us toll-free at **1-800-367-8200**

MAIN OFFICE:
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Visit our website at www.abbott-tech.com and on line quote form at wayne.lovett@abbott-tech.com.

ACI World
Real Time ■ Magnetic ■ Components
1260 Avenida Acaso, Unit B, Camarillo, CA 93012
Tel: (805) 389-9831 ■ (800) 466-9784 ■ Fax: (805) 389-9833
http://www. ACIWORLD.COM

AC/DC WALLMOUNT DIRECT PLUG-IN ADAPTORS FOR THE WORLD

Model	VDC	Current
35-3-50	3V	50mA
35-3-100	3V	100mA
35-3-150	3V	150mA
35-3-200	3V	200mA
35-3-250	3V	250mA
35-3-300	3V	300mA
35-3-350	3V	350mA
35-3-400	3V	400mA
35-3-450	3V	450mA
35-3-500	3V	500mA
35-3-550	3V	550mA
35-3-600	3V	600mA
35-3-650	3V	650mA
35-3-700	3V	700mA
35-3-750	3V	750mA
35-3-800	3V	800mA
35-3-1000	3V	1000mA
35-3.6-50	3.6V	50mA
35-3.6-100	3.6V	100mA
35-3.6-150	3.6V	150mA
35-3.6-200	3.6V	200mA
35-3.6-250	3.6V	250mA
35-3.6-300	3.6V	300mA
35-3.6-350	3.6V	350mA
35-3.6-400	3.6V	400mA
35-3.6-450	3.6V	450mA
35-3.6-500	3.6V	500mA
35-3.6-550	3.6V	550mA
35-3.6-600	3.6V	600mA
35-3.6-650	3.6V	650mA
35-3.6-700	3.6V	700mA
48-4-900	4V	900mA
48-4-950	4V	950mA
41-4-1000	4V	1000mA
48-4-1000	4V	1000mA
48-4-1500	4V	1500mA
35-4.5-50	4.5V	50mA
35-4.5-100	4.5V	100mA
35-4.5-150	4.5V	150mA
35-4.5-200	4.5V	200mA
35-4.5-250	4.5V	250mA
35-4.5-300	4.5V	300mA
35-4.5-350	4.5V	350mA
35-4.5-400	4.5V	400mA
35-4.5-450	4.5V	450mA
35-4.5-500	4.5V	500mA
41-4.5-500	4.5V	500mA
35-4.5-550	4.5V	550mA
41-4.5-550	4.5V	550mA
41-4.5-600	4.5V	600mA
41-4.5-600	4.5V	600mA
41-4.5-650	4.5V	650mA
41-4.5-700	4.5V	700mA
41-4.5-750	4.5V	750mA
41-4.5-800	4.5V	800mA
41-4.5-850	4.5V	850mA
41-4.5-900	4.5V	900mA
41-4.5-950	4.5V	950mA
41-4.5-1000	4.5V	1000mA
35-5-50	5V	50mA
35-5-100	5V	100mA
35-5-150	5V	150mA
35-5-200	5V	200mA
35-5-250	5V	250mA
35-5-300	5V	300mA
35-5-350	5V	350mA
35-5-400	5V	400mA
35-5-450	5V	450mA
35-5-500	5V	500mA
35-6-50	6V	50mA
35-6-100	6V	100mA
35-6-150	6V	150mA
35-6-200	6V	200mA
35-6-250	6V	250mA
35-6-300	6V	300mA
35-6-350	6V	350mA
41-6-350	6V	350mA
35-6-400	6V	400mA
41-6-400	6V	400mA
35-6-450	6V	450mA
41-6-450	6V	450mA
35-6-500	6V	500mA
41-6-500	6V	500mA

Model	VDC	Current
41-6-550	6V	550mA
41-6-600	6V	600mA
41-6-650	6V	650mA
41-6-700	6V	700mA
41-6-750	6V	750mA
41-6-800	6V	800mA
48-6-800	6V	800mA
41-6-850	6V	850mA
48-6-850	6V	850mA
41-6-900	6V	900mA
48-6-900	6V	900mA
48-6-950	6V	950mA
48-6-1000	6V	1000mA
48-6-1050	6V	1050mA
48-6-1100	6V	1100mA
48-6-1150	6V	1150mA
48-6-1200	6V	1200mA
48-6-1250	6V	1250mA
48-6-1300	6V	1300mA
48-6-1350	6V	1350mA
48-6-1400	6V	1400mA
41-7-350	7V	350mA
41-7-400	7V	400mA
41-7-450	7V	450mA
41-7-500	7V	500mA
41-7-550	7V	550mA
41-7-600	7V	600mA
41-7-650	7V	650mA
41-7-700	7V	700mA
41-7-750	7V	750mA
41-7-800	7V	800mA
48-7-800	7V	800mA
48-7-850	7V	850mA
48-7-900	7V	900mA
48-7-950	7V	950mA
48-7-1000	7V	1000mA
48-7-1050	7V	1050mA
48-7-1100	7V	1100mA
48-7-1150	7V	1150mA
48-7-1200	7V	1200mA
48-7-1250	7V	1250mA
48-7-1300	7V	1300mA
35-7.5-50	7.5V	50mA
35-7.5-100	7.5V	100mA
35-7.5-150	7.5V	150mA
35-7.5-200	7.5V	200mA
35-7.5-250	7.5V	250mA
35-7.5-300	7.5V	300mA
35-7.5-350	7.5V	350mA
41-7.5-350	7.5V	350mA
35-7.5-400	7.5V	400mA
41-7.5-400	7.5V	400mA
41-7.5-450	7.5V	450mA
41-7.5-500	7.5V	500mA
41-7.5-550	7.5V	550mA
41-7.5-600	7.5V	600mA
41-7.5-650	7.5V	650mA
41-7.5-700	7.5V	700mA
48-7.5-700	7.5V	700mA
41-7.5-750	7.5V	750mA
48-7.5-750	7.5V	750mA
41-7.5-800	7.5V	800mA
48-7.5-800	7.5V	800mA
48-7.5-850	7.5V	850mA
48-7.5-900	7.5V	900mA
48-7.5-950	7.5V	950mA
48-7.5-1000	7.5V	1000mA
48-7.5-1050	7.5V	1050mA
48-7.5-1100	7.5V	1100mA
48-7.5-1150	7.5V	1150mA
48-7.5-1200	7.5V	1200mA
48-7.5-1250	7.5V	1250mA
48-7.5-1300	7.5V	1300mA
35-9-50	9V	50mA
35-9-100	9V	100mA
35-9-150	9V	150mA
35-9-200	9V	200mA
41-9-200	9V	200mA
35-9-250	9V	250mA
41-9-250	9V	250mA
35-9-300	9V	300mA
41-9-300	9V	300mA
35-9-350	9V	350mA

Model	VDC	Current
41-9-350	9V	350mA
41-9-400	9V	400mA
41-9-450	9V	450mA
41-9-500	9V	500mA
48-9-500	9V	500mA
41-9-550	9V	550mA
48-9-550	9V	550mA
41-9-600	9V	600mA
48-9-600	9V	600mA
41-9-650	9V	650mA
48-9-650	9V	650mA
48-9-700	9V	700mA
48-9-750	9V	750mA
48-9-800	9V	800mA
48-9-850	9V	850mA
48-9-900	9V	900mA
48-9-950	9V	950mA
48-9-1000	9V	1000mA
48-9-1050	9V	1050mA
48-9-1100	9V	1100mA
48-9-1150	9V	1150mA
48-9-1200	9V	1200mA
41-10-250	10V	250mA
41-10-300	10V	300mA
41-10-350	10V	350mA
41-10-400	10V	400mA
41-10-450	10V	450mA
48-10-450	10V	450mA
41-10-500	10V	500mA
48-10-500	10V	500mA
41-10-550	10V	550mA
48-10-550	10V	550mA
48-10-600	10V	600mA
48-10-650	10V	650mA
48-10-700	10V	700mA
48-10-750	10V	750mA
48-10-800	10V	800mA
48-10-850	10V	850mA
48-10-900	10V	900mA
48-10-950	10V	950mA
48-10-1000	10V	1000mA
48-10-1050	10V	1050mA
48-10-1100	10V	1100mA
35-12-50	12V	50mA
35-12-100	12V	100mA
35-12-150	12V	150mA
35-12-200	12V	200mA
41-12-200	12V	200mA
35-12-250	12V	250mA
41-12-250	12V	250mA
41-12-300	12V	300mA
41-12-350	12V	350mA
41-12-400	12V	400mA
48-12-400	12V	400mA
41-12-450	12V	450mA
48-12-450	12V	450mA
41-12-500	12V	500mA
48-12-500	12V	500mA
48-12-550	12V	550mA
41-12-600	12V	600mA
48-12-600	12V	600mA
48-12-650	12V	650mA
41-12-700	12V	700mA
48-12-700	12V	700mA
48-12-750	12V	750mA
48-12-800	12V	800mA
48-12-850	12V	850mA
48-12-900	12V	900mA
48-12-950	12V	950mA
48-12-1000	12V	1000mA
48-12-650	12V	650mA
48-12-700	12V	700mA
48-12-750	12V	750mA
48-12-800	12V	800mA
48-12-850	12V	850mA
41-14-150	14V	150mA
41-14-200	14V	200mA
41-14-250	14V	250mA
41-14-300	14V	300mA
48-14-300	14V	300mA
41-14-350	14V	350mA
48-14-350	14V	350mA
41-14-360	14V	360mA

Model	VDC	Current
41-14-400	14V	400mA
41-14-450	14V	450mA
48-14-450	14V	450mA
48-14-500	14V	500mA
48-14-550	14V	550mA
48-14-600	14V	600mA
48-14-650	14V	650mA
48-14-700	14V	700mA
48-14-750	14V	750mA
48-14-800	14V	800mA
35-15-50	15V	50mA
35-15-100	15V	100mA
35-15-150	15V	150mA
41-15-150	15V	150mA
35-15-200	15V	200mA
41-15-200	15V	200mA
41-15-250	15V	250mA
41-15-300	15V	300mA
48-15-300	15V	300mA
41-15-350	15V	350mA
48-15-350	15V	350mA
41-15-400	15V	400mA
48-15-400	15V	400mA
48-15-450	15V	450mA
48-15-500	15V	500mA
48-15-550	15V	550mA
48-15-600	15V	600mA
48-15-650	15V	650mA
48-15-700	15V	700mA
48-15-750	15V	750mA
48-15-800	15V	800mA
35-16-50	16V	50mA
35-16-100	16V	100mA
35-16-150	16V	150mA
35-18-50	18V	50mA
35-18-100	18V	100mA
35-18-150	18V	150mA
41-18-150	18V	150mA
41-18-200	18V	200mA
41-18-250	18V	250mA
48-18-250	18V	250mA
41-18-300	18V	300mA
48-18-300	18V	300mA
41-18-350	18V	350mA
48-18-350	18V	350mA
48-18-400	18V	400mA
48-18-450	18V	450mA
48-18-500	18V	500mA
48-18-550	18V	550mA
48-18-600	18V	600mA
48-18-650	18V	650mA
48-18-700	18V	700mA
35-21-50	21V	50mA
35-21-100	21V	100mA
41-21-100	21V	100mA
35-21-150	21V	150mA
41-21-150	21V	150mA
41-21-200	21V	200mA
48-21-200	21V	200mA
41-21-250	21V	250mA
48-21-250	21V	250mA
41-21-300	21V	300mA
48-21-300	21V	300mA
48-21-350	21V	350mA
48-21-400	21V	400mA
48-21-450	21V	450mA
48-21-500	21V	500mA
48-21-550	21V	550mA
48-21-600	21V	600mA
35-24-50	24V	50mA
35-24-100	24V	100mA
41-24-100	24V	100mA
35-24-150	24V	150mA
41-24-150	24V	150mA
41-24-200	24V	200mA
48-24-200	24V	200mA
41-24-250	24V	250mA
48-24-250	24V	250mA
41-24-300	24V	300mA
48-24-300	24V	300mA
48-24-350	24V	350mA
48-24-400 to	24V	400mA to
48-24-550	24V	550mA

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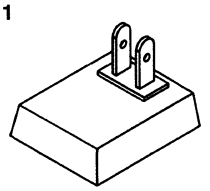
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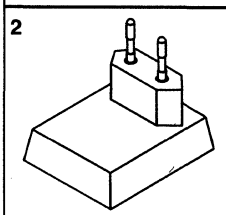
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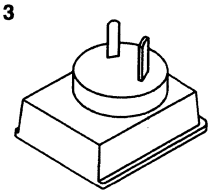
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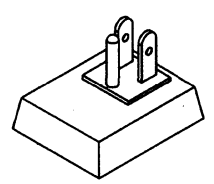
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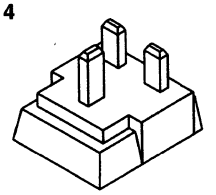
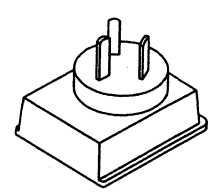
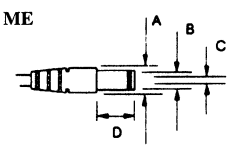

ACI- xx-xx-09

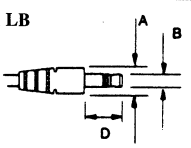

ACI- xx-xx-06A

Model ME



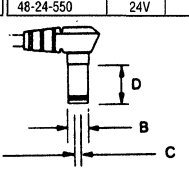
Model	A	B	C	D
ME1	9.5	5.5	2.5	8-14
ME2	9.5	5.5	2.1	8-14
ME3	10.5	5.5	2.5	8-14
ME4	10.5	5.5	2.1	8-14
ME5	9.5	5.0	2.5	8-14
ME5	10.5	5.0	2.5	8-14

Model LB



Model	A	B	C
LB1	9.5	3.5	10-15
LB2	10.5	2.3	10-15
LB3	9.5	2.3	10-15
LB4	10.5	3.5	10-15

Model JS

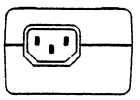


Model	B	C	D
JS1	5.5	2.1	10-15
JS2	5.5	2.5	10-15
JS3	5.0	2.1	10-15
JS4	5.0	2.5	10-15

ACI World
Real Time ■ Magnetic ■ Components
1260 Avenida Acaso, Unit B, Camarillo, CA 93012
Tel: (805) 389-9831 ■ (800) 466-9784 ■ Fax: (805) 389-9833
http://www. ACIWORLD.COM

AC/DC UNIVERSAL INPUT ADAPTORS

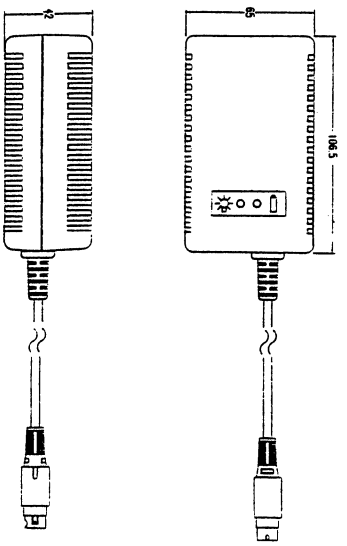
TRIPLE OUTPUT TYPE (ACD-740U SERIES)



■ INPUT: 90-264 VAC, 47-63Hz, 1.0A (Universal) ■ SAFETY: UL, CSA, TUV, CE, T Mark
■ DIMENSION: 106.5*65*42mm.

MODEL	OUTPUT RATING		
ACD-740U-3125	+5.0VDC 2.5A	+12.0VDC 1.0A	-12.0VDC 0.3A
ACD-740U-3155	+5.0VDC 2.5A	+15.0VDC 1.0A	-15.0VDC 0.3A
ACD-740U-3525	+5.0VDC 2.5A	+12.0VDC 1.0A	-12.0VDC 0.3A
ACD-740U-3255	+5.0VDC 2.5A	+15.0VDC 1.0A	-5.0VDC 0.3A
ACD-740U-3152	+5.0VDC 2.5A	+12.0VDC 1.0A	-15.0VDC 0.3A
ACD-740U-3245	+5.0VDC 1.5A	+24.0VDC 0.7A	-5.0VDC 0.3A
ACD-740U-3242	+5.0VDC 1.5A	+24.0VDC 1.0A	-12.0VDC 0.3A

DOUBLE OUTPUT TYPE (ACD-740U SERIES)



■ INPUT: 90-264 VAC, 47-63Hz, (Universal) ■ SAFETY: UL, CUL, TUV, CE, T Mark
■ DIMENSION: 106.5*65*42mm.

MODEL	OUTPUT RATING	
ACD-740U-2205	+5.0VDC 3.0A	+12.0VDC 1.5A
ACD-740U-2245	+5.0VDC 1.5A	+24.0VDC 1.0A
ACD-740U-2248	+8.0VDC 0.7A	+24.0VDC 1.0A

40W REASONABLE PRICE TYPE (ACD-740U SERIES)

■ INPUT: 90-264 VAC, 47-63Hz, 1.0A (Universal) ■ SAFETY: UL, CUL, TUV, NEMKO, CB, CE
■ DIMENSION: 106.5*65*42mm.

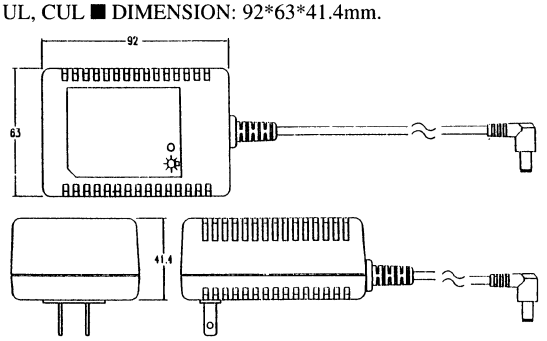
MODEL	OUTPUT RATING
ACD-740U-1050	5.0VDC 4.00A
ACD-740U-1060	6.0VDC 4.00A
ACD-740U-1075	7.0VDC 4.00A
ACD-740U-1090	9.0VDC 3.50A
ACD-740U-1120	12.0VDC 3.00A
ACD-740U-1138	13.0VDC 2.80A
ACD-740U-1150	15.0VDC 2.70A
ACD-740U-1160	16.0VDC 2.50A
ACD-740U-1180	18.0VDC 2.20A
ACD-740U-1200	20.0VDC 2.00A
ACD-740U-1225	22.0VDC 1.80A
ACD-740U-1240	24.0VDC 1.70A

40W WALL PLUG-IN TYPE (ACD-740 SERIES)

■ INPUT: 90-132 VAC, 47-63Hz, 1.0A ■ SAFETY: UL, CUL ■ DIMENSION: 92*63*41.4mm.

MODEL	OUTPUT RATING
ACD-740-1050	5.0VDC 4.00A
ACD-740-1060	6.0VDC 4.00A
ACD-740-1075	7.0VDC 4.00A
ACD-740-1090	9.0VDC 3.50A
ACD-740-1120	12.0VDC 3.00A
ACD-740-1138	13.0VDC 2.80A
ACD-740-1150	15.0VDC 2.60A
ACD-740-1160	16.0VDC 2.50A
ACD-740-1180	18.0VDC 2.20A
ACD-740-1200	20.0VDC 2.00A
ACD-740-1225	22.0VDC 1.80A
ACD-740-1240	24.0VDC 1.70A

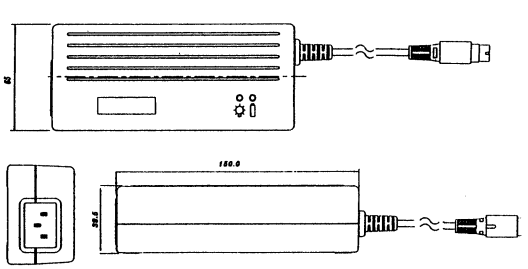
(AVAILABLE IN TUV/CE W/EURO INPUT)



50W OUTPUT TYPE (ACD-850 SERIES)

■ INPUT: 90-264 VAC, 47-63Hz, 1.2A (Universal) ■ UL, CSA, TUV, CE, T Mark
■ DIMENSION: 150*65*39.5mm.

MODEL	OUTPUT RATING
ACD-850-06	12.0VDC 4.16A
ACD-850-08	16.0VDC 3.12A
ACD-850-10	20.0VDC 2.50A
ACD-850-12	24.0VDC 2.08A



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1260 Avenida Acaso, Unit B, Camarillo, CA 93012
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http://www. ACIWORLD.COM

AC/DC UNIVERSAL INPUT ADAPTORS
5 Watt, 10, 15, 20, 30, 45, 50, 60, 98

■ INPUT CHARACTERISTICS:
- 1.1 AC Input Voltage: Universal input from 90VAC ot 265VAC
- 1.2 Input Frequency: From 47Hz to 63 Hz
- 1.3 Input Current: 0.8A RMS Maximum at 120VAC and Full Load
- 1.4 Inrush Current: 15A-90A Maximum at Full Load and 120 VAC, 30A-120A Maximum at Full Load and 230 VAC

■ OUTPUT CHARACTERISTICS:

V-Out	Max. Load	Min. Load	Line Reg.	Load Reg.	VO Tolerance	Ripple Noise	OVP (V)	Eff. %
5V	XX	0A	1%	5%	5%	2%	6-7	85
6V	XX	0A	1%	5%	5%	1%	8-10	85
7V	XX	0A	1%	5%	5%	1%	9-12	85
9V	XX	0A	1%	5%	5%	1%	10-13	85
10V	XX	0A	1%	5%	5%	1%	12-14	85
12V	XX	0A	1%	5%	5%	1%	14-16	85
15V	XX	0A	1%	5%	5%	1%	17-19	85
16V	XX	0A	1%	5%	5%	1%	17-19	85
18V	XX	0A	1%	5%	5%	1%	20-24	85
20V	XX	0A	1%	5%	5%	1%	22-26	85
24V	XX	0A	1%	5%	5%	1%	27-32	85

■ OVERALL PERFORMANCE:
- 3.1 Over Current Protection: Peak power is limited to 150% → 200%
- 3.2 Short Circuit Protection

■ ENVIRONMENT CONDITIONS:
- 4.1 Operating Temperature: 0°C to 40°C with derating above 40°C
- 4.2 Storage Temperature: -20°C to 85°C
- 4.3 Storage Humidity: 10% to 90%
- 4.4 Cooling: Natural Convection

■ SAFETY STANDARD:
- 5.1 UL1950, CUL Approval and meet TUV EN60 950

■ EMI STANDARD
- 6.1 Design to Meet FCC Class B & CE marking

■ DIELECTRIC WITH STAND VOLTAGE:
- 7.1 Input to output: 1.5K VAC 1 min. or 2.2K VDC 1 min.

■ INSULATION RESISTANCE:
- 8.1 Input to ground: 50M OHM minimum
- 8.2 Input to output: 50M OHM minimum

■ RELIABILITY:
- 9.1 Mean time between failure: 50K hours minimum at 25°C ambient

■ OUTPUT CABLE:
- 10.1 6FT cable with hollow plug of DIN connector

■ MECHANICAL DIMENSION:
- 11.1 Size: See page (Case option A, B, C, D, E)

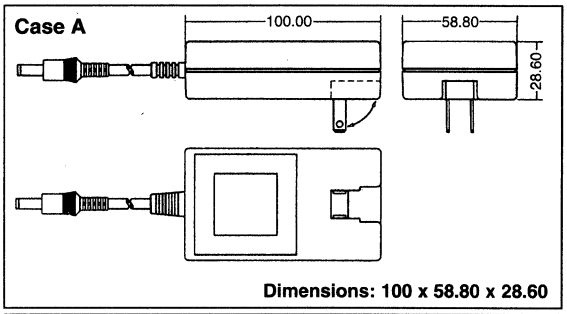
Part number description for Universal Power Adaptors **5W to 100W AC-DC**

APA: ** * * -** -***
A B C D E F

A: ACIworld Power Adaptors
B: Max. Total Power
C: 1-Single Output
2-Dual Output
3-Triple Output
D: Case Size Option: A,B,C,D,E
E: Output Voltage
F: Connector

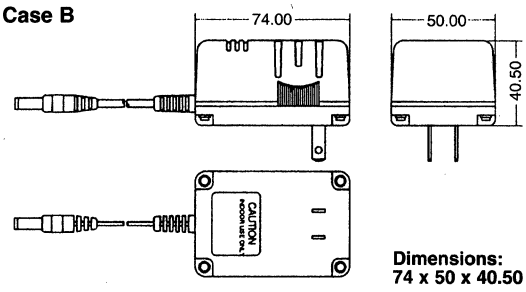
Example: APA - 101-05A-PL1 = 10Watt, 5V Output, Option A
APA - 101B-05-PL-2 = 10Watt, 5V Output, Option B

Case A



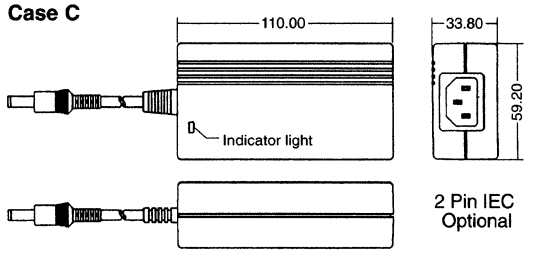
Dimensions: 100 x 58.80 x 28.60

Case B



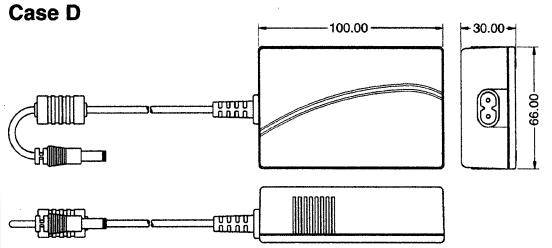
Dimensions: 74 x 50 x 40.50

Case C



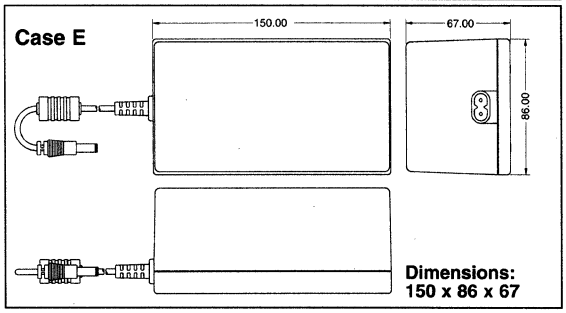
Dimensions: 110 x 33.80 x 59.20

Case D



Dimensions: 100 x 66 x 30

Case E



Dimensions: 150 x 86 x 67

Acopian POWER SUPPLY

LINEAR REGULATED, AC-DC

Shipped within 3 DAYS

1-75 volts
0.02-2.5 amps
0.25-15 watts

MINIATURIZED

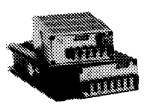
PC Board Mounting

Single output ..... *
Dual & Triple output 3-4
Sockets 4

With Screw Terminals

Single and Dual output 5-6
Mounting kits (for wall mounting or DIN rail mounting) 5

Shipped within 3 DAYS



0-150 volts
0.05-3.5 amps
2-38 watts

NARROW PROFILE

Single output 11-12
Dual output ..... *
Wide adjust output 13-14
Mounting kit (for wall mounting) 18

Shipped within 3 DAYS

0-200 volts
0.1-32 amps
0.6-420 watts

GOLD BOX

Single output 7-10
Dual output ..... *
Triple output ..... *
Wide adjust output 13-14
Adjustable current limiting 13-14
Mounting kit (for wall mounting) 18

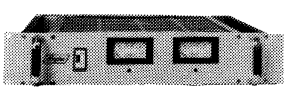
Shipped within 3 DAYS

1-200 volts
0.02-5 amps
0.1-60 watts

PLUG-IN

Single, Dual, and Wide adjust output ..... *
High Isolation and MIL tested ..... *
Solder terminals (optional) ..... *
Sockets ..... *

Shipped within 9 DAYS



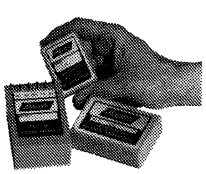
0-150 volts
2.3-60 amps
30-784 watts

RACK MOUNTING

Single output 19-20
Dual output 19-20
Wide adjust output ..... *
Adjustable current limiting ..... *

SWITCHING REGULATED, AC-DC

Shipped within 6 DAYS



5-48 volts
0.65-10.0 amps
50 watts

MINIATURIZED

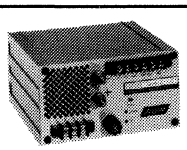
PC Board Mounting

Single output ..... *
Sockets ..... *

With Screw Terminals

Single output ..... *
Mounting kits (for wall mounting or DIN rail mounting) 5

Shipped within 9 DAYS



3.3-48 volts
8-150 amps
325-1200 watts

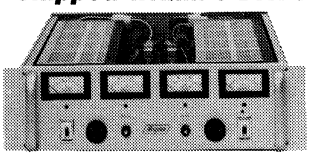
GOLD BOX

Single output 17-18
Wide adjust output 17-18
Mounting kit (for wall mounting) 18

* *See the Acopian Power Supply catalog for these items (call 800-523-9478 to request a catalog). The complete Acopian catalog is also available on the Internet at* ***http://www.acopian.com***

SELECTION GUIDE

Shipped within 9 DAYS — REDUNDANT POWER PACKAGES, AC-DC



PAGE

RACK MOUNTING and NEW!! WALL MOUNTING
Using two linear supplies 22-24
Using two switching supplies ..... 22 and *

Shipped within 9 DAYS — HIGH VOLTAGE REGULATED, AC-DC & DC-DC

0-30 kV
1-60 mA
30-60 watts

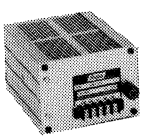
PAGE

MODULAR
Single output 25-26
Mounting kit (for wall mounting) 18

To 30 KV

RACK MOUNTING
Single output 27

Shipped within 3 DAYS — UNREGULATED, AC-DC



GOLD BOX

0-1000 volts
0.02-23 amps
0.8-560 watts

Single output 15-16
Wide adjust output 15-16
Mounting kit (for wall mounting) 18

Shipped within 3 DAYS

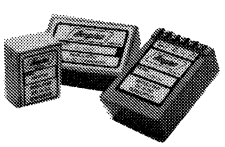
PLUG-IN

0-950 volts
0.02-5 amps
7-140 watts

Single output ..... *
Wide adjust output ..... *
Sockets ..... *

DC-DC CONVERTERS, REGULATED

Shipped within 3 DAYS

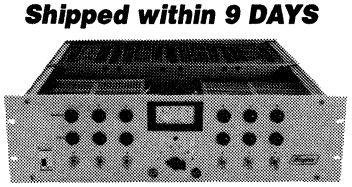


5-28 volts out
0.2-2.5 amps
6-15 watts

MINIATURIZED

PC Board Mounting
Single and Dual output ..... *
Sockets ..... *
With Screw Terminals
Single and Dual output ..... *
Mounting kits (for wall mounting or DIN rail mounting) 5

Shipped within 9 DAYS — POWER SYSTEMS



Any Acopian power module(s) can be included.
Built to user requirements 21

** See the Acopian Power Supply catalog for these items (call 800-523-9478 to request a catalog). The complete Acopian catalog is also available on the Internet at* ***http://www.acopian.com***

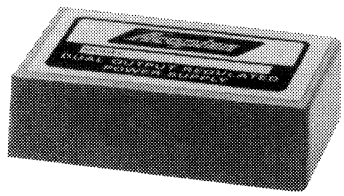
ALL ACOPIAN POWER SUPPLIES MADE IN U.S.A.

Acopian
P. 0. Box 638, Easton, PA 18044
Phone: (610) 258-5441
Fax: (610) 258-2842

dual & triple outputs

Miniaturized - PC Board mounting

LINEAR REGULATED
AC-DC



- Shipped Within 3 Days
- All Models U.L. Recognized
- One Year Warranty

These dual and triple output mini-modules are compact and convenient sources of the voltages required to power operational amplifiers and related circuits. They may be mounted directly on printed circuit board assemblies, simplifying system layout and minimizing the connectors and wiring required.

STANDARD FEATURES

- May be used in series
- No derating or heat sinking required
- Short circuit protected

SPECIFICATIONS

Input Voltage: 105-125 VAC, 47 to 420 Hz, single phase.

Output Voltage Setting: Each output is factory preset to ±2% (1 to 9 volt outputs) or ±1% (10 to 28 volt outputs) of the nominal output voltage. Outputs of Case Size END modules, except those marked (*), may be trimmed to the nominal voltage rating with an external trim resistor.

Polarity: Single output sections may be used in either polarity. Dual output sections, marked (*), are provided with a positive/common/negative output connection configuration.

Ambient Operating Temperature: –20 to +71°C. No derating required.

Storage Temperature: –55 to +85°C.

Temperature Coefficient: From 9 to 28 volts, typical TC is 0.015%/°C; 1 to 8 volts, 0.03%/°C.

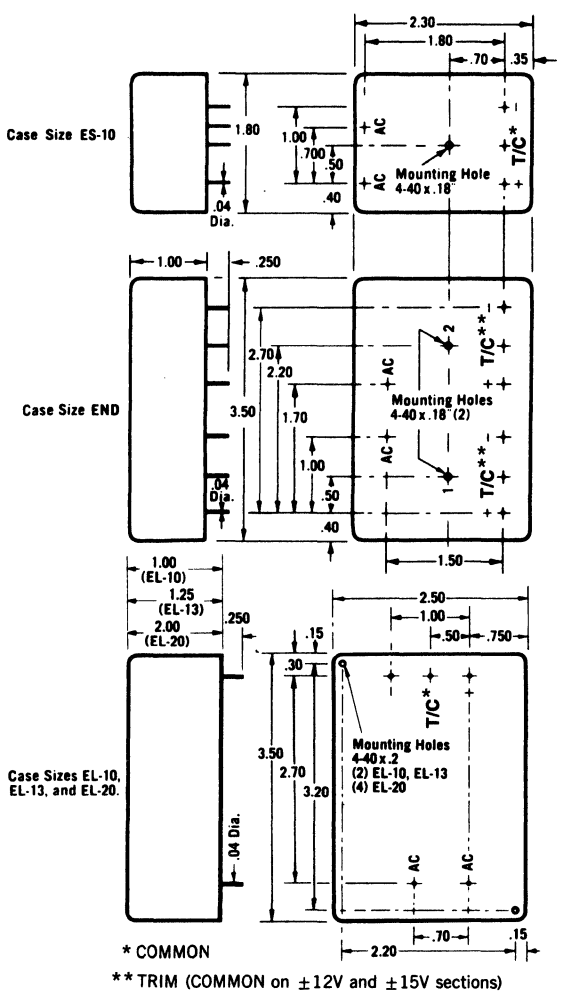
Impedance: 0.07 ohms at 1 kHz and 0.2 ohms at 10 kHz (approx.).

Weight: 7 oz. (Case size ES-10)
13 oz. (Case size END and EL-10)
1 lb. 3 oz. (Case size EL-13)
1 lb. 15 oz. (Case size EL-20)

Mounting: May be mounted on printed circuit board or in socket (see page 4).

OPTIONS

230 Volt Input: All models can be alternately furnished for operation on an input of 210 to 250 VAC, 47-420 Hz. To order, add suffix "–230" to model number and $10.00 to price.



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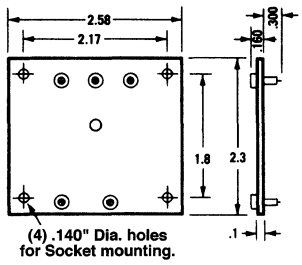
Phone: (610) 258-5441
Fax: (610) 258-2842

The complete Acopian catalog is available on the Internet at **http://www.acopian.com**

Acopian

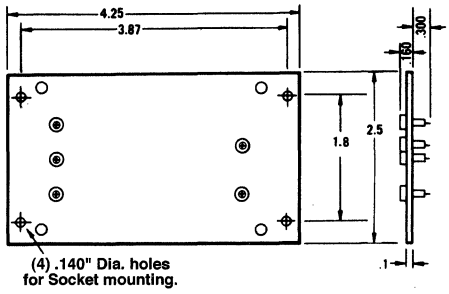
ACCESSORY SOCKETS

For use with PC board mounting Miniaturized Linears and PC board mounting DC-DC Converters. Each of these sockets has a sturdy phenolic base with gold plated teflon-insulated contacts.



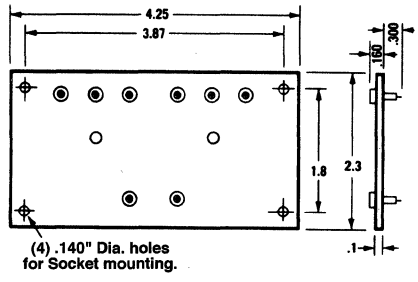
(for case sizes ES-10 and ESC-10)

Model ES-1.....$15



(for case sizes EL-10, EL-13, EL-20 and ELC-10)

Model EL-1.....$15



(for case size END)

Model END-1.....$20

DUAL TRACKING OUTPUTS

Nominal Output Voltages	Amps. per Output	Regulation Load ± %	Regulation Line ± %	Ripple mV RMS	($) Price	Model	Case Size
±5	.150	.1	.05	1.5	79	D5-15	EL-10
±5	.250	.1	.05	1.5	98	D5-25	EL-10
±5	.500	.1	.05	1.5	135	D5-50	EL-20
±10	.200	.05	.05	1	89	D10-20	EL-10
±10	.300	.05	.05	1	115	D10-30	EL-13
±10	.400	.1	.05	1	135	D10-40	EL-20
±12	.025	.1	.05	1	49	D12-03	ES-10
±12	.050	.1	.05	1	59	D12-05	ES-10
±12	.100	.05	.05	1	69	D12-10A	EL-10
±12	.150	.05	.05	1	79	D12-15A	EL-10
±12	.200	.05	.05	1	89	D12-20	EL-10

Nominal Output Voltages	Amps. per Output	Regulation Load ± %	Regulation Line ± %	Ripple mV RMS	($) Price	Model	Case Size
±12	.300	.05	.05	1	105	D12-30	EL-13
±12	.350	.05	.05	1	115	D12-35	EL-13
±12	.500	.1	.05	1	135	D12-50	EL-20
±15	.025	.1	.05	1	49	D15-03	ES-10
±15	.050	.1	.05	1	59	D15-05	ES-10
±15	.100	.05	.05	1	69	D15-10A	EL-10
±15	.150	.05	.05	1	79	D15-15A	EL-10
±15	.200	.05	.05	1	89	D15-20	EL-10
±15	.300	.05	.05	1	105	D15-30	EL-13
±15	.350	.05	.05	1	115	D15-35	EL-13
±15	.500	.1	.05	1	135	D15-50	EL-20

DUAL ISOLATED & TRIPLE OUTPUTS, (User-selectable)

How to Order:

Select two **sections** from those listed below. The complete model number is the combination of the two **section** numbers selected. (*Note that some **sections** provide two outputs; combination with a single output **section** results in a triple-output module.)

Example: The combination of sections 6E20D and 15E10D is the Model 6E20D-15E10D. Always assign the lower voltage section first. (Two of the same section can also be selected.) For pricing purposes, add the costs of the individual sections selected. Example: The price of the Model 6E20D-15E10D is $97.00 total ($52.00 plus $45.00).

Nominal Output Voltage	Output Current Amps.	Regulation Load ± %	Regulation Line ± %	Ripple mV RMS	(see 'How to Order') Price per Section ($)	Section	Case Size
1	.250	.1	.05	0.5	52	1E25D	END
1.5	.250	.1	.05	0.5	52	1.5E25D	END
2	.200	.1	.05	0.5	52	2E20D	END
3	.250	.1	.05	0.5	52	3E25D	END
3.3	.250	.05	.05	0.5	52	3.3E25D	END
4	.200	.05	.05	0.5	52	4E20D	END
5	.250	.05	.05	0.5	52	5E25D	END
6	.200	.05	.05	0.5	52	6E20D	END
7	.170	.05	.05	0.5	52	7E17D	END
8	.150	.05	.05	0.5	52	8E15D	END
9	.130	.05	.05	0.5	45	9E13D	END
10	.120	.02	.02	0.5	45	10E12D	END
±12*	.050	.10	.05	1	52	D12E05	END
12	.100	.02	.02	0.5	45	12E10D	END
12	.150	.05	.05	0.5	55	12E15D	END
13	.100	.02	.02	0.5	45	13E10D	END

Nominal Output Voltage	Output Current Amps.	Regulation Load ± %	Regulation Line ± %	Ripple mV RMS	(see 'How to Order') Price per Section ($)	Section	Case Size
14	.100	.02	.02	0.5	45	14E10D	END
±15*	.050	.10	.05	1	52	D15E05	END
15	.100	.02	.02	0.5	45	15E10D	END
15	.150	.05	.05	0.5	55	15E15D	END
16	.080	.02	.02	0.5	45	16E08D	END
17	.070	.02	.02	0.5	45	17E07D	END
18	.060	.02	.02	0.5	45	18E06D	END
20	.060	.02	.02	0.5	45	20E06D	END
21	.060	.02	.02	0.5	45	21E06D	END
22	.050	.02	.02	0.5	45	22E05D	END
23	.050	.02	.02	0.5	45	23E05D	END
24	.050	.02	.02	0.5	45	24E05D	END
25	.050	.02	.02	0.5	45	25E05D	END
26	.040	.02	.02	0.5	45	26E04D	END
27	.040	.02	.02	0.5	45	27E04D	END
28	.040	.02	.02	0.5	45	28E04D	END

*Dual output section. Combination with a single output section results in a triple output module.

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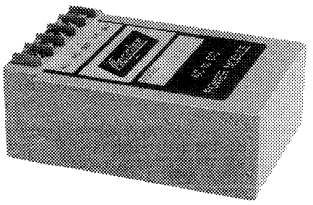


single & dual tracking outputs

Miniaturized - with screw terminals

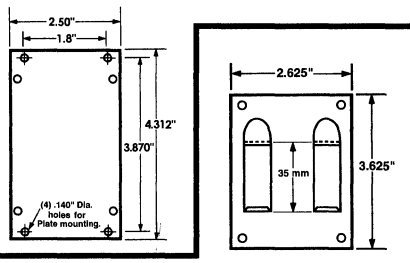
LINEAR REGULATED
AC-DC

- Shipped Within 3 Days
- All Models U.L. Recognized
- One Year Warranty

Although small in size, these mini-modules offer high performance at modest prices. All models, with series regulated outputs ranging from 1 to 75 volts and as high as 2.5 amps, may be mounted in an area only 3.5″ x 2.5″. Dual output models are available with the ratings commonly required for driving op amps and other balanced loads. Terminal strip input/output connections eliminate all need for sockets or soldering. Short circuit protection, encapsulated construction, and conservative design assure long term reliability.

ACCESSORY MOUNTING KITS

For Wall Mounting: To mount from the power supply side of the mounting surface, necessary when the other side of the mounting surface is inaccessible, use accessory Mounting Kit EB4. This kit consists of an aluminum plate and four screws for attaching it to the power supply, effectively adding mounting flanges to the power supply. **Mounting Kit EB4.....$5.00**



For DIN rail mounting: This kit consists of an aluminum plate, with two clips attached to it, and four screws for attaching the plate to the power supply. The power supply can then be snapped onto a 35mm "top hat" type of DIN rail. **Mounting Kit EB35DIN.....$12.00**

STANDARD FEATURES

- May be used in series
- No derating or heat sinking required
- Short circuit protected
- Small, lightweight

SPECIFICATIONS

Input Voltage: 105-125 VAC, 47 to 420 Hz, single phase.

Output Voltage Trim Adjustment: Outputs factory preset to ±2% (1 to 9 volt models) or ±1% (10 to 75 volt models) of nominal output voltage. Single output models may be trimmed to the nominal voltage rating with an external trim resistor.

Polarity: Either positive or negative terminal of a single output module may be grounded. Dual output modules have a positive/common/negative output terminal configuration.

Ambient Operating Temperature: –20 to +71°C. No derating required.

Storage Temperature: –55 to +85°C.

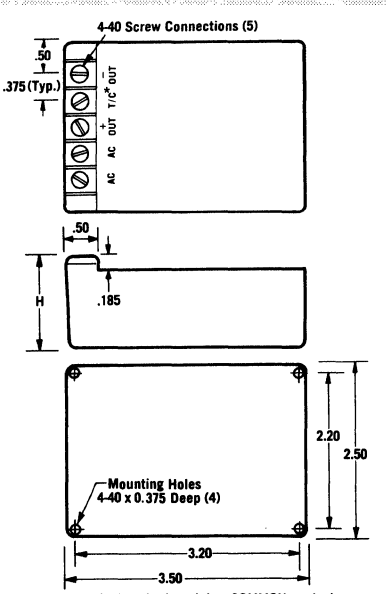
Temperature Coefficient: From 9 to 75 volts, typical TC is 0.015%/°C; 1 to 8 volts, 0.03%/°C.

Impedance: 0.07 ohms at 1 kHz and 0.2 ohms at 10 kHz (approx.).

Mounting: Threaded mounting holes permit mounting to a chassis, cabinet wall or bracket, or they may be used on a test bench or tabletop. When wall-mounting or DIN rail mounting is desired, use accessory Mounting Kit EB4 or EB35DIN.

OPTIONS

230 Volt Input: All models can be alternately furnished for operation on an input of 210 to 250 VAC, 47-420 Hz. To order, add suffix "–230" to model number and $10.00 to price.



Case Size	H	Approx. Weight
EB-10	1.375	15 oz.
EB-13	1.625	1 lb. 4 oz.
EB-20	2.375	2 lb. 1 oz.

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SINGLE OUTPUT, WITH SCREW TERMINALS

(For Miniaturized power supplies with higher wattage outputs than those shown below, contact factory.)

Nominal Output Voltage	Output Current Amps.	Regulation Load ±%	Regulation Line ±%	Ripple mV RMS	($) Price	Model	Case Size
1	.500	.4	.05	1	79	1EB50	EB-10
1.5	.500	.3	.05	1	79	1.5EB50	EB-10
1.5	1.0	.5	.05	1	105	1.5EB100	EB-13
1.5	2.5	.6	.05	1	140	1.5EB250	EB-20
2	.400	.25	.05	1	79	2EB40	EB-10
3	.500	.25	.05	1	79	3EB50	EB-10
3.3	.500	.15	.05	1	79	3.3EB50	EB-10
3.3	1.0	.4	.05	1	105	3.3EB100	EB-13
3.3	2.0	.4	.05	1	125	3.3EB200	EB-20
4	.400	.15	.05	1	79	4EB40	EB-10
5	.500	.15	.05	1	79	5EB50	EB-10
5	1.0	.25	.05	1	95	5EB100	EB-13
5	1.5	.25	.05	1	110	5EB150	EB-13
5	2.0	.25	.05	1	125	5EB200	EB-20
5	2.5	.25	.05	1	140	5EB250	EB-20
6	.400	.1	.05	1	79	6EB40	EB-10
6	.550	.25	.05	1	95	6EB55	EB-10
6	1.0	.25	.05	1	110	6EB100	EB-13
6	1.75	.2	.05	1	130	6EB175	EB-20
7	.340	.1	.05	1	79	7EB34	EB-10
7	.450	.2	.05	1	95	7EB45	EB-10
7	.900	.25	.05	1	110	7EB90	EB-13
7	1.15	.2	.05	1	130	7EB115	EB-20
8	.300	.1	.05	1	79	8EB30	EB-10
8	.700	.2	.05	1	110	8EB70	EB-13
8	1.1	.2	.05	1	130	8EB110	EB-20
9	.260	.1	.05	1	79	9EB26	EB-10
9	.450	.15	.05	1	95	9EB45	EB-10
9	.850	.2	.05	1	110	9EB85	EB-13
9	1.5	.2	.05	1	135	9EB150	EB-20
10	.240	.05	.05	1	79	10EB24	EB-10
10	.400	.15	.05	1	95	10EB40	EB-10
10	.750	.2	.05	1	110	10EB75	EB-13
10	1.2	.15	.05	1	135	10EB120	EB-20
11	.220	.05	.05	1	79	11EB22	EB-10
11	.350	.15	.05	1	95	11EB35	EB-10
11	.600	.15	.05	1	110	11EB60	EB-13
11	1.0	.15	.05	1	135	11EB100	EB-20
12	.200	.05	.05	1	79	12EB20	EB-10
12	.400	.1	.05	1	95	12EB40	EB-10
12	.700	.15	.05	1	115	12EB70	EB-13
12	1.2	.2	.05	1	135	12EB120	EB-20
13	.200	.05	.05	1	79	13EB20	EB-10
13	.350	.1	.05	1	95	13EB35	EB-10
13	.600	.1	.05	1	115	13EB60	EB-13
13	1.0	.15	.05	1	135	13EB100	EB-20
14	.200	.05	.05	1	79	14EB20	EB-10
14	.300	.1	.05	1	95	14EB30	EB-10
14	.500	.1	.05	1	110	14EB50	EB-13
14	1.0	.15	.05	1	135	14EB100	EB-20
15	.200	.05	.05	1	79	15EB20	EB-10
15	.400	.1	.05	1	95	15EB40	EB-10
15	.600	.1	.05	1	110	15EB60	EB-13
15	1.0	.15	.05	1	135	15EB100	EB-20
16	.160	.05	.05	1	79	16EB16	EB-10
16	.350	.1	.05	1	100	16EB35	EB-10
16	.500	.1	.05	1	115	16EB50	EB-13
16	.900	.15	.05	1	135	16EB90	EB-20
17	.140	.05	.05	1	79	17EB14	EB-10
17	.325	.1	.05	1	100	17EB33	EB-10
17	.450	.1	.05	1	115	17EB45	EB-13
17	.750	.15	.05	1	135	17EB75	EB-20
18	.120	.05	.05	1	79	18EB12	EB-10
18	.270	.1	.05	1	95	18EB27	EB-10
18	.400	.1	.05	1	110	18EB40	EB-13
18	.550	.1	.05	1	130	18EB55	EB-20

Nominal Output Voltage	Output Current Amps.	Regulation Load ±%	Regulation Line ±%	Ripple mV RMS	($) Price	Model	Case Size
19	.120	.05	.05	1	79	19EB12	EB-10
19	.250	.1	.05	1	95	19EB25	EB-10
19	.400	.1	.05	1	110	19EB40	EB-13
19	.700	.1	.05	1	135	19EB70	EB-20
20	.120	.05	.05	1	79	20EB12	EB-10
20	.200	.1	.05	1	95	20EB20	EB-10
20	.400	.1	.05	1	110	20EB40	EB-13
20	.700	.1	.05	1	135	20EB70	EB-20
21	.120	.05	.05	1	79	21EB12	EB-10
21	.175	.1	.05	1	95	21EB18	EB-10
21	.375	.1	.05	1	110	21EB38	EB-13
21	.600	.1	.05	1	130	21EB60	EB-20
22	.100	.05	.05	1	79	22EB10	EB-10
22	.150	.1	.05	1	95	22EB15	EB-10
22	.300	.1	.05	1	110	22EB30	EB-13
22	.500	.1	.05	1	130	22EB50	EB-20
23	.100	.05	.05	1	79	23EB10	EB-10
23	.200	.1	.05	1	95	23EB20	EB-10
23	.300	.1	.05	1	110	23EB30	EB-13
23	.600	.1	.05	1	135	23EB60	EB-20
24	.100	.05	.05	1	79	24EB10	EB-10
24	.200	.1	.05	1	95	24EB20	EB-10
24	.350	.1	.05	1	115	24EB35	EB-13
24	.600	.1	.05	1	135	24EB60	EB-20
25	.100	.05	.05	1	79	25EB10	EB-10
25	.190	.1	.05	1	95	25EB19	EB-10
25	.325	.1	.05	1	115	25EB33	EB-13
25	.550	.1	.05	1	135	25EB55	EB-20
26	.080	.05	.05	1	79	26EB08	EB-10
26	.170	.1	.05	1	95	26EB17	EB-10
26	.300	.1	.05	1	110	26EB30	EB-13
26	.450	.1	.05	1	130	26EB45	EB-20
27	.080	.05	.05	1	79	27EB08	EB-10
27	.160	.1	.05	1	95	27EB16	EB-10
27	.300	.1	.05	1	110	27EB30	EB-13
27	.500	.1	.05	1	135	27EB50	EB-20
28	.080	.05	.05	1	79	28EB08	EB-10
28	.150	.1	.05	1	95	28EB15	EB-10
28	.300	.1	.05	1	115	28EB30	EB-13
28	.500	.1	.05	1	135	28EB50	EB-20
30	.080	.02	.02	1	85	30EB08	EB-13
32	.070	.02	.02	1	85	32EB07	EB-13
34	.060	.02	.02	1	85	34EB06	EB-13
35	.050	.02	.02	1	85	35EB05	EB-13
36	.050	.02	.02	1	85	36EB05	EB-13
38	.040	.02	.02	1	85	38EB04	EB-13
40	.030	.02	.02	1	85	40EB03	EB-13
40	.060	.02	.02	1	105	40EB06	EB-13
42	.030	.02	.02	1	85	42EB03	EB-13
44	.030	.02	.02	1	85	44EB03	EB-13
45	.030	.02	.02	1	85	45EB03	EB-13
48	.030	.02	.02	1	85	48EB03	EB-13
48	.050	.02	.02	1	105	48EB05	EB-13
50	.030	.02	.02	1	85	50EB03	EB-13
50	.050	.02	.02	1	105	50EB05	EB-13
55	.040	.02	.02	1	105	55EB04	EB-13
60	.050	.02	.02	1	105	60EB05	EB-13
65	.050	.02	.02	1	105	65EB05	EB-13
70	.040	.02	.02	1	105	70EB04	EB-13
75	.030	.02	.02	1	105	75EB03	EB-13
185	.025	Unregulated		2V	55	NX-25B	EB-10
185	.050	Unregulated		3.5V	75	NX-50B	EB-13

DUAL TRACKING OUTPUTS

Nominal Output Voltages	Amps. per Output	Regulation Load ±%	Regulation Line ±%	Ripple mV RMS	($) Price	Model	Case Size
±5	.150	.1	.05	1.5	85	DB5-15	EB-10
±5	.250	.1	.05	1.5	105	DB5-25	EB-10
±5	.500	.1	.05	1.5	145	DB5-50	EB-20
±10	.200	.05	.05	1	95	DB10-20	EB-10
±10	.300	.05	.05	1	125	DB10-30	EB-13
±10	.400	.1	.05	1	145	DB10-40	EB-20
±12	.100	.05	.05	1	75	DB12-10	EB-10
±12	.150	.05	.05	1	85	DB12-15	EB-10
±12	.200	.05	.05	1	95	DB12-20	EB-10

Nominal Output Voltages	Amps. per Output	Regulation Load ±%	Regulation Line ±%	Ripple mV RMS	($) Price	Model	Case Size
±12	.300	.05	.05	1	115	DB12-30	EB-13
±12	.350	.05	.05	1	125	DB12-35	EB-13
±12	.500	.1	.05	1	145	DB12-50	EB-20
±15	.100	.05	.05	1	75	DB15-10	EB-10
±15	.150	.05	.05	1	85	DB15-15	EB-10
±15	.200	.05	.05	1	95	DB15-20	EB-10
±15	.300	.05	.05	1	115	DB15-30	EB-13
±15	.350	.05	.05	1	125	DB15-35	EB-13
±15	.500	.1	.05	1	145	DB15-50	EB-20

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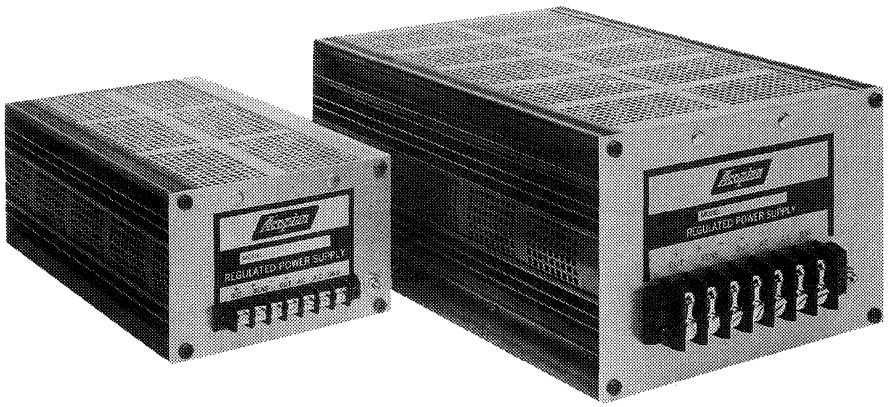
Gold Box

SINGLE OUTPUT

LINEAR REGULATED
AC-DC

SERIES A (High Performance)



- Shipped Within 3 Days
- All Models U.L. Recognized
- Five Year Warranty

Series A power supplies offer unusually high performance—many models have regulation of ±0.005%. Electronic current limiting and provision for remote voltage sensing are standard features; overvoltage protection is available as a built-in option. Rugged extruded aluminum cases include threaded mounting holes on bottom, back, and side, permitting mounting in any position.

SERIES A: HIGH PERFORMANCE POWER SUPPLIES

STANDARD FEATURES

- Provision for remote sensing and/or external output adjustment
- Short circuit proof with automatic recovery (electronic current limiting)
- Can be mounted on any of three surfaces (case sizes H8, H11 and H16; two surfaces)

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Output Specifications: See pages 9 and 10. Series A supplies have model numbers beginning with the letter A.

Remote Voltage Sensing: Provision for sensing the output voltage across the load, so that drops in the load line are compensated, is a standard feature.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 volts above ground.

Temperature Coefficient: 0.015%/°C (Typical).

Ambient Operating Temperature: –20 to +71°C.

Storage Temperature: –55 to +85°C.

Response Time: Less than 20 microseconds.

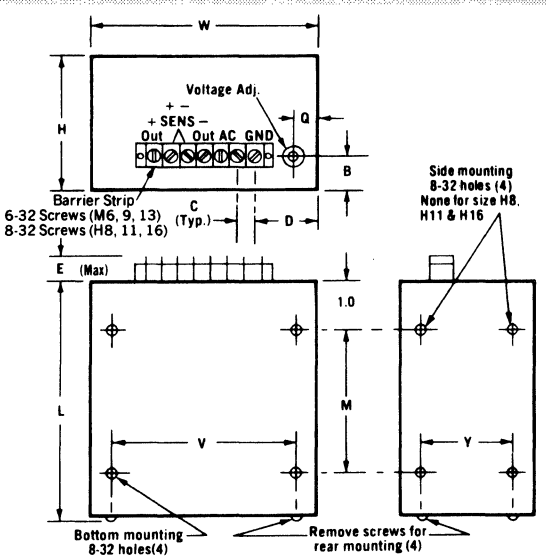
OPTIONS

Overvoltage Protection: An internal preset overvoltage protector is available in models with outputs of 3 volts and higher. To order, add prefix "V" to the model number, and increase standard price as follows:

Outputs of	3-70V	75-150V
All case sizes except H16	$25.00	$35.00
Case size H16	75.00	85.00

Terminal Strip Cover: Clips on. To order, add suffix "M" to model number and $5.00 to price.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210-250 VAC, 50-400 Hz. To order, add suffix "–230" to model number and $25.00 to price. (For models in case sizes H8, H11 and H16, add $40.00.)



Case Size	L	W	H	M	V	Y	E	Q	B	C	D	Approx. Weight
M6	6.59	5.12	3.44	4.0	4.5	3.0	.58	.5	.75	.375	1.44	4 lb. 4 oz.
M9	9.25	5.12	3.44	6.0	4.5	3.0	.58	.5	.75	.375	1.44	7 lb. 4 oz.
M13	13.25	5.12	3.44	10.0	4.5	3.0	.58	.5	.75	.375	1.44	11 lb.
H8	8.75	7.37	5.12	6.0	6.75	4.56	.78	1.12	1.25	.562	2.25	15 lb. 8 oz.
H11	11.25	7.37	5.12	8.0	6.75	4.56	.78	1.12	1.25	.562	2.25	18 lb. 4 oz.
H16	16.00	7.37	5.12	11.0	6.75	4.56	.78	1.12	1.25	.562	2.25	26 lb.

Mounting: Threaded mounting holes permit mounting to a chassis, cabinet wall or bracket, or they may be used on a test bench or tabletop. To mount from the power supply side of the mounting surface, see accessory Mounting Kit GB8 on page 18.

P. 0. Box 638, Easton, PA 18044
Phone: (610) 258-5441
Fax: (610) 258-2842

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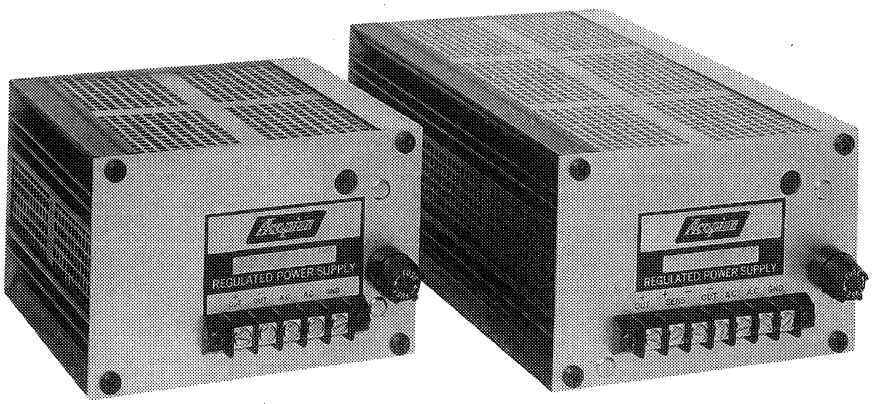


Gold Box

SINGLE OUTPUT

LINEAR REGULATED AC-DC

SERIES B (General Purpose)

- Shipped Within 3 Days
- All Models U.L. Recognized
- Five Year Warranty

Series B power supplies are ideal for powering digital circuitry, test sets, instrument bridges, and process control transmitters. Many models have regulation of ±0.1% or better. All components are generously derated to insure a long and trouble-free life, and they use the same rugged construction as the Series A line. Overvoltage protection and other options are available.

SERIES B: GENERAL PURPOSE POWER SUPPLIES

STANDARD FEATURES

- Short circuit proof (electronic current limiting)
- May be mounted on any of three surfaces
- Completely serviceable

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Output Specifications: See pages 9 and 10. Series B supplies have model numbers beginning with the letter B.

Remote Voltage Adjustment/Sensing: Available as an option. See below.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 volts above ground.

Temperature Coefficient: 0.02%/°C (Typical).

Ambient Operating Temperature: 0 to +71°C.

Storage Temperature: –55 to +85°C.

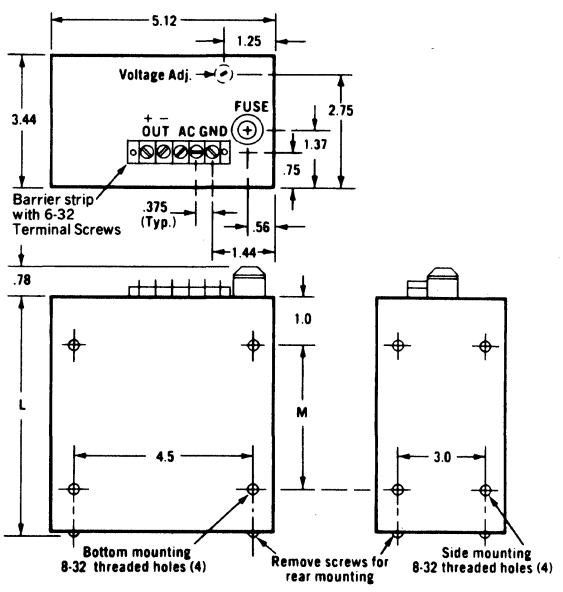
OPTIONS

Overvoltage Protection: An internal preset overvoltage protector is available in all models with outputs of 3 volts and higher. To order, add prefix "V" to the model number, and add $25.00 to the standard price of models with outputs of 3 to 70 volts; $35.00, for 75 to 200 volt outputs.

Remote Voltage Sensing: Provision for sensing the output voltage across the load, so that drops in the load lines are compensated, is available on all models. (This option also permits the use of an externally located potentiometer to adjust output voltage.) To order, add prefix "R" to the model number. No increase in price.

Terminal Strip Cover: Clips on. To order, add suffix "M" to model number and $5.00 to price.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210-250 VAC, 50-400 Hz. To order, add suffix "–230" to model number and $25.00 to price.



Case Size	L	M	Approx. Weight
G3	3.71	1.62	3 lb. 2 oz.
G5	5.09	3.00	4 lb. 14 oz.
G6	6.59	4.00	5 lb. 8 oz.
G9	9.25	6.00	7 lb. 4 oz.
G13	13.25	10.00	11 lb.

Mounting: Threaded mounting holes permit mounting to a chassis, cabinet wall or bracket, or they may be used on a test bench or tabletop. To mount from the power supply side of the mounting surface, see accessory Mounting Kit GB8 on page 18.

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Acopian

SERIES A & B

Nominal Output Voltage	Adjust ±V	Output Current Amps. at 40°C	55°C	71°C	Regulation Load ± %*	Line ± %*	Ripple mV RMS	($) Price	Model	Case Size
1.5	.5	6.0	4.3	3.5	.005	.005	.250	205	A1.5MT600	M6
1.5	.5	9.0	7.2	5.5	.005	.005	.250	235	A1.5MT900	M9
1.5	.5	12.0	10.0	8.0	.005	.005	.250	280	A1.5MT1200	M13
1.5	.5	22.0	18.5	15.5	.005	.005	.250	360	A1.5H2200	H11
1.5	.5	32.0	27.0	22.5	.005	.005	.250	440	A1.5H3200	H16
2	.5	6.0	4.3	3.5	.005	.005	.250	205	A2MT600	M6
2	.5	12.0	10.0	8.0	.005	.005	.250	280	A2MT1200	M13
3	.5	.500	.500	.500	.2	.1	1	95	B3G50	G3
3	.5	1.2	1.1	1.0	.2	.1	1	115	B3G120	G3
3	.5	2.1	2.1	2.0	.5	.1	1	135	B3G210	G5
3	.5	4.0	3.5	3.0	.5	.1	1.5	170	B3G400	G6
3	.5	6.0	4.3	3.5	.005	.005	.250	205	A3MT600	M6
3	.5	9.0	7.2	5.5	.005	.005	.250	235	A3MT900	M9
3	.5	12.0	10.0	8.0	.005	.005	.250	280	A3MT1200	M13
3	.5	17.0	14.5	12.0	.005	.005	.250	315	A3H1700	H8
3	.5	20.0	16.5	13.5	.005	.005	.250	360	A3H2000	H11
3	.5	30.0	25.0	20.0	.005	.005	.250	440	A3H3000	H16
3.3	.5	.500	.500	.500	.2	.1	1	95	B3.3G50	G3
3.3	.5	1.2	1.1	1.0	.2	.1	1	115	B3.3G120	G3
3.3	.5	2.1	2.1	2.0	.5	.1	1	135	B3.3G210	G5
3.3	.5	4.0	3.5	3.0	.5	.1	1.5	170	B3.3G400	G6
3.3	.5	6.0	4.3	3.5	.005	.005	.250	205	A3.3MT600	M6
3.3	.5	7.0	5.9	4.9	.5	.1	1.5	210	B3.3G700	G9
3.3	.5	9.0	7.2	5.5	.005	.005	.250	240	A3.3MT900	M9
3.3	.5	12.0	10.0	8.0	.005	.005	.250	280	A3.3MT1200	M13
3.3	.5	17.0	14.5	12.0	.005	.005	.250	315	A3.3H1700	H8
3.3	.5	22.0	18.5	15.5	.005	.005	.250	360	A3.3H2200	H11
3.3	.5	32.0	27.0	22.5	.005	.005	.250	440	A3.3H3200	H16
5	.5	.500	.500	.500	.1	.1	1	95	B5G50	G3
5	.5	1.2	1.1	1.0	.1	.1	1	115	B5G120	G3
5	.5	1.7	1.5	1.3	.2	.1	1.5	125	B5G170	G3
5	.5	2.1	2.1	2.0	.2	.1	1.5	135	B5G210	G5
5	.5	4.0	3.5	3.0	.3	.1	1.5	160	B5G400	G6
5	.5	5.0	4.4	3.0	.4	.1	1.5	175	B5G500	G6
5	.5	5.1	3.6	2.6	.005	.005	.250	190	A5MT510	M6
5	.5	6.0	4.3	3.5	.005	.005	.250	210	A5MT600	M6
5	.5	8.0	7.0	5.0	.4	.1	1.5	215	B5G800	G9
5	.5	9.0	7.2	5.5	.005	.005	.250	240	A5MT900	M9
5	.5	10.0	9.0	7.0	.4	.1	1.5	245	B5G1000	G13
5	.5	12.0	10.0	8.0	.005	.005	.250	280	A5MT1200	M13
5	.5	17.0	14.5	12.0	.005	.005	.250	315	A5H1700	H8
5	.5	22.0	18.5	15.0	.005	.005	.250	360	A5H2200	H11
5	.5	32.0	27.0	22.0	.005	.005	.250	440	A5H3200	H16
6	1	.500	.500	.500	.1	.1	1	95	B6G50	G3
6	.5	1.2	1.1	1.0	.1	.1	1	115	B6G120	G3
6	.5	1.7	1.5	1.3	.2	.1	1.5	125	B6G170	G3
6	.5	3.2	3.1	3.0	.3	.1	1.5	155	B6G320	G6
6	.5	4.9	3.5	2.5	.005	.005	.250	175	A6MT490	M6
6	.5	6.0	4.5	3.5	.005	.005	.250	200	A6MT600	M6
6	.5	8.5	7.5	5.2	.005	.005	.250	240	A6MT850	M9
6	.5	11.0	9.3	7.5	.005	.005	.250	280	A6MT1100	M13
6	.5	16.0	13.6	11.2	.005	.005	.250	320	A6H1600	H8
6	.5	21.0	17.0	14.0	.005	.005	.250	365	A6H2100	H11
6	.5	28.0	23.0	19.0	.005	.005	.250	440	A6H2800	H16
7	1	.500	.500	.500	.1	.05	1	100	B7G50	G3
7	1	1.0	1.0	1.0	.1	.1	1	125	B7G100	G3
7	.5	2.0	2.0	2.0	.2	.1	1.5	145	B7G200	G5
7	.5	3.0	2.7	2.5	.3	.1	1.5	165	B7G300	G6
7	.5	5.0	4.0	3.0	.005	.005	.250	200	A7MT500	M6
7	.5	6.5	5.2	4.0	.4	.1	1.0	210	B7G650	G9
7	.5	8.0	6.5	5.0	.005	.005	.250	245	A7MT800	M9
7	.5	10.0	8.0	7.0	.4	.1	1.5	255	B7G1000	G13
7	.5	10.0	8.8	7.0	.005	.005	.250	280	A7MT1000	M13
8	1	.500	.500	.500	.1	.05	1	100	B8G50	G3
8	1	1.0	1.0	1.0	.1	.1	1	125	B8G100	G3
8	.5	2.0	2.0	2.0	.2	.1	1.5	145	B8G200	G5
8	.5	3.0	2.7	2.5	.2	.1	1.5	165	B8G300	G6
8	.5	5.0	4.0	3.5	.005	.005	.250	200	A8MT500	M6
8	.5	6.5	5.2	4.0	.3	.1	1.5	220	B8G650	G9
8	.5	8.0	6.5	5.0	.005	.005	.250	245	A8MT800	M9
8	.5	10.0	8.0	7.0	.4	.1	1.5	255	B8G1000	G13
8	.5	10.5	8.8	7.0	.005	.005	.250	280	A8MT1050	M13
8	.5	20.0	16.8	13.5	.005	.005	.250	385	A8H2000	H11
8	.5	28.0	23.0	19.0	.005	.005	.250	440	A8H2800	H16
9	1	.500	.500	.500	.1	.05	1	100	B9G50	G3
9	1	1.0	1.0	1.0	.1	.1	1	125	B9G100	G3
9	.5	2.0	2.0	2.0	.2	.1	1.5	145	B9G200	G5
9	.5	3.0	2.7	2.5	.2	.1	1.5	165	B9G300	G6
9	.5	6.5	5.2	4.0	.3	.1	1.5	220	B9G650	G9
9	.5	10.0	8.3	7.0	.005	.005	.250	280	A9MT1000	M13

*or 2 mv, whichever is greater

Nominal Output Voltage	Adjust ±V	Output Current Amps. at 40°C	55°C	71°C	Regulation Load ± %*	Line ± %*	Ripple mV RMS	($) Price	Model	Case Size
10	1	.500	.500	.500	.1	.05	1	95	B10G50	G3
10	1	1.0	1.0	1.0	.1	.1	1	115	B10G100	G3
10	.5	2.0	2.0	2.0	.2	.1	1.5	145	B10G200	G5
10	.5	3.0	2.7	2.5	.2	.1	1.5	165	B10G300	G6
10	.5	4.5	3.6	2.7	.005	.005	.250	200	A10MT450	M6
10	.5	6.0	5.0	4.0	.3	.1	1.5	220	B10G600	G9
10	.5	7.5	6.0	4.5	.005	.005	.250	250	A10MT750	M9
10	.5	10.0	8.3	7.0	.4	.1	1.5	255	B10G1000	G13
10	.5	10.0	8.3	7.0	.005	.005	.250	280	A10MT1000	M13
10	.5	14.0	11.9	9.8	.005	.005	.250	335	A10H1400	H8
10	.5	18.0	15.0	12.0	.005	.005	.250	385	A10H1800	H11
10	.5	25.0	20.0	16.5	.005	.005	.250	440	A10H2500	H16
12	1	.500	.500	.500	.1	.05	1	95	B12G50	G3
12	1	1.0	1.0	1.0	.1	.1	1	115	B12G100	G3
12	.5	2.0	1.7	1.5	.2	.1	1.5	140	B12G200	G5
12	.5	3.0	2.7	2.5	.2	.1	1.5	160	B12G300	G6
12	.5	3.8	3.3	2.6	.2	.1	1.5	170	B12G380	G6
12	.5	4.0	3.3	2.6	.005	.005	.250	195	A12MT400	M6
12	.5	6.5	5.3	4.0	.3	.1	1.5	220	B12G650	G9
12	.5	6.5	5.3	4.0	.005	.005	.250	245	A12MT650	M9
12	.5	9.0	7.5	6.0	.4	.1	1.5	255	B12G900	G13
12	.5	9.0	7.5	6.0	.005	.005	.250	280	A12MT900	M13
12	.5	13.0	11.0	9.1	.005	.005	.250	335	A12H1300	H8
12	.5	17.0	14.3	11.5	.005	.005	.250	385	A12H1700	H11
12	.5	21.0	17.5	14.5	.005	.005	.250	440	A12H2100	H16
13	1	.500	.500	.500	.1	.05	1	105	B13G50	G3
13	1	1.5	1.4	1.3	.1	.1	1.5	140	B13G150	G3
13	.5	2.0	2.0	2.0	.2	.1	1.5	155	B13G200	G5
13	.5	3.0	2.7	2.5	.2	.1	1.5	175	B13G300	G6
13	.5	3.5	3.0	2.5	.005	.005	.250	200	A13MT350	M6
13	.5	5.0	4.5	4.0	.2	.1	1.5	215	B13G500	G9
13	.5	8.0	7.5	7.0	.3	.1	1.5	255	B13G800	G13
13	.5	8.0	7.5	7.0	.005	.005	.250	280	A13MT800	M13
14	1	.500	.500	.500	.1	.05	1	105	B14G50	G3
14	1	1.5	1.4	1.3	.1	.1	1.5	140	B14G150	G3
14	.5	2.0	2.0	2.0	.2	.1	1.5	155	B14G200	G5
14	.5	3.0	2.7	2.5	.2	.1	1.5	175	B14G300	G6
14	.5	3.0	2.7	2.5	.005	.005	.250	195	A14MT300	M6
14	.5	5.0	4.5	4.0	.2	.1	1.5	210	B14G500	G9
14	.5	7.0	6.5	6.0	.3	.1	1.5	255	B14G700	G13
14	.5	8.0	7.5	7.0	.005	.005	.250	280	A14MT800	M13
15	1	.750	.750	.750	.1	.1	1	110	B15G75	G3
15	1	1.0	1.0	1.0	.1	.1	1	115	B15G100	G3
15	1	1.5	1.4	1.3	.1	.1	1.5	130	B15G150	G3
15	.5	2.0	1.7	1.5	.1	.1	1.5	145	B15G200	G5
15	.5	3.0	2.8	2.5	.1	.1	1.5	165	B15G300	G6
15	.5	3.0	2.8	2.5	.005	.005	.250	180	A15MT300	M6
15	.5	4.2	3.8	3.0	.15	.1	1.5	195	B15G420	G9
15	.5	5.5	4.7	4.0	.005	.005	.250	245	A15MT550	M9
15	.5	6.0	5.0	4.0	.2	.1	1.5	235	B15G600	G9
15	.5	7.0	6.0	5.0	.2	.1	1.5	255	B15G700	G13
15	.5	8.0	6.5	5.5	.005	.005	.250	280	A15MT800	M13
15	.5	11.5	9.7	8.0	.005	.005	.250	335	A15H1150	H8
15	.5	15.0	12.8	10.5	.005	.005	.250	380	A15H1500	H11
15	.5	19.0	16.3	13.5	.005	.005	.250	440	A15H1900	H16
16	1	.300	.300	.300	.05	.05	1	80	B16G30	G3
16	.5	1.0	1.0	1.0	.1	.1	1	125	B16G100	G3
16	.5	3.0	2.5	2.0	.15	.1	1	190	B16G300	G9
16	.5	5.0	5.0	5.0	.2	.1	1.5	245	B16G500	G9
16	.5	6.5	6.0	5.5	.005	.005	.250	280	A16MT650	M13
18	1	.300	.300	.300	.05	.05	1	80	B18G30	G3
18	1	.750	.750	.750	.1	.1	1	110	B18G75	G3
18	.5	1.1	1.1	1.0	.1	.1	1	125	B18G110	G5
18	.5	2.1	2.0	1.8	.1	.1	1	155	B18G210	G5
18	.5	2.1	2.1	2.0	.005	.005	.250	175	A18MT210	M6
18	.5	3.0	2.8	2.5	.15	.1	1	190	B18G300	G9
18	.5	4.5	4.0	3.5	.005	.005	.250	235	A18MT450	M9
18	.5	6.5	6.0	5.5	.005	.005	.250	280	A18MT650	M13
18	.5	14.0	12.0	10.0	.005	.005	.250	385	A18H1400	H11
18	.5	18.0	15.5	13.0	.005	.005	.250	440	A18H1800	H16
20	1	.300	.300	.300	.05	.05	1	80	B20G30	G3
20	1	.750	.750	.750	.1	.05	1	110	B20G75	G3
20	1	1.1	1.1	1.0	.1	.1	1	125	B20G110	G5
20	.5	1.7	1.7	1.5	.1	.1	1.5	140	B20G170	G5
20	.5	2.0	2.0	2.0	.005	.005	.250	180	A20MT200	M6
20	.5	2.7	2.0	1.2	.15	.1	1.5	190	B20G270	G6
20	.5	4.0	3.5	3.0	.005	.005	.250	235	A20MT400	M9
20	.5	5.0	5.0	5.0	.15	.1	1.5	250	B20G500	G13
20	.5	6.0	5.5	5.0	.005	.005	.250	280	A20MT600	M13
20	.5	9.5	8.0	6.6	.005	.005	.250	335	A20H950	H8
20	.5	13.0	11.3	9.5	.005	.005	.250	385	A20H1300	H11
20	.5	16.0	14.0	12.0	.005	.005	.250	440	A20H1600	H16

*or 2 mv, whichever is greater

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SERIES A & B

Nominal Output Voltage	Adjust ±V	Output Current Amps. at 40°C	55°C	71°C	Regulation Load ± %	Line ± %	Ripple mV RMS	($) Price	Model	Case Size
24	1	.300	.300	.300	.05	.05	1	80	B24G30	G3
24	1	.750	.750	.750	.1	.05	1	115	B24G75	G3
24	1	1.1	1.1	1.0	.1	.1	1.5	130	B24G110	G5
24	.5	1.7	1.7	1.5	.1	.1	1.5	145	B24G170	G5
24	.5	2.1	2.0	2.0	.1	.1	1.5	160	B24G210	G5
24	.5	2.1	2.0	2.0	.005	.005	.250	185	A24MT210	M6
24	.5	3.5	3.0	2.5	.15	.1	1.5	205	B24G350	G9
24	.5	3.5	3.0	2.5	.005	.005	.250	245	A24MT350	M9
24	.5	5.0	5.0	5.0	.15	.1	1.5	255	B24G500	G13
24	.5	5.5	5.0	4.5	.005	.005	.250	280	A24MT550	M13
24	.5	8.5	7.2	5.9	.005	.005	.250	335	A24H850	H8
24	.5	12.0	10.5	9.0	.005	.005	.250	385	A24H1200	H11
24	.5	15.0	13.0	11.0	.005	.005	.250	440	A24H1500	H16
25	1	.300	.300	.300	.05	.05	1	100	B25G30	G3
25	1	.750	.750	.750	.1	.05	1	120	B25G75	G3
25	1	1.1	1.1	1.1	.1	.1	1.5	140	B25G110	G5
25	.5	1.7	1.7	1.5	.1	.1	1.5	165	B25G170	G5
25	.5	2.1	2.1	2.0	.1	.1	1.5	170	B25G210	G5
25	.5	3.5	3.0	2.5	.15	.1	1.5	210	B25G350	G9
25	.5	5.0	5.0	5.0	.15	.1	1.5	265	B25G500	G13
28	1	.300	.300	.300	.05	.05	1	100	B28G30	G3
28	1	.500	.500	.500	.05	.05	1	110	B28G50	G3
28	1	.800	.800	.800	.1	.05	1	120	B28G80	G5
28	1	1.1	1.1	1.0	.1	.05	1	135	B28G110	G5
28	.5	1.8	1.6	1.5	.1	.1	1.5	160	B28G180	G5
28	.5	2.1	2.1	2.0	.1	.1	1.5	170	B28G210	G5
28	.5	2.1	2.1	2.0	.005	.005	.250	190	A28MT210	M6
28	.5	3.0	2.7	2.5	.15	.1	1.5	200	B28G300	G9
28	.5	3.0	2.7	2.5	.005	.005	.250	225	A28MT300	M9
28	.5	5.0	5.0	5.0	.15	.1	1.5	255	B28G500	G13
28	.5	5.0	5.0	5.0	.005	.005	.250	280	A28MT500	M13
28	.5	8.0	6.8	5.6	.005	.005	.250	335	A28H800	H8
28	.5	11.0	9.5	8.0	.005	.005	.250	385	A28H1100	H11
28	.5	14.0	12.0	10.0	.005	.005	.250	440	A28H1400	H16
30	1	.300	.300	.300	.05	.05	1	100	B30GT30	G3
30	1	.500	.500	.500	.05	.05	1	115	B30GT50	G3
30	1	1.1	1.1	1.0	.1	.1	1	145	B30GT110	G5
30	.5	1.7	1.6	1.5	.1	.1	1.5	160	B30GT170	G5
30	.5	2.1	2.1	2.0	.1	.1	1.5	175	B30G210	G6
30	.5	2.1	2.1	2.0	.005	.005	.250	195	A30MT210	M6
30	.5	3.0	2.7	2.5	.005	.005	.250	230	A30MT300	M9
30	.5	5.0	5.0	5.0	.15	.1	1.5	260	B30GT500	G13
30	.5	5.0	5.0	5.0	.005	.005	.250	280	A30MT500	M13
30	.5	7.5	6.3	5.2	.005	.005	.250	340	A30H750	H8
30	.5	10.0	9.0	8.0	.005	.005	.250	395	A30H1000	H11
30	.5	14.0	12.0	10.0	.005	.005	.250	455	A30H1400	H16
32	1	.300	.300	.300	.05	.05	1	100	B32GT30	G3
32	1	.500	.500	.500	.05	.05	1	115	B32GT50	G3
32	1	1.0	1.0	1.0	.1	.1	1	145	B32GT100	G5
32	1	1.5	1.5	1.5	.1	.1	1.5	170	B32GT150	G5
32	.5	1.8	1.6	1.3	.005	.005	.250	205	A32MT180	M6
32	.5	2.5	2.1	1.7	.005	.005	.250	245	A32MT250	M9
32	.5	9.0	7.5	6.0	.005	.005	.250	410	A32HT900	H11
34	1	.300	.300	.300	.05	.05	1	100	B34GT30	G3
34	1	.800	.800	.800	.1	.1	1	145	B34GT80	G5
34	1	1.5	1.5	1.5	.1	.1	1.5	175	B34GT150	G5
35	1	.100	.100	.100	.05	.05	1	90	B35GT10	G3
35	1	.300	.300	.300	.05	.05	1	100	B35GT30	G3
35	1	.500	.500	.500	.05	.05	1	120	B35GT50	G3
35	1	.600	.600	.600	.1	.05	1	135	B35GT60	G3
35	1	.800	.800	.800	.1	.1	1.5	145	B35GT80	G5
36	1	.100	.100	.100	.05	.05	1	90	B36GT10	G3
36	1	.500	.500	.500	.05	.05	1	120	B36GT50	G3
36	1	.800	.750	.700	.1	.05	1	145	B36GT80	G5
36	.5	1.3	1.3	1.3	.1	.1	1.5	160	B36GT130	G6
36	.5	1.3	1.3	1.3	.005	.005	.250	200	A36MT130	M6
36	.5	2.3	2.0	1.8	.1	.1	1.5	225	B36GT230	G9
36	.5	2.3	2.0	1.8	.005	.005	.250	245	A36MT230	M9
36	.5	4.0	3.2	2.5	.005	.005	.250	290	A36MT400	M13
36	.5	8.0	6.6	5.3	.005	.005	.250	410	A36HT800	H11
36	.5	11.0	9.1	7.2	.005	.005	.250	510	A36HT1100	H16
40	1	.200	.200	.200	.05	.05	1	105	B40GT20	G3
40	1	.400	.400	.400	.05	.05	1	130	B40GT40	G3
40	1	.500	.500	.500	.1	.05	1	145	B40GT50	G5
40	1	1.0	1.0	1.0	.1	.1	1.5	165	B40GT100	G6
45	1	.200	.200	.200	.05	.05	1	105	B45GT20	G3
45	1	.400	.400	.400	.05	.05	1	140	B45GT40	G3

Nominal Output Voltage	Adjust ±V	Output Current Amps. at 40°C	55°C	71°C	Regulation Load ± %	Line ± %	Ripple mV RMS	($) Price	Model	Case Size
48	1	.200	.200	.200	.05	.05	1	105	B48GT20	G3
48	1	.400	.400	.400	.05	.05	1	145	B48GT40	G3
48	1	.600	.600	.600	.1	.1	1	175	B48GT60	G5
48	1	1.1	1.0	.600	.1	.1	1.5	190	B48GT110	G6
48	1	1.2	1.0	.800	.005	.005	.250	215	A48MT120	M6
48	1	1.8	1.6	1.2	.005	.005	.250	250	A48MT180	M9
48	1	3.0	2.6	2.1	.005	.005	.250	290	A48MT300	M13
48	1	6.0	5.0	4.0	.005	.005	.250	410	A48HT600	H11
48	1	8.5	7.2	5.5	.005	.005	.250	510	A48HT850	H16
50	1	.400	.400	.400	.05	.05	1	155	B50GT40	G3
50	1	.500	.500	.500	.05	.05	1	180	B50GT50	G5
50	1	1.0	.800	.700	.005	.005	.250	225	A50MT100	M6
50	1	1.5	1.3	1.0	.005	.005	.250	265	A50MT150	M9
50	1	2.7	2.3	1.8	.005	.005	.250	305	A50MT270	M13
50	1	6.0	5.0	4.0	.005	.005	.250	420	A50HT600	H11
50	1	8.0	6.6	5.2	.005	.005	.250	510	A50HT800	H16
55	1	.300	.300	.300	.05	.05	1	155	B55GT30	G3
55	1	.500	.500	.500	.05	.05	1	185	B55GT50	G5
60	1	.200	.200	.200	.05	.05	1	130	B60GT20	G3
60	1	.300	.300	.300	.05	.05	1	160	B60GT30	G3
60	1	.400	.400	.400	.05	.05	1	185	B60GT40	G5
60	1	.850	.720	.600	.005	.005	.250	230	A60MT85	M6
60	1	1.2	1.0	.800	.005	.005	.250	265	A60MT120	M9
60	1	2.5	2.1	1.7	.005	.005	.250	305	A60MT250	M13
60	1	5.0	4.1	3.3	.005	.005	.250	425	A60HT500	H11
60	1	7.0	5.8	4.6	.005	.005	.250	515	A60HT700	H16
65	1	.300	.300	.300	.05	.05	1	160	B65GT30	G3
70	1	.100	.100	.100	.05	.05	1	120	B70GT10	G3
70	1	.300	.300	.300	.05	.05	1	160	B70GT30	G3
75	1	.050	.050	.050	.05	.05	1	105	B75GT05	G3
75	1	.200	.200	.200	.05	.05	1	155	B75GT20	G3
75	1	.600	.500	.400	.005	.005	.250	230	A75MT60	M6
75	1	1.0	.830	.660	.005	.005	.250	270	A75MT100	M9
75	1	2.0	1.8	1.5	.005	.005	.250	305	A75MT200	M13
75	1	4.0	3.3	2.6	.01	.01	1	425	A75HT400	H11
75	1	5.6	4.6	3.6	.01	.01	1	520	A75HT560	H16
80	1	.100	.100	.100	.05	.05	1	135	B80GT10	G3
80	1	.200	.200	.200	.05	.05	1	160	B80GT20	G3
85	1	.200	.200	.200	.05	.05	1	160	B85GT20	G3
90	1	.200	.200	.200	.05	.05	1	160	B90GT20	G3
90	1	.500	.400	.300	.005	.005	.250	230	A90MT50	M6
90	1	.800	.700	.600	.005	.005	.250	270	A90MT80	M9
90	1	1.5	1.3	1.0	.005	.005	.250	305	A90MT150	M13
90	1	3.3	2.7	2.1	.01	.01	1	435	A90HT330	H11
90	1	4.4	3.6	2.9	.01	.01	1	525	A90HT440	H16
95	1	.200	.200	.200	.05	.05	1	165	B95GT20	G3
100	1	.100	.100	.100	.05	.05	1	150	B100GT10	G3
100	1	.200	.200	.200	.05	.05	1	165	B100GT20	G3
100	1	.460	.460	.340	.1	.1	1.5	200	B100GT46	G6
100	1	.650	.650	.650	.1	.1	1.5	225	B100G65	G6
100	1	.700	.600	.500	.005	.005	.250	265	A100M70	M6
100	1	1.3	1.2	1.0	.005	.005	.250	305	A100MT130	M13
100	1	3.0	2.5	2.0	.01	.01	1	435	A100HT300	H11
100	1	4.0	3.3	2.6	.01	.01	1	525	A100HT400	H16
110	1	.200	.200	.200	.05	.05	1	170	B110GT20	G3
120	1	.100	.100	.100	.05	.05	1	155	B120GT10	G3
120	1	.200	.200	.200	.05	.05	1	170	B120GT20	G3
120	1	.400	.400	.300	.1	.1	1.5	195	B120GT40	G6
120	1	.550	.550	.550	.1	.1	1.5	235	B120G55	G6
120	1	.600	.500	.400	.005	.005	.250	275	A120M60	M6
120	1	1.2	1.1	1.0	.005	.005	.250	305	A120MT120	M13
120	1	2.5	2.0	1.6	.01	.01	1	445	A120HT250	H11
120	1	3.5	2.9	2.3	.01	.01	1	535	A120HT350	H16
125	1	.200	.200	.200	.05	.05	1	190	B125GT20	G3
130	1	.200	.200	.200	.05	.05	1	195	B130GT20	G3
135	1	.200	.200	.200	.05	.05	1	195	B135GT20	G3
140	1	.200	.200	.200	.05	.05	1	195	B140GT20	G3
150	1	.100	.100	.100	.05	.05	1	160	B150GT10	G3
150	1	.200	.200	.200	.05	.05	1	190	B150GT20	G3
150	1	.320	.320	.250	.1	.1	1.5	210	B150GT32	G6
150	1	.420	.420	.420	.1	.1	1.5	225	B150GT42	G9
150	1	1.0	.900	.800	.005	.005	.250	335	A150MT100	M13
150	1	3.0	2.5	2.0	.01	.01	1	555	A150HT300	H16
200	1	.100	.100	.100	.1	.05	1.5	190	B200GT10	G3

Acopian
P. 0. Box 638, Easton, PA 18044
Phone: (610) 258-5441
Fax: (610) 258-2842

The complete Acopian catalog is available on the Internet at **http://www.acopian.com**

Acopian

Narrow Profile

SINGLE OUTPUT

LINEAR REGULATED
AC-DC

- Shipped Within 3 Days
- All Models U.L. Recognized
- Five Year Warranty

Where only a narrow mounting space is available, Acopian Narrow Profile power supplies fit where many others cannot. Choose from Series A (High Performance) and Series B (General Purpose) models with output ratings up to 150 volts, up to 3.5 amps.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Output Specifications: See table.
Series A: Model numbers begin with the letter A.
Series B: Model numbers begin with the letter B.

Remote Voltage Adjustment/Sensing: Standard in Series A, not available in Series B.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 volts above ground.

Temperature Coefficient:
Series A: 0.015%/°C (Typical).
Series B: 0.02%/°C (Typical).

Ambient Operating Temperature:
Series A: −20 to +71°C.
Series B: 0 to +71°C.

Storage Temperature: −55 to +85°C.

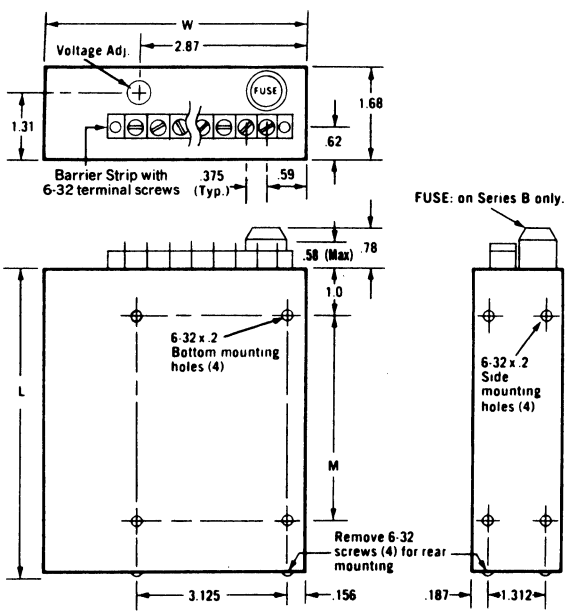
Overload/Short Circuit Protection:
Series A: Foldback current limiting with automatic recovery.
Series B: Input fuse and output current limiting.

Mounting: Threaded mounting holes permit mounting to a chassis, cabinet wall or bracket, or they may be used on a test bench or tabletop. To mount from the power supply side of the mounting surface, see accessory Mounting Kit NP6 on page 18.

OPTIONS

Overvoltage Protection: An internal preset overvoltage protector is available on all models with outputs of 3 volts and higher. To order, add prefix "V" to the model number and add $25.00 to the standard price of models with outputs of 3 to 70 volts; $35.00, for 75 to 150 volt outputs.

Terminal Strip Cover: Clips on. To order, add suffix "M" to model number and $5.00 to price.



Case Size	L	W	M	Approx. Weight
F6T	6.59	3.84	4.0	2 lb. 4 oz.
F8T	8.47	3.84	5.0	3 lb. 2 oz.
N8T	8.47	3.84	5.0	3 lb. 2 oz.
N8H	8.47	4.68	5.0	3 lb. 14 oz.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210-250 VAC, 50-400 Hz. To order, add suffix "−230" to model number and $25.00 to price.

Acopian
P. 0. Box 638, Easton, PA 18044
Phone: (610) 258-5441
Fax: (610) 258-2842

The complete Acopian catalog is available on the Internet at **http://www.acopian.com**

NARROW PROFILE SINGLE OUTPUT

Nominal Output Voltage	Adjust ±V	Output Current Amps. at 40°C	55°C	71°C	Regulation Load ± %*	Line ± %*	Ripple mV RMS	($) Price	Model	Case Size
1	.5	2.2	2.1	2.0	.005	.005	.250	150	A1NT220	N8T
1	.5	3.5	3.5	3.0	.005	.005	.250	180	A1NT350	N8H
1.5	.5	2.2	2.1	2.0	.005	.005	.250	150	A1.5NT220	N8T
1.5	.5	3.5	3.5	3.0	.005	.005	.250	180	A1.5NT350	N8H
2	.5	2.2	2.1	2.0	.005	.005	.250	150	A2NT220	N8T
2	.5	3.0	3.0	3.0	.005	.005	.250	180	A2NT300	N8H
3	.5	1.0	1.0	1.0	.5	.1	1	125	B3TN100	F6T
3	.5	2.2	2.1	2.0	.005	.005	.250	150	A3NT220	N8T
3	.5	3.5	3.5	3.0	.005	.005	.250	180	A3NT350	N8H
3.3	.5	1.0	1.0	1.0	.5	.1	1	125	B3.3TN100	F6T
3.3	.5	2.2	2.1	2.0	.005	.005	.250	150	A3.3NT220	N8T
3.3	.5	3.5	3.5	3.0	.005	.005	.250	180	A3.3NT350	N8H
5	.5	1.0	1.0	1.0	.1	.1	1	120	B5TN100	F6T
5	.5	1.1	1.0	1.0	.005	.005	.250	130	A5TN110	N8T
5	.5	2.2	2.1	2.0	.005	.005	.250	150	A5NT220	N8T
5	.5	3.5	3.5	3.0	.005	.005	.250	180	A5NT350	N8H
6	.5	1.0	1.0	1.0	.1	.1	1	125	B6TN100	F6T
6	.5	2.2	2.1	2.0	.005	.005	.250	150	A6NT220	N8T
6	.5	2.7	2.7	2.7	.005	.005	.250	180	A6NT270	N8H
7	1	1.0	1.0	1.0	.1	.1	1	125	B7TN100	F6T
7	.5	1.1	1.0	1.0	.005	.005	.250	145	A7TN110	N8T
7	.5	2.0	2.0	2.0	.005	.005	.250	170	A7NT200	N8H
8	1	1.0	1.0	1.0	.1	.1	1	125	B8TN100	F6T
8	.5	1.1	1.0	1.0	.005	.005	.250	145	A8TN110	N8T
8	.5	2.0	2.0	2.0	.005	.005	.250	170	A8NT200	N8H
9	1	1.0	1.0	1.0	.1	.1	1	125	B9TN100	F6T
9	.5	1.1	1.0	1.0	.005	.005	.250	145	A9TN110	N8T
9	.5	2.0	2.0	2.0	.005	.005	.250	170	A9NT200	N8H
10	1	1.0	1.0	1.0	.1	.1	1	130	B10TN100	F6T
10	.5	1.1	1.0	1.0	.005	.005	.250	145	A10TN110	N8T
10	.5	2.0	2.0	2.0	.005	.005	.250	170	A10NT200	N8H
11	1	1.0	1.0	.750	.1	.1	1	130	B11TN100	F6T
11	.5	1.1	1.0	1.0	.005	.005	.250	145	A11TN110	N8T
11	.5	2.0	2.0	2.0	.005	.005	.250	170	A11NT200	N8H
12	1	1.0	1.0	.750	.1	.1	1	130	B12TN100	F6T
12	.5	1.1	1.0	1.0	.005	.005	.250	145	A12TN110	N8T
12	.5	2.0	2.0	2.0	.005	.005	.250	170	A12NT200	N8H
13	1	1.0	1.0	.750	.1	.1	1	130	B13TN100	F6T
13	.5	1.1	1.0	1.0	.005	.005	.250	145	A13TN110	N8T
13	.5	2.0	2.0	2.0	.005	.005	.250	170	A13NT200	N8H
14	1	1.0	1.0	.750	.1	.1	1	130	B14TN100	F6T
14	.5	1.1	1.0	1.0	.005	.005	.250	145	A14TN110	N8T
14	.5	2.0	2.0	2.0	.005	.005	.250	170	A14NT200	N8H
15	1	1.0	1.0	.750	.1	.1	1	130	B15TN100	F6T
15	.5	1.1	1.0	1.0	.005	.005	.250	145	A15TN110	N8T
15	.5	2.0	2.0	2.0	.005	.005	.250	170	A15NT200	N8H
16	1	1.0	1.0	.750	.1	.1	1	130	B16TN100	F6T
16	.5	1.0	1.0	1.0	.005	.005	.250	145	A16TN100	N8T
16	.5	1.75	1.75	1.75	.005	.005	.250	170	A16NT175	N8H
18	1	.750	.750	.750	.1	.1	1	130	B18TN75	F6T
18	.5	1.0	1.0	1.0	.005	.005	.250	145	A18TN100	N8T
18	.5	1.5	1.5	1.5	.005	.005	.250	170	A18NT150	N8H
20	1	.500	.500	.500	.1	.1	1	115	B20TN50	F6T
20	.5	.900	.900	.900	.005	.005	.250	145	A20TN90	N8T
20	.5	1.25	1.25	1.25	.005	.005	.250	170	A20NT125	N8H
24	1	.750	.750	.750	.1	.1	1	130	B24TN75	F6T
24	.5	1.0	1.0	1.0	.005	.005	.250	150	A24TN100	N8T
24	.5	1.25	1.25	1.25	.005	.005	.250	175	A24NT125	N8H
25	1	.750	.750	.750	.1	.05	1	130	B25TN75	F6T
25	.5	.750	.750	.750	.005	.005	.250	150	A25TN75	N8T
25	.5	1.25	1.25	1.25	.005	.005	.250	175	A25NT125	N8H

Nominal Output Voltage	Adjust ±V	Output Current Amps. at 40°C	55°C	71°C	Regulation Load ± %	Line ± %	Ripple mV RMS	($) Price	Model	Case Size
26	1	.750	.750	.750	.1	.05	1	130	B26TN75	F6T
26	.5	1.2	1.25	1.25	.005	.005	.250	175	A26NT125	N8H
28	1	.700	.700	.700	.1	.05	1	130	B28TN70	F6T
28	.5	.800	.800	.800	.005	.005	.250	150	A28NT80	N8T
28	.5	1.25	1.25	1.25	.005	.005	.250	175	A28NT125	N8H
30	1	.500	.500	.500	.05	.05	1	130	B30TN50	F6T
30	.5	.750	.750	.750	.005	.005	.250	155	A30NT75	N8T
30	.5	1.1	1.1	1.1	.005	.005	.250	180	A30NT110	N8H
32	1	.400	.400	.400	.05	.05	1	125	B32TN40	F6T
32	.5	.600	.600	.600	.005	.005	.250	150	A32TN60	N8T
34	1	.400	.400	.400	.05	.05	1	125	B34TN40	F6T
34	.5	1.1	1.1	1.1	.005	.005	.250	180	A34NT110	N8H
35	1	.400	.400	.400	.05	.05	1	125	B35TN40	F6T
35	.5	.600	.600	.600	.005	.005	.250	150	A35TN60	N8T
35	.5	1.1	1.1	1.1	.005	.005	.250	180	A35NT110	N8H
36	1	.400	.400	.400	.05	.05	1	125	B36TN40	F6T
36	.5	.600	.600	.600	.005	.005	.250	150	A36TN60	N8T
36	.5	1.0	1.0	1.0	.005	.005	.250	180	A36NT100	N8H
38	1	.200	.200	.200	.05	.05	1	115	B38TN20	F6T
40	1	.400	.400	.400	.05	.05	1	135	B40TN40	F6T
40	.5	.750	.750	.750	.005	.005	.250	170	A40NT75	N8T
45	1	.400	.400	.400	.05	.05	1	145	B45TN40	F6T
45	.5	.600	.600	.600	.005	.005	.250	175	A45NT60	N8T
48	1	.400	.400	.400	.05	.05	1	150	B48TN40	F6T
48	.5	.500	.500	.500	.005	.005	.250	180	A48NT50	N8T
50	1	.400	.400	.400	.05	.05	1	160	B50FT40	F6T
50	1	.450	.450	.450	.005	.005	.250	185	A50NT45	N8T
55	1	.200	.200	.200	.05	.05	1	135	B55FT20	F6T
55	1	.400	.400	.400	.005	.005	.250	185	A55NT40	N8T
60	1	.150	.150	.150	.05	.05	1	135	B60FT15	F6T
60	1	.350	.350	.350	.005	.005	.250	185	A60NT35	N8T
65	1	.100	.100	.100	.05	.05	1	130	B65FT10	F6T
65	1	.250	.250	.250	.05	.05	1	165	B65FT25	F8T
65	1	.270	.270	.270	.005	.005	.250	185	A65NT27	N8T
67	1	.100	.100	.100	.05	.05	1	130	B67FT10	F6T
70	1	.100	.100	.100	.05	.05	1	130	B70FT10	F6T
70	1	.250	.250	.250	.005	.005	.250	185	A70NT25	N8T
75	1	.200	.200	.200	.05	.05	1	160	B75FT20	F8T
75	1	.250	.250	.250	.005	.005	.250	185	A75NT25	N8T
80	1	.100	.100	.100	.05	.05	1	140	B80FT10	F6T
80	1	.200	.200	.200	.05	.05	1	160	B80FT20	F8T
80	1	.250	.250	.250	.005	.005	.250	185	A80NT25	N8T
85	1	.250	.250	.250	.005	.005	.250	185	A85NT25	N8T
90	1	.100	.100	.100	.05	.05	1	145	B90FT10	F6T
90	1	.200	.200	.200	.05	.05	1	165	B90FT20	F8T
90	1	.250	.250	.250	.005	.005	.250	190	A90NT25	N8T
95	1	.200	.200	.200	.05	.05	1	170	B95FT20	F8T
95	1	.200	.200	.200	.005	.005	.250	185	A95NT20	N8T
100	1	.100	.100	.100	.05	.05	1	160	B100FT10	F6T
100	1	.200	.200	.200	.05	.05	1	175	B100FT20	F8T
100	1	.200	.200	.200	.005	.005	.250	195	A100NT20	N8T
110	1	.100	.100	.100	.05	.05	1	160	B110FT10	F6T
115	1	.100	.100	.100	.05	.05	1	160	B115FT10	F6T
120	1	.050	.050	.050	.05	.05	1	155	B120FT05	F6T
120	1	.200	.200	.200	.05	.05	1	180	B120FT20	F8T
120	1	.200	.200	.200	.005	.005	.250	195	A120NT20	N8T
125	1	.050	.050	.050	.05	.05	1	155	B125FT05	F6T
125	1	.200	.200	.200	.05	.05	1	180	B125FT20	F8T
125	1	.200	.200	.200	.005	.005	.250	195	A125NT20	N8T
150	1	.100	.100	.100	.05	.05	1	175	B150FT10	F8T
150	1	.100	.100	.100	.005	.005	.250	195	A150NT10	N8T

*or 2 mv, whichever is greater

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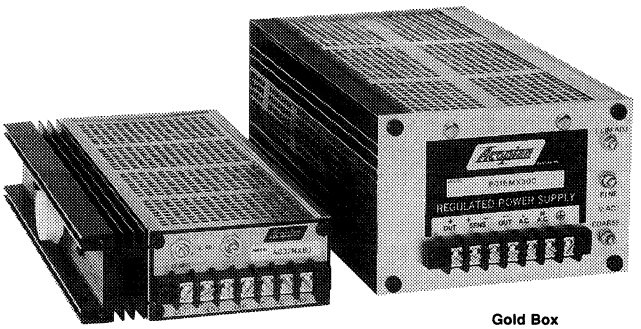
Acopian

Gold Box & Narrow Profile
WIDE ADJUST OUTPUT
LINEAR REGULATED
AC-DC
(fixed & adjustable current limiting)

- Shipped Within 3 Days
- U.L. Recognized
- Five Year Warranty



Narrow Profile Gold Box

These power supplies have the broad adjustment capability required for analog instrumentation and circuitry, electronic system development, basic research, and similar applications.

For applications requiring a constant current or adjustable current limiting, a power supply with a true constant-current characteristic, such as those with model numbers beginning with the letter P, should be used.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Regulation, Ripple (in constant voltage mode):
Line Regulation: ±0.005% or 2 mV, whichever is greater.
Load Regulation: ±0.005% or 2 mV, whichever is greater.
Ripple: 0.25 mV rms.

Regulation, Ripple (in constant current mode):
Line Regulation: ±0.1% or 2 mA.
Load Regulation: ±0.2% or 5 mA.
Ripple: 0.1% rms.

Remote Voltage Sensing: Provision for sensing the output voltage across the load, to compensate voltage drops in output wiring, is a standard feature.

Remote Voltage Programming: The output voltage of all models may be controlled by means of external resistance connected in series with the –S lead.

Voltage Programming Coefficient: See table.
Calibration tolerance, ±2%.

Current Limiting: Models with fixed current limiting have a rolloff characteristic with automatic recovery. All others have current limiting with a constant-voltage/constant-current crossover characteristic.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 volts above ground.

Temperature Coefficient (in constant voltage mode): 0.015%/°C (Typical).

Ambient Operating Temperature: –20 to +71°C.

Storage Temperature: –55 to +85°C.

Mounting: Threaded mounting holes permit mounting to a chassis, cabinet wall or bracket, or they may be used on a test bench or tabletop. To mount from the power supply side of the mounting surface, see accessory Mounting Kit on page 18.

OPTIONS

Remote Current Limiting Adjustment: All models having numbers beginning with the letter P have a built in (front panel) current limit control. Provision for control of the current limit setting by adjustment of an external resistance is available as an option. To order, add the prefix letter "E" to the model number, and add $10.00 to the standard price.

The current limit setting is inversely related to resistance. Use a 200 ohm, ½ W potentiometer.

Overvoltage Protection: An internally mounted overvoltage protection circuit, set approximately 20% above the maximum output voltage rating of the supply, is available on all models. To order, add prefix "V" to the model number, and increase standard price as follows:

Maximum output of	**.6-60V**	**100-150V**
All case sizes except H16 . . .	$25.00	$35.00
Case size H16	75.00	85.00

Terminal Strip Cover: Clips on. To order, add suffix "M" to model number and $5.00 to price.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210-250 VAC, 50-400 Hz. To order, add suffix "–230" to model number and $25.00 to price. (For models in case sizes H11 and H16, add $40.00.)

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GOLD BOX MODELS

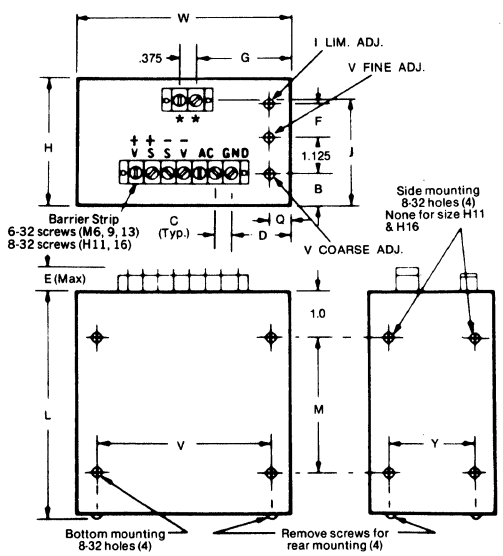
Output Voltage Range	Output Current Amps. at 40°C	55°C	71°C	Voltage Prgmg. Coeff. (Ω/V)	Case Size	Voltage Programmable Fixed Current Limiting Model	Price($)	Voltage Programmable Adjust. Current Limiting Model	Price($)
0-6	1.2	1.2	1.2	820	M6	A06MX120	165	P06MX120	185
0-6	2.0	2.0	2.0	820	M6	A06MX200	185	P06MX200	205
0-6	3.0	2.5	2.0	820	M6	A06MX300	215	P06MX300	235
0-6	5.0	4.0	3.0	820	M9	A06MX500	260	P06MX500	280
0-6	8.0	7.0	6.0	820	M13	A06MX800	300	P06MX800	320
0-6	12.0	10.0	7.0	820	H11	A06HX1200	385	P06HX1200	405
0-6	16.0	13.0	10.0	820	H16	A06HX1600	460	P06HX1600	480
0-15	1.0	1.0	1.0	330	M6	A015MX100	155	P015MX100	175
0-15	2.0	1.6	1.2	330	M6	A015MX200	205	P015MX200	225
0-15	3.0	2.4	1.8	330	M9	A015MX300	260	P015MX300	280
0-15	5.0	4.0	2.5	330	M13	A015MX500	300	P015MX500	320
0-15	8.0	6.0	4.0	330	H11	A015HX800	400	P015HX800	420
0-15	10.0	8.0	6.0	330	H16	A015HX1000	460	P015HX1000	480
0-30	.50	.50	.50	160	M6	A030MX50	175	P030MX50	195
0-30	1.0	1.0	1.0	160	M6	A030MX100	205	P030MX100	225
0-30	1.6	1.4	1.2	160	M9	A030MX160	245	P030MX160	265
0-30	2.5	2.0	1.5	160	M13	A030MX250	295	P030MX250	315
0-30	4.0	3.0	2.0	160	H11	A030HX400	410	P030HX400	430
0-30	5.0	4.0	3.0	160	H16	A030HX500	475	P030HX500	495
0-50	.35	.34	.33	1000	M6	A050MX35	195	P050MX35	215
0-50	.60	.50	.40	1000	M6	A050MX60	245	P050MX60	265
0-50	.85	.75	.65	1000	M9	A050MX85	285	P050MX85	305
0-50*	1.2	.96	.72	1000	M13	A050MX120	340	P050MX120	365
0-50*	2.4	1.9	1.4	1000	H11	A050HX240	455	P050HX240	480
0-50*	3.0	2.4	1.8	1000	H16	A050HX300	535	P050HX300	560
0-100	.10	.09	.08	500	M6	A0100MX10	245	P0100MX10	265
0-100	.25	.20	.15	500	M6	A0100MX25	285	P0100MX25	305
0-100*	.45	.36	.27	500	M9	A0100MX45	330	P0100MX45	355
0-100*	.60	.48	.36	500	M13	A0100MX60	385	P0100MX60	410
0-100*	1.2	.96	.72	500	H11	A0100HX120	500	P0100HX120	525
0-100*	1.5	1.2	.90	500	H16	A0100HX150	575	P0100HX150	600

* Not U.L. recognized when this catalog was published.

NARROW PROFILE MODELS
(for limited space applications)

Output Voltage Range	Output Current Amps. (to +71°C)	Voltage Prgmg. Coeff. (Ω/V)	Case Size	Model	($) Price
0-7	1.0	700	N8T	A07XN100	155
0-7	2.1	700	N8H	A07NX210	190
0-18	.400	270	N8T	A018XN40	150
0-18	1.0	270	N8H	A018NX100	180
0-32	.250	150	N8T	A032XN25	135
0-32	.600	150	N8H	A032NX60	180
0-60	.125	820	N8T	A060NX12	160
0-60	.250	820	N8H	A060NX25	200
0-150	.050	330	N8T	A0150NX05	190
0-150	.100	330	N8H	A0150NX10	230

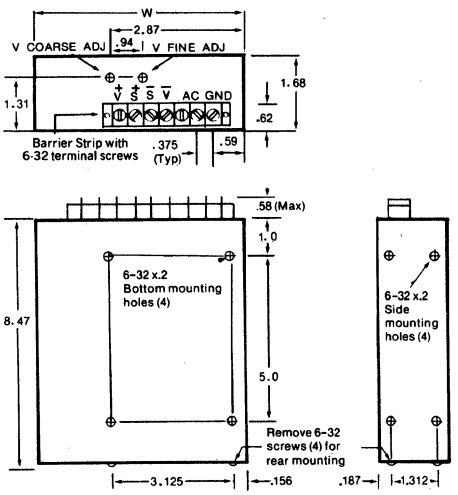
Gold Box



*To external current limit control (optional)

Case Size	L	W	H	M	V	Y	E	Q	B	C	D	F	G	J	Approx. Weight
M6	6.59	5.12	3.44	4.0	4.5	3.0	.58	.5	.75	.375	1.44	.75	2.37	3.09	4 lb. 4 oz.
M9	9.25	5.12	3.44	6.0	4.5	3.0	.58	.5	.75	.375	1.44	.75	2.37	3.09	7 lb. 4 oz.
M13	13.25	5.12	3.44	10.0	4.5	3.0	.58	.5	.75	.375	1.44	.75	2.37	3.09	11 lb.
H11	11.25	7.37	5.12	8.0	6.75	4.56	.78	1.12	1.25	.562	2.25	1.12	3.75	4.72	18 lb. 4 oz.
H16	16.00	7.37	5.12	11.0	6.75	4.56	.78	1.12	1.25	.562	2.25	1.12	3.75	4.72	23 lb.

Narrow Profile



Case Size	W	Approx. Weight
N8T	3.84	3 lb. 2 oz.
N8H	4.68	3 lb. 14 oz.

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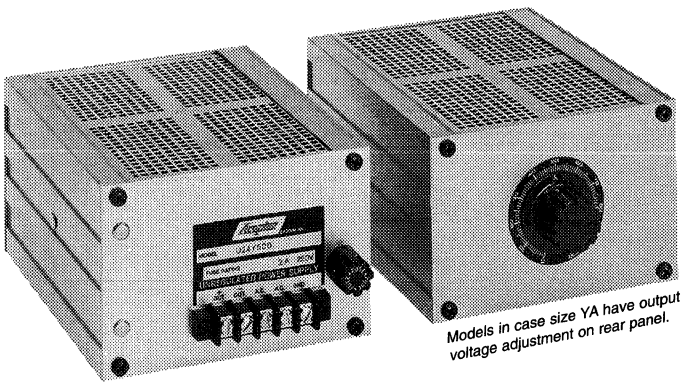
Acopian

Gold Box

UNREGULATED

AC-DC

single output & wide adjust output



Models in case size YA have output voltage adjustment on rear panel.

- Shipped Within 3 Days
- U.L. Recognized
- Five Year Warranty

Low-cost DC power suitable for driving loads such as lamps, relays, and small motors is provided by these unregulated power supplies. All components are generously derated, insuring a long and trouble-free life; built-in fusing prevents damage due to prolonged overloading or short circuits. Mechanically similar to the regulated supplies shown on pages 20 and 21, they are housed in extruded aluminum cases which can be mounted in any position. Many models are U.L. Recognized.

STANDARD FEATURES

- Capacitive filtering
- Fused input
- May be used in series or parallel
- No derating or heat sinking required
- Completely serviceable

SPECIFICATIONS

Input Voltage: 0-125 VAC, 50-400 Hz, single phase.

Output Voltage Adjustment: Adjustable voltage models are provided with a built-in continuously adjustable autotransformer.

Load Regulation: The nominal output voltages of single output models, and the maximum rated output voltages for models with wide adjust outputs, are based on 115 VAC input with approximately one-half load. At no load, they will increase by approximately 10%. At full load, they will be reduced by approximately 10%.

Line Regulation: Output voltage change due to line change directly proportional to input change.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 volts above ground.

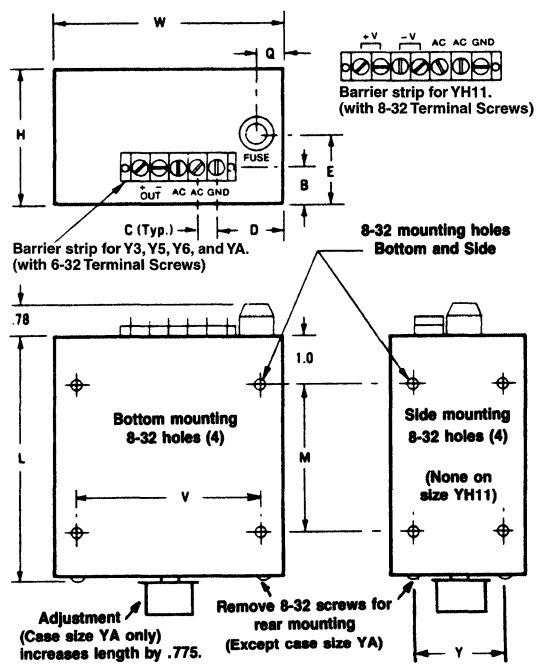
Ambient Operating Temperature: –10 to +65°C. No derating required.

Storage Temperature: –55 to +85°C.

OPTIONS

Terminal Strip Cover: Clips on. To order, add suffix "M" to model number and $5.00 to price.

230 Volt Input: Provision for inputs of 0-250 VAC, 50-400 Hz, replacing the standard 0-125 VAC input voltage range, is available on most models. Contact factory for information.



Case Size	L	W	H	M	V	Y	Q	E	B	D	C	Approx. Weight
Y3	3.71	5.12	3.44	1.62	4.5	3.0	.56	1.37	.75	1.44	.375	2 lb. 8 oz.
Y5	5.09	5.12	3.44	3.00	4.5	3.0	.56	1.37	.75	1.44	.375	4 lb. 8 oz.
Y6	6.59	5.12	3.44	4.00	4.5	3.0	.56	1.37	.75	1.44	.375	7 lb. 8 oz.
YH11	11.25	7.37	5.12	8.0	6.75	4.56	1.10	2.64	1.25	2.25	.562	18 to 23 lb.
YA	6.59	5.12	3.44	4.00	4.5	3.0	.56	1.37	.75	1.44	.375	4 to 5 lb.

Mounting: Threaded mounting holes permit mounting to a chassis, cabinet wall or bracket, or they may be used on a test bench or tabletop. To mount from the power supply side of the mounting surface, see accessory Mounting Kit GB8 on page 18.

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SINGLE OUTPUT

Nominal Output Voltage	Output Current Amps.	Output Voltage N/L-F/L	Ripple Volts RMS	($) Price	Model	Case Size
4	.200	4.4 to 3.6	.2	70	U4Y20	Y3
5	10.0 (@ 5.0)	6.7 to 3.6 (5.0)	1.8 (1.3)	105	U5Y1000	Y6
6	2.0	7.7 to 4.8	2.0	70	U6Y200	Y3
6	5.0	7.5 to 5.0	1.8	105	U6Y500	Y5
7	8.0	8.0 to 5.4	1.5	105	U7Y800	Y6
9	10.0 (@ 5.0)	11.5 to 7.5 (9.0)	2.3 (1.3)	105	U9Y1000	Y6
10	10.0 (@ 5.0)	12.4 to 8.0 (9.8)	2.3 (1.3)	105	U10Y1000	Y6
12	1.5	14.9 to 10.9	2.5	70	U12Y150	Y3
12	5.0	14.8 to 10.5	1.8	100	U12Y500	Y5
12	10.0 (@ 5.0)	14.1 to 9.8 (11.5)	2.3 (1.3)	110	U12Y1000	Y6
14	1.0	15.4 to 12.6	.7	70	U14Y100	Y3
14	10.0 (@ 5.0)	16.4 to 12.1 (14.0)	2.3 (1.3)	110	U14Y1000	Y6
15	10.0 (@ 5.0)	17.2 to 12.8 (14.5)	2.3 (1.3)	110	U15Y1000	Y6
16	1.0	17.6 to 14.4	.7	70	U16Y100	Y3
16	10.0 (@ 5.0)	18.8 to 14.2 (16.0)	2.3 (1.3)	110	U16Y1000	Y6
18	1.0	19.8 to 16.2	.7	70	U18Y100	Y3
18	10.0 (@ 5.0)	21.0 to 15.8 (18.0)	2.4 (1.4)	110	U18Y1000	Y6
20	4.0	22.0 to 17.5	2.0	100	U20Y400	Y5
20	10.0 (@ 5.0)	23.7 to 18.3 (20.4)	2.4 (1.4)	110	U20Y1000	Y6
24	1.0	26.4 to 21.6	1.7	70	U24Y100	Y3
24	3.5	26.0 to 21.0	2.0	100	U24Y350	Y5
24	5.0	26.5 to 21.0	2.5	110	U24Y500	Y6
24	10.0	26.8 to 21.4	2.4	135	U24Y1000	Y6
24	17.0	26.4 to 21.6	1.5	235	U24Y1700	YH11
24	23.0	27.0 to 21.0	1.5	265	U24Y2300	YH11
25	5.0	28.1 to 22.3	2.5	110	U25Y500	Y6
27	5.0	30.0 to 24.0	2.6	110	U27Y500	Y6
28	1.0	30.8 to 25.2	1.7	70	U28Y100	Y3
28	3.0	30.8 to 26.0	2.0	100	U28Y300	Y5
28	5.0	31.2 to 24.8	2.6	110	U28Y500	Y6
28	8.0	30.2 to 25.0	2.4	135	U28Y800	Y6
28	15.0	30.8 to 25.2	1.5	235	U28Y1500	YH11
28	20.0	30.4 to 24.5	1.5	265	U28Y2000	YH11
30	1.0	33.0 to 27.0	1.6	80	30UY100	Y3
30	2.0	33.0 to 27.0	1.5	95	U30Y200	Y5
32	.400	35.2 to 28.8	.6	70	U32Y40	Y3
32	5.0	35.5 to 28.0	3.3	115	U32Y500	Y6
35	5.0	38.0 to 30.0	3.3	115	U35Y500	Y6
37	5.0	40.5 to 32.2	3.3	115	U37Y500	Y6
38	5.0	43.0 to 34.0	3.3	115	U38Y500	Y6
40	1.0	44.0 to 36.0	1.6	80	40UY100	Y3
40	2.0	44.0 to 36.0	1.5	100	U40Y200	Y5
40	5.0	45.0 to 37.0	3.3	115	U40Y500	Y6

Nominal Output Voltage	Output Current Amps.	Output Voltage N/L-F/L	Ripple Volts RMS	($) Price	Model	Case Size
41	.400	45.1 to 36.9	.6	70	U41Y40	Y3
42	5.0	48.0 to 36.0	6.5	115	U42Y500	Y6
44	2.0	48.4 to 39.6	1.5	100	U44Y200	Y5
45	1.0	49.5 to 40.5	1.6	85	45UY100	Y3
45	5.0	51.0 to 38.5	6.5	115	U45Y500	Y6
48	.400	52.8 to 43.2	.6	75	U48Y40	Y3
50	1.0	55 to 45	1.6	85	50UY100	Y3
52	.400	57.2 to 46.8	.6	80	U52Y40	Y3
55	.250	60.5 to 49.5	.4	75	U55Y25	Y3
60	1.0	65.3 to 53.0	2.8	95	U60Y100	Y5
62	.400	69.0 to 58.0	1.5	80	U62Y40	Y3
65	.250	71.5 to 58.5	.4	80	U65Y25	Y3
80	.300	88.0 to 72.0	1.0	80	U80Y30	Y3
90	.400	99.0 to 81.0	2.2	80	U90Y40	Y3
95	.150	105 to 85	1.1	80	U95Y15	Y3
100	.200	110 to 93	1.0	80	U100Y20	Y3
110	.200	121 to 100	1.0	80	U110Y20	Y3
120	.200	132 to 110	1.0	80	U120Y20	Y3
140	.200	154 to 126	1.7	85	U140Y20	Y3
150	.200	165 to 135	1.7	85	U150Y20	Y3
165	.200	176 to 144	1.7	85	U165Y20	Y3
170	.200	187 to 153	2.0	85	U170Y20	Y3
180	.200	190 to 162	2.0	85	U180Y20	Y3
200	.200	220 to 180	2.0	90	U200Y20	Y3
230	.100	252 to 207	3.0	85	U230Y10	Y3
250	.200	275 to 225	4.0	90	250UY20	Y3
275	.100	303 to 247	3.0	85	U275Y10	Y3
275	.200	303 to 247	4.0	95	U275Y20	Y5
300	.200	330 to 270	5.0	95	U300Y20	Y5
325	.200	360 to 295	6.0	95	U325Y20	Y5
340	.100	374 to 306	3.0	85	U340Y10	Y3
360	.100	396 to 324	3.0	85	U360Y10	Y3
370	.100	407 to 333	3.0	85	U370Y10	Y3
400	.200	440 to 360	6.0	100	U400Y20	Y5
420	.100	462 to 378	6.7	85	U420Y10	Y3
475	.020	523 to 426	3.1	85	U475Y02	Y3
500	.200	550 to 450	9.1	105	U500Y20	Y5
550*	.100	605 to 495	4.8	105	U550Y10	Y5
580*	.020	638 to 522	3.1	85	U580Y02	Y3
600*	.100	660 to 540	10.0	110	U600Y10	Y5
750*	.020	825 to 675	3.1	85	U750Y02	Y3
800*	.100	880 to 720	13.0	110	U800Y10	Y5
900*	.020	990 to 810	5.0	90	U900Y02	Y3
900*	.100	990 to 810	13.0	110	U900Y10	Y5
1000*	.100	1100 to 900	13.0	110	U1000Y10	Y5

*Not U.L. recognized when this catalog was published.

WIDE ADJUST OUTPUT

Output Voltage Range	Output Current Amps.	Ripple Volts RMS	($) Price	Model	Case Size
0-8*	2.0	2	190	U8YA200	YA
0-15*	1.5	2.5	190	U15YA150	YA
0-54*	1.0	1.6	190	U54YA100	YA
0-95*	.300	2.2	190	U95YA30	YA
0-125*	.200	1.5	190	U125YA20	YA
0-220*	.200	2	190	U220YA20	YA
0-260*	.200	4	190	U260YA20	YA
0-370*	.100	3	190	U370YA10	YA
0-450*	.100	6.7	190	U450YA10	YA
0-800*	.020	3.1	190	U800YA02	YA
0-950*	.020	5	190	U950YA02	YA

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Acopian
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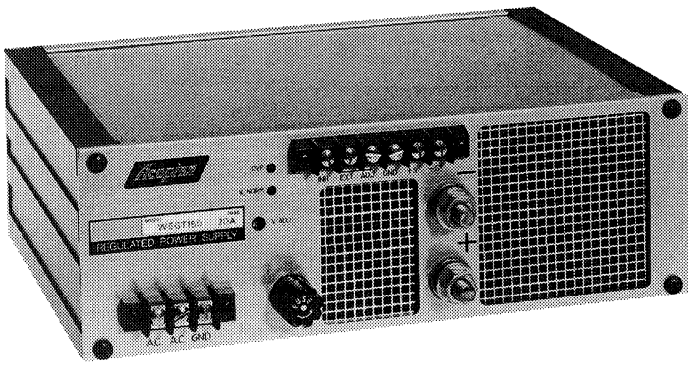
Acopian

Gold Box

SWITCHING REGULATED

AC-DC

single output & wide adjust output



- Shipped Within 9 Days
- All Models U.L. Recognized
- Five Year Warranty (fans-1 year)

These state-of-the-art power supplies use MOSfet output transistors operating at 55 kHz, resulting in a reduced component count and increased efficiency compared to bipolar designs with comparable ratings. Features include status indicator lights, overvoltage protection, EMI filtering, and "soft start" operation.

SPECIFICATIONS

Input Voltage: 90-132 VAC, 49-61 Hz, single phase. For models W24GT50, W28GT42 and W48GT25, the use of a 30A line is recommended and when operating on 50 Hz input, derate output by 5%.

Startup Time: 400 mS maximum (250 mS typical).

Input Undervoltage: An input of less than 90 VAC (180 VAC with "–230" option) will not damage power supply.

Regulation:
Line: ±0.05%
Load: ±0.05%

Remote Voltage Programming: The output voltage may be controlled by means of an external potentiometer (2500 ohms for single output models; 50,000 ohms for wide adjust output models).

Polarity: Output is floating and may be used in either polarity.

Drift: ±0.1% maximum over 8 hours, after 30 minute warmup.

Temperature Coefficient: ±0.02%/°C (Typical).

Holdup Time: 33 mS minimum (At nominal input voltage, with full load).

Transient Response: 300 µS to return to ±1% of output setting. Maximum of ±3% output excursion following a load step change from 50% to 100%.

Remote Sensing: Compensates up to 0.5 volt drop per output line, within the limits of the output voltage adjustment range.

Overload/Short Circuit Protection: Foldback current limiting with automatic recovery.

Overvoltage Protection: Latches power supply OFF, reset by momentarily removing AC input power. Red indicator lights to indicate latchup.

Output Inhibit: Applying between +2 and +30 Vdc to the inhibit terminal will disable the supply (TTL compatible).

Thermal Protection: Thermostat, self-resetting.

Efficiency: See table. (Typical, at nominal input voltage, with full load.)

Ambient Operating Temperature: 0 to +71°C.

Storage Temperature: –40 to +85°C.

Cooling: Forced-air cooled (ball bearing fan); air enters back of power supply and exits from front.

Switching Frequency: 55 kHz (Typical).

Isolation:
Input to output: 1400 Vdc
Input to case: 1400 Vdc
Output to case: 400 Vdc

Mounting: Threaded mounting holes permit mounting to a chassis, cabinet wall or bracket, or they may be used on a test bench or tabletop. To mount from the power supply side of the mounting surface, see accessory Mounting Kit GB8 on page 18.

OPTIONS

230 Volt Input: For applications where operation on an input of 180-264 VAC, 49-61 Hz, is desired. To order, add suffix "–230" to the model number and $40.00 to the standard price.

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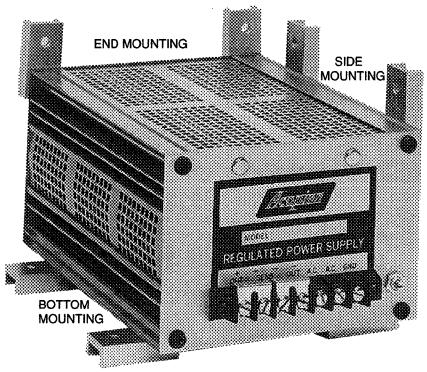
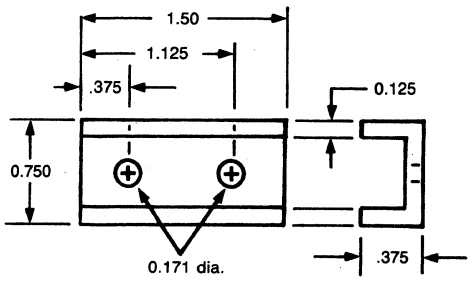
Acopian

ACCESSORY MOUNTING KITS *For use with Gold Box, Narrow Profile, and modular High Voltage power supplies.*



These kits provide four tabs for mounting power supplies on a wall or panel when the other side of the mounting surface is inaccessible.

Each kit consists of four aluminum brackets and four machine screws for fastening them to the power supply.



For Gold Box and modular High Voltage power supplies *(#8-32 mounting holes)*:
Model GB8 . . . . . $8

For Narrow Profile power supplies *(#6-32 mounting holes)*:
Model NP6 . . . . . $8

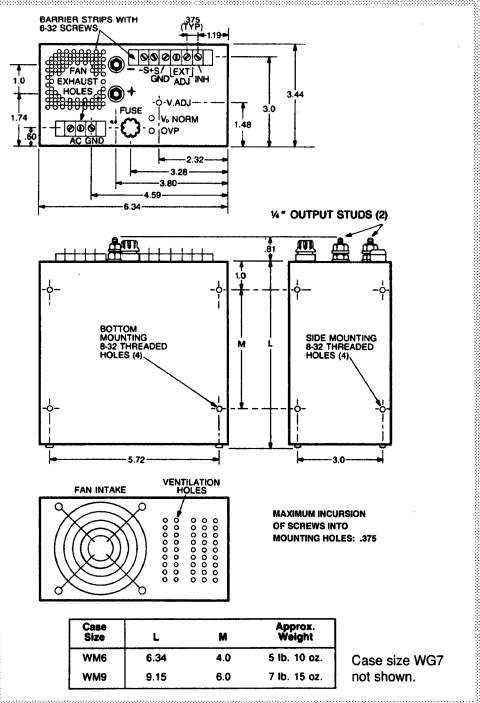
SINGLE OUTPUT MODELS

Nominal Output Voltage	Adjust Range ± V	Output Current Amps. at 40°C	Output Current Amps. at 71°C	Ripple mV (@ 25 MHz BW) RMS	Ripple mV (@ 25 MHz BW) P-P	Effic. (Typ.) %	($) Price	Model	Case Size
3.3	.25	65	45	10	50	65	595	W3.3MT65	WM6
3.3	.25	100	70	10	50	65	795	W3.3MT100	WM9
3.3	.25	150	105	10	50	65	995	W3.3GT150	WG7
5	.25	65	45	10	50	70	595	W5MT65	WM6
5	.25	100	70	10	50	70	795	W5MT100	WM9
5	.25	150	105	10	50	70	995	W5GT150	WG7
6	.25	56	39	10	50	71	595	W6MT56	WM6
6	.25	86	60	10	50	71	795	W6MT86	WM9
8	.25	41	28	15	100	73	595	W8MT41	WM6
8	.25	63	44	15	100	73	795	W8MT63	WM9
9	.25	37	26	15	100	73	595	W9MT37	WM6
9	.25	57	40	15	100	73	795	W9MT57	WM9
10	.5	34	24	15	100	74	595	W10MT34	WM6
10	.5	52	36	15	100	74	795	W10MT52	WM9
12	.5	29	20	15	100	76	595	W12MT29	WM6
12	.5	45	32	15	100	76	795	W12MT45	WM9
12	.5	68	47	15	100	76	995	W12GT68	WG7
15	.5	23	16	15	100	76	595	W15MT23	WM6
15	.5	36	25	15	100	76	795	W15MT36	WM9
15	.5	54	38	15	100	76	995	W15GT54	WG7
18	.5	20	14	15	100	78	595	W18MT20	WM6
18	.5	31	22	15	100	78	795	W18MT31	WM9
20	1	19	13	15	100	79	595	W20MT19	WM6
20	1	28	19	15	100	79	795	W20MT28	WM9
24	1	16	11	15	100	81	595	W24MT16	WM6
24	1	25	18	15	100	81	795	W24MT25	WM9
24	1	38	26	15	100	81	995	W24GT38	WG7
24	1	50	35	15	100	81	1095	W24GT50	WG7
28	1	14	10	15	100	81	595	W28MT14	WM6
28	1	21	15	15	100	81	795	W28MT21	WM9
28	1	32	22	15	100	81	995	W28GT32	WG7
28	1	42	29	15	100	81	1095	W28GT42	WG7
30	1	13	9	25	150	81	595	W30MT13	WM6
30	1	19	13	25	150	81	795	W30MT19	WM9
36	1	10	7	25	150	81	595	W36MT10	WM6
36	1	15	11	25	150	81	795	W36MT15	WM9
40	1	9	6	25	150	82	595	W40MT9	WM6
40	1	14	10	25	150	82	795	W40MT14	WM9
48	1	8	5	25	150	82	595	W48MT8	WM6
48	1	12	8.5	25	150	82	795	W48MT12	WM9
48	1	19	13	25	150	82	995	W48GT19	WG7
48	1	25	17	25	150	82	1095	W48GT25	WG7

WIDE ADJUST OUTPUT MODELS

Output Voltage Range	Output Current Amps. at 40°C	Output Current Amps. at 71°C	Ripple mV (@ 25 MHz BW) RMS	Ripple mV (@ 25 MHz BW) P-P	Effic. (Typ.) %*	($) Price	Model	Case Size
5-15	23	16	15	100	76	650	W515MT23	WM6
5-15	36	25	15	100	76	850	W515MT36	WM9
5-15	54	38	15	100	76	1050	W515GT54	WG7
5-30	13	9	25	150	81	650	W530MT13	WM6
5-30	19	13	25	150	81	850	W530MT19	WM9
5-30	30	20	25	150	81	1050	W530GT30	WG7
15-50	8	5	25	150	82	650	W1550MT8	WM6
15-50	12	8.5	25	150	82	850	W1550MT12	WM9
15-50	18	12	25	150	82	1050	W1550GT18	WG7

* At maximum output voltage



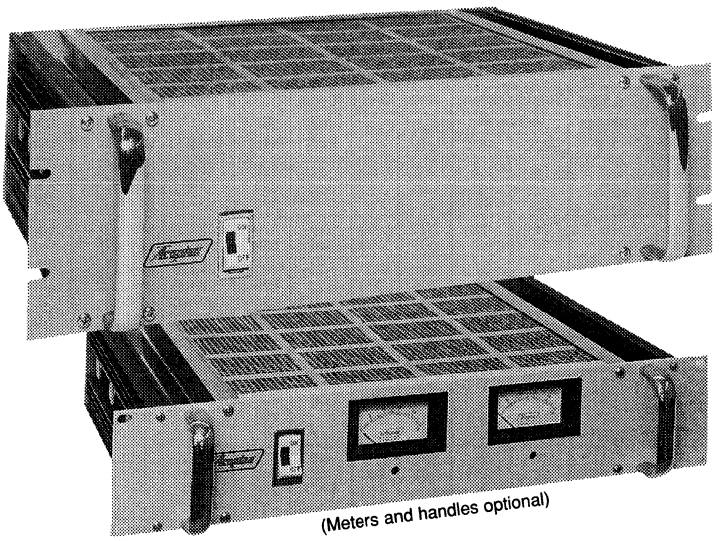
Case Size	L	M	Approx. Weight
WM6	6.34	4.0	5 lb. 10 oz.
WM9	9.15	6.0	7 lb. 15 oz.

Case size WG7 not shown.

single & dual tracking outputs

Rack Mounting

LINEAR REGULATED
AC-DC


(Meters and handles optional)

- Shipped Within 9 Days
- All Models U.L. Recognized
- Five Year Warranty

Acopian rack-mounting power supplies feature excellent regulation and ripple specifications in 101 models with outputs up to 150 volts and 60 amps. Metering and overvoltage protection are available as options. These power supplies are constructed in sturdy extruded aluminum assemblies designed expressly for mounting in standard 19″ wide RETMA cabinet racks. The front panels are finished in light gray enamel.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Remote Voltage Sensing: Provision for sensing the output voltage across the load is a standard feature.

Polarity:

Single Output Models: Output is floating; either positive or negative terminal may be grounded or floated up to 300 volts above ground.
Dual Output Models: Positive output, common, negative output.

Temperature Coefficient:

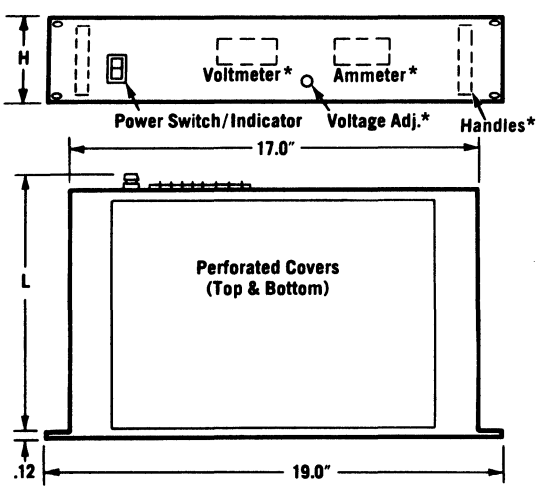
Single Output Models: 0.015%/°C (Typical).
Dual Output Models: 0.02%/°C (Typical).

Ambient Operating Temperature:

Single Output Models: –20 to +55°C.
Dual Output Models: –10 to +55°C.

Storage Temperature: –55 to +85°C.

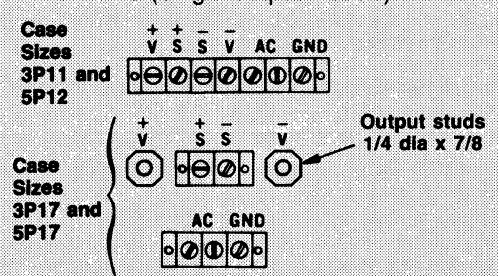
Overload/Short Circuit Protection: Foldback current limiting with automatic recovery.



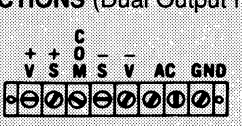
*Optional

Case Size	H	L	Approx. Weight
3P11	3½″	10⅞″	22 lb.
3P17	3½″	16 13/16″	38 lb.
5P12	5¼″	11 15/16″	28 lb.
5P17	5¼″	16 13/16″	53 lb.

CONNECTIONS (Single Output models):



CONNECTIONS (Dual Output models):



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SINGLE OUTPUT

Nominal Output Voltage	Adjust Range ± V	Output Current Amps. at 40°C	Output Current Amps. at 55°C	Regulation Load* ±%	Regulation Line* ±%	Ripple mV RMS	($) Price	Model	Case Size
1.5	.5	20	20	.005	.005	.25	520	1.5PT20	3P11
1.5	.5	32	27	.005	.005	.25	635	1.5PH32	5P12
1.5	.25	60	47	.05	.05	1	930	1.5PH60	5P17
2	.5	20	20	.005	.005	.25	520	2PT20	3P11
2	.5	30	25	.005	.005	.25	630	2PH30	5P12
3	.5	20	20	.005	.005	.25	520	3PT20	3P11
3	.5	30	25	.005	.005	.25	635	3PH30	5P12
3	.25	60	47	.05	.05	1	930	3PH60	5P17
3.3	.5	20	20	.005	.005	.25	520	3.3PT20	3P11
3.3	.5	32	27	.005	.005	.25	635	3.3PH32	5P12
3.3	.25	60	47	.05	.05	1	930	3.3PH60	5P17
5	.5	20	20	.005	.005	.25	520	5PT20	3P11
5	.5	32	27	.005	.005	.25	635	5PH32	5P12
5	.25	48	37	.05	.05	1	795	5PT48	3P17
5	.25	60	47	.05	.05	1	930	5PH60	5P17
6	.5	20	20	.005	.005	.25	520	6PT20	3P11
6	.5	28	23	.005	.005	.25	635	6PH28	5P12
6	.25	47	36	.05	.05	1	795	6PT47	3P17
6	.25	58	45	.05	.05	1	930	6PH58	5P17
7	.5	20	20	.005	.005	.25	520	7PT20	3P11
8	.5	20	20	.005	.005	.25	520	8PT20	3P11
8	.5	28	23	.005	.005	.25	635	8PH28	5P12
8	.5	44	34	.05	.05	1	795	8PT44	3P17
8	.25	54	42	.05	.05	1	930	8PH54	5P17
9	.5	20	20	.005	.005	.25	520	9PT20	3P11
9	.5	41	32	.05	.05	1	795	9PT41	3P17
9	.5	52	41	.05	.05	1	930	9PH52	5P17
10	.5	20	20	.005	.005	.25	520	10PT20	3P11
10	.5	25	20	.005	.005	.25	635	10PH25	5P12
10	.5	38	30	.05	.05	1	795	10PT38	3P17
10	.5	50	39	.05	.05	1	930	10PH50	5P17
12	.5	17	17	.005	.005	.25	520	12PT17	3P11
12	.5	22	22	.005	.005	.25	635	12PH22	5P12
12	.5	33	26	.05	.05	1	795	12PT33	3P17
12	.5	45	35	.05	.05	1	930	12PH45	5P17
13	.5	16	16	.005	.005	.25	520	13PT16	3P11
13	.5	43	34	.05	.05	1	930	13PH43	5P17
14	.5	12	12	.005	.005	.25	520	14PT12	3P11
15	.5	10	10	.005	.005	.25	520	15PT10	3P11
15	.5	19	16	.005	.005	.25	635	15PH19	5P12
15	.5	25	20	.05	.05	1	795	15PT25	3P17
15	.5	40	31	.05	.05	1	930	15PH40	5P17
16	.5	10	10	.005	.005	.25	520	16PT10	3P11
18	.5	10	10	.005	.005	.25	520	18PT10	3P11
18	.5	18	15	.005	.005	.25	635	18PH18	5P12
18	.5	24	19	.05	.05	1	795	18PT24	3P17
18	.5	36	28	.05	.05	1	930	18PH36	5P17
20	.5	10	10	.005	.005	.25	520	20PT10	3P11
20	.5	16	14	.005	.005	.25	635	20PH16	5P12
20	.5	23	18	.05	.05	1	795	20PT23	3P17
20	.5	32	25	.05	.05	1	930	20PH32	5P17
22	.5	10	10	.005	.005	.25	520	22PT10	3P11
24	.5	10	10	.005	.005	.25	520	24PT10	3P11
24	.5	15	13	.005	.005	.25	635	24PH15	5P12
24	.5	20	16	.05	.05	1	795	24PT20	3P17
24	.5	30	23	.05	.05	1	930	24PH30	5P17
25	.5	10	10	.005	.005	.25	520	25PT10	3P11
26	.5	10	10	.005	.005	.25	520	26PT10	3P11
28	.5	10	10	.005	.005	.25	520	28PT10	3P11
28	.5	14	12	.005	.005	.25	635	28PH14	5P12
28	.5	19	15	.05	.05	1	795	28PT19	3P17
28	.5	28	22	.05	.05	1	930	28PH28	5P17
30	.5	10	10	.005	.005	.25	520	30PT10	3P11
30	.5	14	12	.005	.005	.25	635	30PH14	5P12
32	.5	5	5	.005	.005	.25	450	32PT5	3P11
32	.5	10	10	.005	.005	.25	595	32PT10	5P12
34	.5	5	5	.005	.005	.25	460	34PT5	3P11
34	.5	10	10	.005	.005	.25	600	34PT10	5P12
35	.5	5	5	.005	.005	.25	470	35PT5	3P11
35	.5	10	10	.005	.005	.25	615	35PT10	5P12
36	.5	5	5	.005	.005	.25	475	36PT5	3P11
36	.5	10	10	.005	.005	.25	625	36PT10	5P12
38	.5	5	5	.005	.005	.25	485	38PT5	3P11
38	.5	10	10	.005	.005	.25	630	38PT10	5P12
40	.5	5	5	.005	.005	.25	485	40PT5	3P11
40	.5	10	10	.005	.005	.25	645	40PT10	5P12
45	.5	5	5	.005	.005	.25	495	45PT5	3P11
45	.5	10	10	.005	.005	.25	660	45PT10	5P12
48	.5	5	5	.005	.005	.25	495	48PT5	3P11
48	.5	10	10	.005	.005	.25	660	48PT10	5P12
48	.5	15	12	.005	.005	.25	820	48PT15	5P17
50	.5	5	5	.005	.005	.25	495	50PT5	3P11
50	.5	10	10	.005	.005	.25	660	50PT10	5P12
55	.5	5	3.8	.005	.005	.25	505	55PT5	3P11
55	.5	8	6	.005	.005	.25	675	55PT8	5P12
60	.5	5	3.8	.005	.005	.25	510	60PT5	3P11
60	.5	8	6	.005	.005	.25	690	60PT8	5P12
75	1	4	3	.01	.01	1	520	75PT4	3P11
75	1	5.6	4.2	.01	.01	1	715	75PT5	5P12
90	1	3.3	2.5	.01	.01	1	530	90PT3	3P11
90	1	4.4	3.3	.01	.01	1	725	90PT4	5P12
100	1	3	2.2	.01	.01	1	540	100PT3	3P11
100	1	4	3	.01	.01	1	735	100PT4	5P12
120	1	2.5	1.8	.01	.01	1	550	120PT2	3P11
120	1	3.5	2.6	.01	.01	1	745	120PT3	5P12
150	1	2.3	1.7	.01	.01	1	560	150PT2	3P11
150	1	3	2.2	.01	.01	1	755	150PT3	5P12

*or 2 mv, whichever is greater.

DUAL TRACKING OUTPUTS

Nominal Output Voltages	Adjust Range ± V	Amps. per Output at 40°C	Amps. per Output at 55°C	Regulation Load ±%	Regulation Line ±%	Ripple mV RMS	($) Price	Model	Case Size
±12	.5	7	5.6	.1	.1	1.5	530	PD12-700	3P11
±12	.5	9	7.2	.1	.1	1.5	645	PD12-900	5P12
±15	.5	7	5.6	.1	.1	1.5	530	PD15-700	3P11
±15	.5	9	7.2	.1	.1	1.5	645	PD15-900	5P12

OPTIONS

EXAMPLE: The Model 5PT20 equipped with all options is designated as the Model V5PT20AFHMP-230. (List suffix letters in alphabetical sequence.)

Overvoltage Protection: An internally installed and preset overvoltage protector is available for models with outputs of 3 volts and higher. On dual output models, if either output fails, both outputs are 'crowbarred'. To order, add prefix "V" to the model number and increase price as follows:

Outputs of	3-70V	75-150V
Case size 3P11	$35.00	$45.00
Other case sizes	$85.00	$95.00

Metering (Single Output Models):
Ammeter: Add suffix "A" to model number and $45.00 to price.
Voltmeter: Add suffix "F" to model number and $45.00 to price.

Metering (Dual Output Models):
Ammeters: One for each output. Add suffix "A" to model number and $90.00 to price. "A" and "F" options cannot be combined in one power supply.
Voltmeters: One for each output. Add suffix "F" to model number and $90.00 to price. "A" and "F" options cannot be combined in one power supply.
Voltmeter and Ammeter: Each with switch for selecting output to be monitored. Add suffix "G" to model number and $140.00 to price.

Handles: Add suffix "H" to model number and $30.00 to price.

Terminal Strip Cover: Clips on. To order, add suffix "M" to model number and $5.00 to price.

Front Panel Voltage Adjustment: Standard models have a voltage adjustment located at the rear. A voltage control mounted on the front panel is available as an option. To order, add suffix "P" to the model number and $15.00 to price.

230 Volt Input: For operation on inputs of 210 to 250 VAC, 50-400 Hz. Add suffix "–230" to model number and $40.00 to price.

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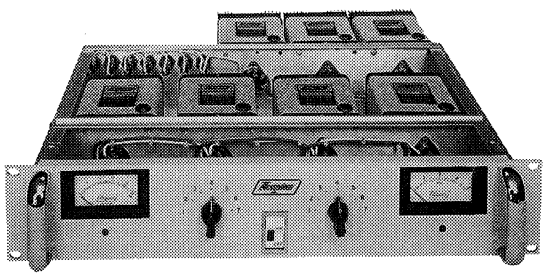
Acopian

HOW TO ORDER an Acopian Rack Mountable Power System

Design your Power System on the phone

Fill your requirements for completely wired multiple-output Power Systems without preparing time consuming mechanical layouts, detailed purchase requisitions or searching through a power supply catalog. **Simply call Acopian and specify the output voltages and currents that you require.**

Acopian production expertise assures that each system will be completely wired, tested and **shipped within 9 days** after receipt of your order.

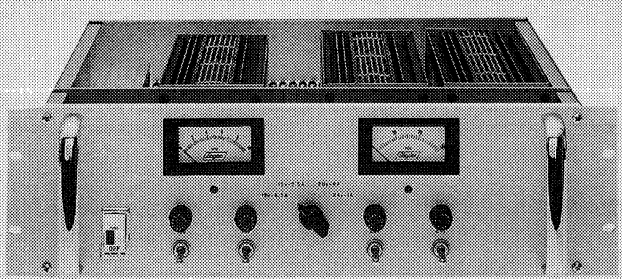


SHIPPED WITHIN 9 DAYS

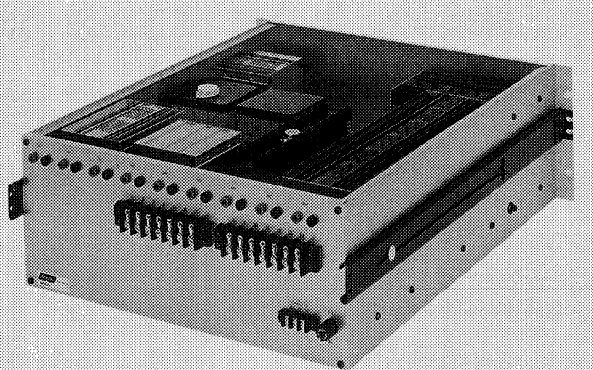
Shown are just a few examples of the unlimited variety of assemblies that Acopian can build and ship in 9 DAYS.

Ordering an Acopian Power System is this easy:

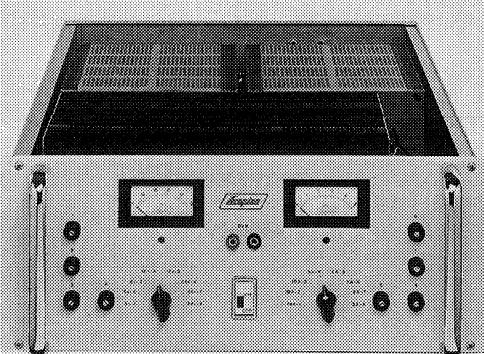
- *List the DC output ratings you require. Or, select the power modules that you wish to be included. Any module in this catalog can be used.*
- *Also list any assembly features you would like included - output controls, meters, test points, switches, handles, chassis slides, etc.*
- *Determine if any size restrictions (assembly height or depth) would be necessary.*
- *Call Acopian and ask for the Power Systems Dept.*
- *An Acopian Applications Engineer will answer - on the phone - any questions which you may have.*
- *A distinctive system model number will be assigned, and a firm price will be quoted. Your completely-wired power supply system will be **shipped within 9 days**.*



Four outputs, each separately switched, are provided by this 5¼" high assembly. The voltmeter and ammeter may be switched to monitor any output.



Test points for all outputs, in addition to screw terminals for all input and output connections, are on the rear panel of this 7" high assembly. Chassis slides permit easy access.



Front panel adjustments, each with a shaft lock to prevent accidental changes, permit easy calibration of the eight outputs provided by this 7" high assembly.

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Acopian

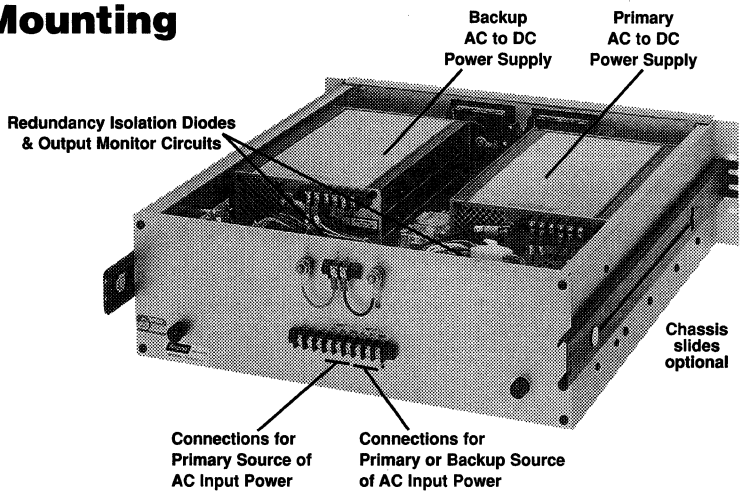
REDUNDANT POWER PACKAGES

Rack Mounting & Wall Mounting

AC-DC

LINEAR (PAGES 23 & 24)
SWITCHING (contact factory)

- Shipped Within 9 Days
- All Models U.L. Recognized
- Five Year Warranty



Output Redundancy: Each Redundant Power Package contains two identical power supplies with their outputs interconnected through a diode switching arrangement that will detect any fault condition, isolate it from the system output, and pass only the output of the other supply with no interruption of output power during the transition.

Input Redundancy: All Acopian Redundant Power Packages may be operated with only one AC power source. However, two isolated sets of AC input connections are provided, so that two independent sources of input power may be used, to obtain the additional protection of input redundancy. A battery-backup power source (UPS) and/or a second power line from the power utility can be used to maintain output power without interruption when your primary source of AC power fails.

Serviceability: Wing-nut mounting (Rack Mounting models) or hanger brackets (Wall Mounting models), and insulated connectors in the wiring to each power supply, facilitate the rapid and safe installation or removal of a supply without the need for tools. All input, output and alarm-contact connections are at the rear of the assembly for Rack Mounting models or on the front for Wall Mounting models. For Rack Mounting models, the chassis slides and handles options are recommended for applications where it is desired to service the Redundant Power Package without removing it from the rack.

Applications: Redundant Power Packages should be considered for any equipment where the highest attainable reliability is essential, and an unexpected loss of power would be disastrous. Such applications include communications systems (both voice and data types), computer systems (volatile memory systems in particular), process controls, utility and municipal systems, and security/safety alarm systems.

Theory of Operation: Each Redundant Power Package consists of the two power supplies installed in either a Rack Mounting or Wall Mounting assembly. The output voltage of the primary supply is set approximately 0.2 volt higher than that of the backup supply. Under this condition, the backup supply's diode is not forward biased; only the primary supply delivers current to the load. If the output voltage of the primary supply decreases by more than 0.2 volt, the situation is reversed and only the backup supply delivers load current. There is no interruption of output power during the transition.

Monitoring Circuitry: The Redundant Power Package contains two voltage monitoring circuits with relays, contacts of which are available to control external failure alarms or other circuitry. The contact wiring of the two relays is connected in cascade, to simulate a single set of Form C contacts which switches if the output voltage of either power supply decreases by more than 2.0 volts (3.0 volts for outputs over 48 volts) from the nominal rating.

Overvoltage Protection: Each power supply contains an overvoltage protection circuit, to assure that neither power supply output will significantly exceed the nominal output voltage rating under any condition, including incorrect application and misadjustment.

Acopian

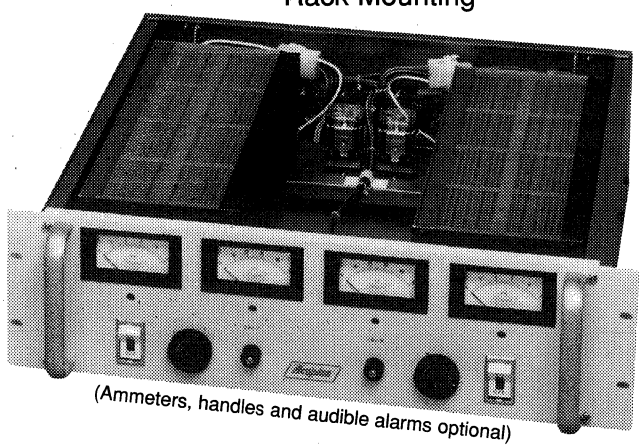
LINEAR REGULATED
Redundant Power Packages
Rack Mounting & Wall Mounting

AC-DC
single output

- Shipped Within 9 Days
- All Models U.L. Recognized
- Five Year Warranty

An Acopian Redundant Power Package is installed by simply connecting the AC input and DC output terminals. All wiring (including isolation diodes, output monitor circuits, switches, meters, adjustments and connectors) has been done for you.

Rack Mounting



(Ammeters, handles and audible alarms optional)

See page 22 for general Redundant Power Package information.

OPTIONS

Add option suffixes in alphabetical order. Example: R5H16AH-230.

Ammeters: One for each output. For models in case size 3R14, two volt/ammeters, each with switch, are substituted for the standard voltmeters. Add suffix letter "A" to model number and $90.00 to price.

Audible Alarms: Piercing whistle alerts personnel to a voltage lower than normal. Front panel mounted, one for each power supply. Units with this option do not have provision for control of an external alarm. To order, add suffix "K" to model number and $90.00 to price.

Handles (for Rack Mounting models): Add suffix "H" to model number and $30.00 to price.

Terminal Strip Cover: Clips on.
Wall Mounting models: Standard.
Rack Mounting models: To order, add suffix "M" to model number and $10.00 to price.

Chassis Slides (for Rack Mounting models): For racks having rear mounting rails spaced 20" to 26" behind the front panel. To order, add suffix "S" to model number and $90.00 to price.

230 Volt Input: For operation on inputs of 210-250 VAC, 50-400 Hz. To order, add suffix "–230" to model number and $75.00 to price.

Linear Regulated REDUNDANT POWER PACKAGES

Nominal Output Voltage	Adjust Range ±V	Output Current Amps. at 40°C	55°C	71°C	Ripple mV RMS	Rack Mounting Models ($) Price	Model	Case Size	Wall Mounting Models ($) Price	Model	Case Size
5	.5	2.6	2.5	2.4	1	1095	R5N8X	3R14	1395	RWL5N8X	317R18
5	.5	5.3	4.4	3.5	1	1195	R5M6	5R14	1495	RWL5M6	517R18
5	.5	11.0	9.3	7.5	1	1295	R5M13	5R18	1595	RWL5M13	519R20
5	.5	21.0	17.0	14.0	1	1495	R5H11	7R18	1795	RWL5H11	719R20
5	.5	28.0	23.0	19.0	1	1695	R5H16	7R20	1995	RWL5H16	719R25
12	.5	1.5	1.5	1.5	1	1095	R12N8X	3R14	1395	RWL12N8X	317R18
12	.5	3.5	3.0	2.5	1	1195	R12M6	5R14	1495	RWL12M6	517R18
12	.5	8.0	7.5	7.0	1	1295	R12M13	5R18	1595	RWL12M13	519R20
12	.5	16.0	13.8	11.2	1	1495	R12H11	7R18	1795	RWL12H11	719R20
12	.5	20.0	17.0	14.2	1	1695	R12H16	7R20	1995	RWL12H16	719R25
15	.5	1.5	1.5	1.5	1	1095	R15N8X	3R14	1395	RWL15N8X	317R18
15	.5	4.0	3.8	3.6	1	1195	R15M9	5R14	1495	RWL15M9	517R18
15	.5	6.5	6.0	5.5	1	1295	R15M13	5R18	1595	RWL15M13	519R20
15	.5	14.7	12.5	10.3	1	1495	R15H11	7R18	1795	RWL15H11	719R20
15	.5	18.7	16.0	13.3	1	1695	R15H16	7R20	1995	RWL15H16	719R25
24	.5	.9	.9	.9	1	1095	R24N8X	3R14	1395	RWL24N8X	317R18
24	.5	3.0	2.7	2.4	1	1195	R24M9	5R14	1495	RWL24M9	517R18
24	.5	5.0	5.0	5.0	1	1295	R24M13	5R18	1595	RWL24M13	519R20
24	.5	11.7	10.2	8.7	1	1495	R24H11	7R18	1795	RWL24H11	719R20
24	.5	14.7	12.7	10.7	1	1695	R24H16	7R20	1995	RWL24H16	719R25
28	.5	1.0	1.0	1.0	1	1095	R28N8X	3R14	1395	RWL28N8X	317R18
28	.5	2.7	2.6	2.5	1	1195	R28M9	5R14	1495	RWL28M9	517R18
28	.5	5.0	5.0	5.0	1	1295	R28M13	5R18	1595	RWL28M13	519R20
28	.5	10.5	9.2	8.0	1	1495	R28H11	7R18	1795	RWL28H11	719R20
28	.5	14.0	12.0	10.0	1	1695	R28H16	7R20	1995	RWL28H16	719R25
48	.5	.4	.4	.4	1	1130	R48N8T	3R14	1430	RWL48N8T	317R18
48	.5	1.6	1.4	1.2	1	1240	R48M9	5R14	1540	RWL48M9	517R18
48	.5	3.0	3.0	3.0	1	1340	R48M13	5R18	1640	RWL48M13	519R20
48	.5	6.0	5.0	4.0	1	1545	R48H11	7R18	1845	RWL48H11	719R20
48	.5	8.5	7.2	5.5	1	1835	R48H16	7R20	2135	RWL48H16	719R25
60	1	.25	.25	.25	1	1160	R60N8T	3R14	1460	RWL60N8T	317R18
60	1	1.0	.9	.8	1	1270	R60M9	5R14	1570	RWL60M9	517R18
60	1	2.5	2.1	1.7	1	1370	R60M13	5R18	1670	RWL60M13	519R20
60	1	5.0	4.1	3.3	1	1575	R60H11	7R18	1875	RWL60H11	719R20
60	1	7.0	5.8	4.6	1	1845	R60H16	7R20	2145	RWL60H16	719R25
75	1	.17	.17	.17	1	1160	R75N8T	3R14	1460	RWL75N8T	317R18
75	1	.9	.8	.7	1	1270	R75M9	5R14	1570	RWL75M9	517R18
75	1	2.0	1.8	1.5	1	1370	R75M13	5R18	1670	RWL75M13	519R20
75	1	4.0	3.3	2.6	1	1575	R75H11	7R18	1875	RWL75H11	719R20
75	1	5.6	4.6	3.6	1	1855	R75H16	7R20	2155	RWL75H16	719R25
120	1	.12	.12	.12	1	1180	R120N8T	3R14	1480	RWL120N8T	317R18
120	1	.5	.5	.4	1	1295	R120M6	5R14	1595	RWL120M6	517R18
120	1	1.2	1.1	1.0	1	1400	R120M13	5R18	1700	RWL120M13	519R20
120	1	2.5	2.0	1.6	1	1615	R120H11	7R18	1915	RWL120H11	719R20
120	1	3.5	2.9	2.3	1	1890	R120H16	7R20	2190	RWL120H16	719R25

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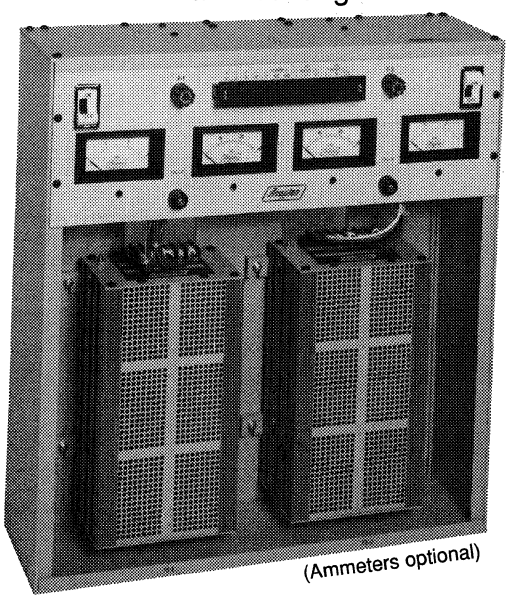
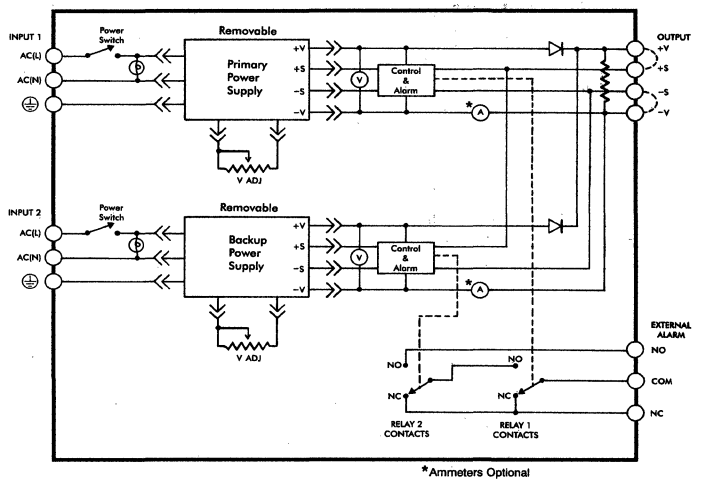
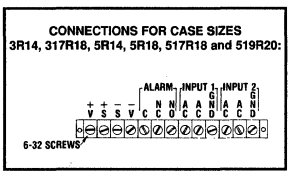
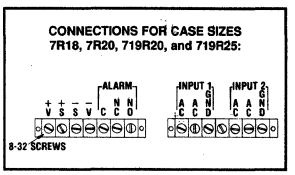
Wall Mounting



(Ammeters optional)





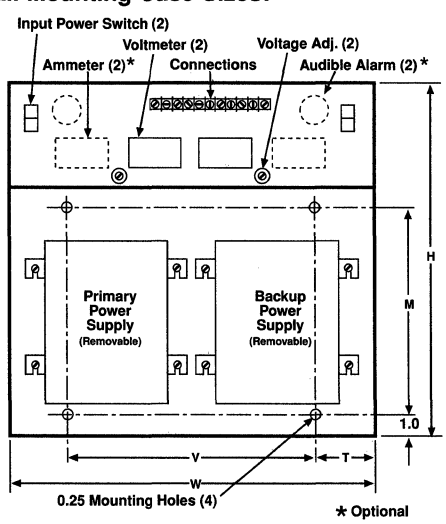


CASE SIZE:

Rack Mounting:

3R14	3½″ x 19″ panel, 14 13/16″ deep. (15 lb.)
5R14	5¼″ x 19″ panel, 14 13/16″ deep. (23 lb.)
5R18	5¼″ x 19″ panel, 17⅞″ deep. (29 lb.)
7R18	7″ x 19″ panel, 18½″ deep. (50 lb.)
7R20	7″ x 19″ panel, 20½″ deep. (64 lb.)

Wall Mounting Case Sizes:



Case Size	H	W	M	V	T	Depth	Approx. Weight
317R18	18½″	17	11	14	1½	4¼	10 lb.
517R18	18½″	17	11	14	1½	6	22-26 lb.
519R20	20½″	19	13	13	3	6	32 lb.
519RW15	15½″	19	8	13	3	6 1/16	24 lb.
519RW18	18½″	19	11	13	3	6 1/16	27 lb.
522RW17	17¼″	22½	10	16½	3	6 1/16	33 lb.
719R20	20½″	19	13	13	3	7¾	58 lb.
719R25	25½″	19	18	13	3	7¾	70 lb.

SPECIFICATIONS

Input Voltage: (A separate set of AC input terminals is provided for each power supply, so that if two sources of AC input power are available, one may be used for each supply and so reduce the possibility of output dropout due to loss of input power.)

Linear: 105-125 VAC, 50-400 Hz, single phase.

Output Voltage:
Normal mode: Nominal voltage shown in table.
Backup mode: 0.2 volt less than nominal voltage shown in table.

Output Regulation:
Line: ±0.05%.
Load: ±0.05% (Dynamic regulation - does not include 0.2 volt shift which occurs during switchover to lower-set backup supply.)

Load Protection: Overvoltage protection.

Overload/Short Circuit Protection: Foldback current limiting with automatic recovery.

Polarity: Output is floating; either positive or negative output terminal may be grounded or floated up to 300 volts above ground.

Output Metering: A separate voltmeter for each output (standard). Ammeters available; see Options.

Temperature Coefficient: 0.02%/°C (Typical).

Ambient Operating Temperature:
Linear: –20 to +71°C.

Storage Temperature:
Linear: –55 to +85°C.

Front Panel Finish: Light gray baked enamel.

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Fax: (610) 258-2842

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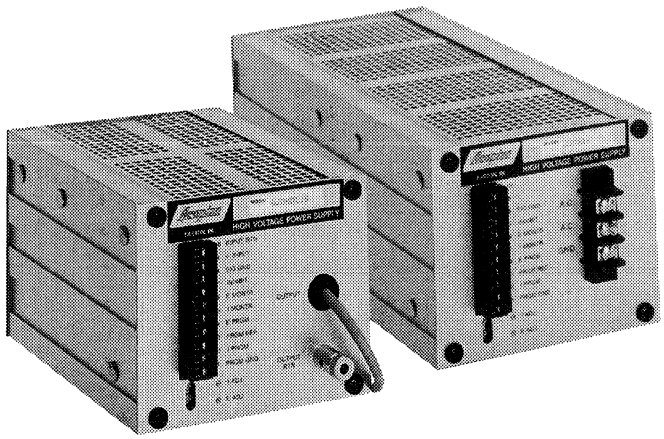
Acopian

High Voltage AC-DC & DC-DC

MODULAR
REGULATED

Output ranges:
0 - 1,000 volts to 0 - 30,000 volts

- Shipped Within 6 Days
- Five Year Warranty



These modular High Voltage supplies may be used as constant voltage or constant current sources. They may be remotely programmed by means of either voltage or resistance, and have provisions for remote monitoring and output inhibiting. All control and monitoring connections are on a pluggable terminal block that functions as a connector, providing wiring convenience and permitting easy and rapid connect/disconnect. Outputs are arc/short circuit protected.

SPECIFICATIONS

Output Polarity: Positive output is standard. For negative output, change first letter of model number from P to N.

Regulation (constant voltage operation):
Line: ±0.05%
Load: ±0.05%

Regulation (constant current operation):
Line: ±0.1%
Load: ±0.1% plus 50 µA.

Ripple: 0.05%, peak-to-peak.

Output Controls: Voltage and current may be controlled by means of two 20-turn front panel adjustments, or by using remotely located 1000 ohm potentiometers.

Output Programming: Output voltage and current may be programmed from 0 to full rating by means of control voltage inputs of 0 to +5.1 Vdc.

Voltage Monitor Terminal: Permits monitoring output voltage, stepped down by ratio shown. Accuracy is 2% of maximum rated output voltage.

Current Monitor Terminal: Permits monitoring output current at mV/mA ratio shown. Accuracy is 2% of maximum rated output current.

Inhibit Terminal: Grounding inhibits output.

Input Protection: "Soft start" circuit minimizes start-up power stresses.

Output Protection: Current regulation circuit protects power supply from short circuits, overload, and arcing.

Efficiency: Greater than 70% at full load.

Response Time: Less than 5 mS for 100 µA load step change.

Stability: 0.05% over eight hours, after 30 minute warmup.

Temperature Coefficient: 200 PPM/°C = 0.02%/°C (Typical).

Ambient Operating Temperature: –10 to +60°C. No derating required.

Storage Temperature: –20 to +85°C.

Humidity: Maximum of 90% relative, non-condensing.

Mounting: Threaded mounting holes permit mounting to a chassis, cabinet wall or bracket, or they may be used on a test bench or tabletop. To mount from the power supply side of the mounting surface, see accessory Mounting Kit GB8 on page 18.

Optional Output Connector: Models with an output of 5000 volts or less can be provided with an MHV connector (and 8′ long detachable shielded output cable with mating MHV connector installed) instead of the flying lead. To order, add suffix letter "T" to the model number and $50.00 to price.

AC INPUT MODELS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Connections: 24″ flying lead for high side of output and 5-way binding post for return (ground) are at the rear. AC input connections on separate terminal strip. All other connections on pluggable terminal block.

OPTIONS (for AC INPUT models)

Terminal Strip Cover: Clips on AC input terminal strip. To order, add suffix "M" to model number and $5.00 to price.

230 Volt Input: For operation on inputs of 210-250 VAC, 50-400 Hz, single phase. To order, add suffix "–230" to model number and $40.00 to price.

DC INPUT MODELS

Input Voltage: +21.6 to 32.0 Vdc.

Connections: 24″ flying lead for high side of output and 5-way binding post for return (ground). All other connections on pluggable terminal block.

Acopian
P. 0. Box 638, Easton, PA 18044
Phone: (610) 258-5441
Fax: (610) 258-2842

The complete Acopian catalog is available on the Internet at **http://www.acopian.com**

AC INPUT MODELS

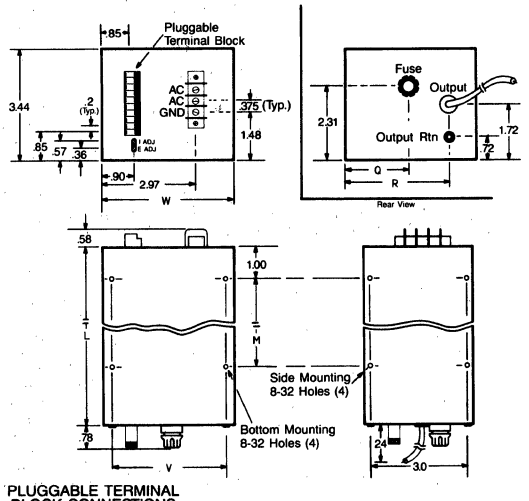
Output Range kVdc	Output Current mA	Output Monitor Ratio Voltage	Output Monitor Ratio Current mV/mA	($) Price	Model (Positive Output)*	Case Size
0-1	30	1,000:1	100:1	590	P01HA30	HA349
0-1	60	1,000:1	10:1	690	P01HA60	HA359
0-1.5	20	1,000:1	100:1	590	P01.5HA20	HA349
0-1.5	40	1,000:1	100:1	690	P01.5HA40	HA359
0-2	15	1,000:1	100:1	590	P02HA15	HA349
0-2	30	1,000:1	100:1	690	P02HA30	HA359
0-2.5	12	1,000:1	100:1	590	P02.5HA12	HA349
0-2.5	24	1,000:1	100:1	690	P02.5HA24	HA359
0-3.5	8.5	1,000:1	100:1	590	P03.5HA8.5	HA349
0-3.5	17	1,000:1	100:1	690	P03.5HA17	HA359
0-5	6	10,000:1	100:1	650	P05HA6	HA349
0-5	12	10,000:1	100:1	750	P05HA12	HA359
0-7.5	4	10,000:1	100:1	650	P07.5HA4	HA349
0-7.5	8	10,000:1	100:1	750	P07.5HA8	HA359
0-10	3	10,000:1	1,000:1	650	P010HA3	HA349
0-10	6	10,000:1	100:1	750	P010HA6	HA359
0-12	2.5	10,000:1	1,000:1	650	P012HA2.5	HA349
0-12	5	10,000:1	100:1	750	P012HA5	HA359
0-15	2	10,000:1	1,000:1	690	P015HA2	HA349
0-15	4	10,000:1	100:1	790	P015HA4	HA359
0-18	1.6	10,000:1	1,000:1	690	P018HA1.6	HA349
0-18	3.2	10,000:1	1,000:1	790	P018HA3.2	HA359
0-20	1.5	10,000:1	1,000:1	790	P020HA1.5	HA349
0-20	3	10,000:1	1,000:1	890	P020HA3	HA359
0-22	1.3	10,000:1	1,000:1	790	P022HA1.3	HA349
0-22	2.6	10,000:1	1,000:1	890	P022HA2.6	HA359
0-25	1.2	10,000:1	1,000:1	890	P025HA1.2	HA349
0-25	2.4	10,000:1	1,000:1	990	P025HA2.4	HA359
0-30	1	10,000:1	1,000:1	890	P030HA1	HA349
0-30	2	10,000:1	1,000:1	990	P030HA2	HA359

* Positive output is standard. For negative output, change first letter of model number from P to N.

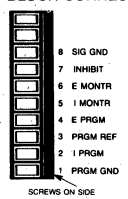
DC INPUT MODELS

Output Range kVdc	Output Current mA	Output Monitor Ratio Voltage	Output Monitor Ratio Current mV/mA	($) Price	Model (Positive Output)*	Case Size
0-1	30	1,000:1	100:1	490	P01HD30	HD345
0-1	60	1,000:1	10:1	590	P01HD60	HD355
0-1.5	20	1,000:1	100:1	490	P01.5HD20	HD345
0-1.5	40	1,000:1	100:1	590	P01.5HD40	HD355
0-2	15	1,000:1	100:1	490	P02HD15	HD345
0-2	30	1,000:1	100:1	590	P02HD30	HD355
0-2.5	12	1,000:1	100:1	490	P02.5HD12	HD345
0-2.5	24	1,000:1	100:1	590	P02.5HD24	HD355
0-3.5	8.5	1,000:1	100:1	490	P03.5HD8.5	HD345
0-3.5	17	1,000:1	100:1	590	P03.5HD17	HD355
0-5	6	10,000:1	100:1	550	P05HD6	HD345
0-5	12	10,000:1	100:1	650	P05HD12	HD355
0-7.5	4	10,000:1	100:1	550	P07.5HD4	HD345
0-7.5	8	10,000:1	100:1	650	P07.5HD8	HD355
0-10	3	10,000:1	1,000:1	550	P010HD3	HD345
0-10	6	10,000:1	100:1	650	P010HD6	HD355
0-12	2.5	10,000:1	1,000:1	550	P012HD2.5	HD345
0-12	5	10,000:1	100:1	650	P012HD5	HD355
0-15	2	10,000:1	1,000:1	590	P015HD2	HD345
0-15	4	10,000:1	100:1	690	P015HD4	HD355
0-18	1.6	10,000:1	1,000:1	590	P018HD1.6	HD345
0-18	3.2	10,000:1	1,000:1	690	P018HD3.2	HD355
0-20	1.5	10,000:1	1,000:1	690	P020HD1.5	HD345
0-20	3	10,000:1	1,000:1	790	P020HD3	HD355
0-22	1.3	10,000:1	1,000:1	690	P022HD1.3	HD345
0-22	2.6	10,000:1	1,000:1	790	P022HD2.6	HD355
0-25	1.2	10,000:1	1,000:1	790	P025HD1.2	HD345
0-25	2.4	10,000:1	1,000:1	890	P025HD2.4	HD355
0-30	1	10,000:1	1,000:1	790	P030HD1	HD345
0-30	2	10,000:1	1,000:1	890	P030HD2	HD355

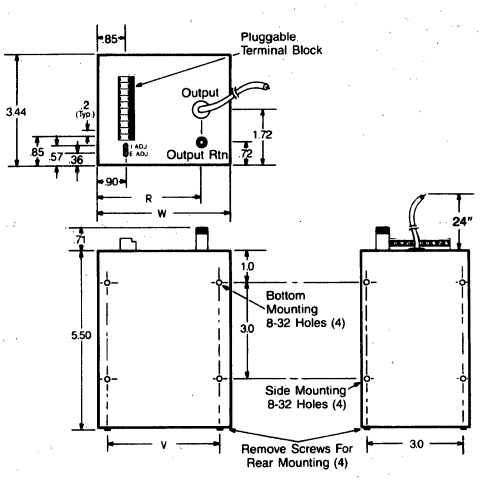
* Positive output is standard. For negative output, change first letter of model number from P to N.

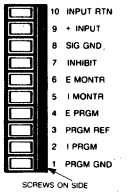


PLUGGABLE TERMINAL BLOCK CONNECTIONS



Case Size	L	W	M	V	Q	R	Approx. Weight
HA349	8.82	4.13	6.00	3.50	2.00	3.25	6 lb. 8 oz.
HA359	9.33	5.13	7.00	4.50	2.78	4.25	10 lb.





Case Size	W	V	R	Approx. Weight
HD345	4.13	3.50	3.25	2 lb.
HD355	5.13	4.50	4.25	2 lb. 12 oz.

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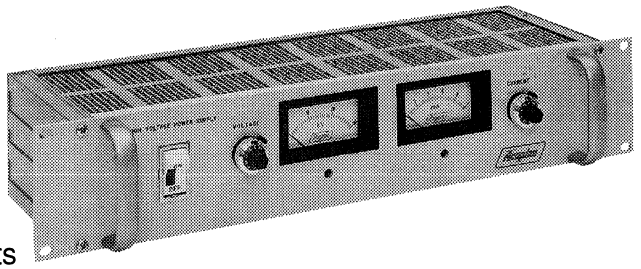
Acopian

High Voltage AC-DC

RACK MOUNTING
REGULATED



Output ranges: 0 - 1,000 volts to 0 - 30,000 volts

- Shipped Within 9 Days
- Five Year Warranty

Ideal for laboratory and instrumentation applications, these rack mounting supplies have the same output ratings and specifications as the modular supplies shown on pages 4 and 5, but additionally feature calibrated ten-turn controls (with locking vernier dials) for precisely setting voltage and current. Voltmeter, ammeter and handles are standard. An 8′ long shielded output cable is included.

SPECIFICATIONS

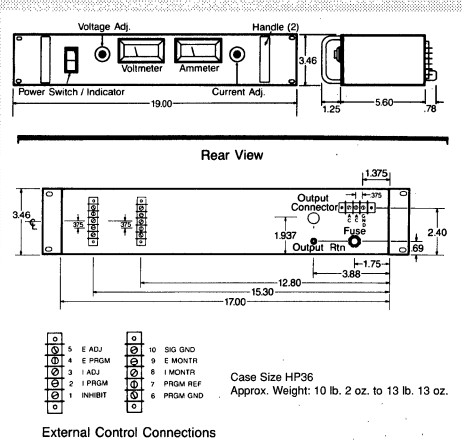
Input Voltage: 105-125 VAC, 50-400 Hz, single phase.
Input Current: 30 watt output ratings: 0.6A
60 watt output ratings: 1.2A
Output Polarity: Positive output is standard. For negative output, change first letter of model number from P to N.
Regulation (constant voltage operation):
Line: ±0.05%
Load: ±0.05%
Regulation (constant current operation):
Line: ±0.1%
Load: ±0.1% plus 50 µA.
Ripple: 0.05%, peak-to-peak.
Output Controls: Voltage and current may be controlled by means of two 10-turn front panel adjustments with locking vernier dials. Control linearity is 1% of full rated output. Calibration accuracy is 1% of rated output plus 1% of setting. (Remotely located 1000 ohm potentiometers may alternately be used for output control.)
Metering: Voltmeter and ammeter are standard. Accuracy is 2% of full scale.
Voltage Monitor Terminal: Permits remote monitoring of output voltage, stepped down by ratio shown. Accuracy is 2% of maximum rated output voltage.
Current Monitor Terminal: Permits remote monitoring of output current, at mV/mA ratio shown. Accuracy is 2% of maximum rated output current.
Inhibit Terminal: Grounding inhibits output.
Input Protection: "Soft start" circuit minimizes start-up power stresses.
Output Programming: Output voltage and current may be programmed from 0 to full rating by means of control voltage inputs of 0 to +5.1 Vdc, ±2%.
Output Protection: Current regulation circuit protects power supply from short circuits, overload, and arcing.
Response Time: Less than 5 mS for 100 µA load step change.
Stability:0.05% over eight hours, after 30 minute warmup.
Temperature Coefficient: 200 PPM/°C = 0.02%/°C (Typical).
Ambient Operating Temperature: –10 to +60°C. No derating required.
Storage Temperature: –20 to +85°C.
Humidity: Maximum of 90% relative, non-condensing.
Connections:
Input, Control and Monitoring: Screw terminals.
Output: High voltage connector (Type varies with model number). An 8′ shielded output cable, with mating connector installed, is provided.

OPTIONS

Terminal Strip Cover: Clips on AC input terminal strip. To order, add suffix "M" to model number and $5.00 to price.
230 Volt Input: All models can be alternately furnished for operation on inputs of 210-250 VAC, 50-400 Hz, single phase. To order, add suffix "–230" to model number and add $40.00 to price.

Output Range kVdc	Output Current mA	Output Monitor Ratio Voltage	Output Monitor Ratio Current mV/mA	($) Price	Model (Positive Output)*
0-1	30	1,000:1	100:1	995	P01HP30
0-1	60	1,000:1	10:1	1095	P01HP60
0-1.5	20	1,000:1	100:1	1095	P01.5HP20
0-1.5	40	1,000:1	100:1	1195	P01.5HP40
0-2	15	1,000:1	100:1	995	P02HP15
0-2	30	1,000:1	100:1	1095	P02HP30
0-2.5	12	1,000:1	100:1	995	P02.5HP12
0-2.5	24	1,000:1	100:1	1095	P02.5HP24
0-3.5	8.5	1,000:1	100:1	995	P03.5HP8.5
0-3.5	17	1,000:1	100:1	1095	P03.5HP17
0-5	6	10,000:1	100:1	1050	P05HP6
0-5	12	10,000:1	100:1	1150	P05HP12
0-7.5	4	10,000:1	100:1	1050	P07.5HP4
0-7.5	8	10,000:1	100:1	1150	P07.5HP8
0-10	3	10,000:1	1,000:1	1050	P010HP3
0-10	6	10,000:1	100:1	1150	P010HP6
0-12	2.5	10,000:1	1,000:1	1050	P012HP2.5
0-12	5	10,000:1	100:1	1150	P012HP5
0-15	2	10,000:1	1,000:1	1095	P015HP2
0-15	4	10,000:1	100:1	1195	P015HP4
0-18	1.6	10,000:1	1,000:1	1095	P018HP1.6
0-18	3.2	10,000:1	1,000:1	1195	P018HP3.2
0-20	1.5	10,000:1	1,000:1	1095	P020HP1.5
0-20	3	10,000:1	1,000:1	1195	P020HP3
0-22	1.3	10,000:1	1,000:1	1150	P022HP1.3
0-22	2.6	10,000:1	1,000:1	1250	P022HP2.6
0-25	1.2	10,000:1	1,000:1	1195	P025HP1.2
0-25	2.4	10,000:1	1,000:1	1295	P025HP2.4
0-30	1	10,000:1	1,000:1	1195	P030HP1
0-30	2	10,000:1	1,000:1	1295	P030HP2

* Positive output is standard. For negative output, change first letter of model number from P to N.



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Advance POWER

DC Power Supplies

Advance Power, Inc. has over fifty years experience producing high quality power supplies. Advance products include open frame and enclosed switch mode power supplies with single and multiple outputs ranging up to 5600 watts. For the Telecommunications industry, our wide range of products include rectifiers from 200 to 5600W. In addition, our extensive range of open frame, desk top/wall mount and dc-dc products can be found on pages D1446 thru D1449 under the Advance Tektris brand name. Advance power supplies are designed and manufactured in the U.K. in facilities that are approved to ISO9001 and other international standards, including UL 1950, CSA 22.2-234, EN 60950, BABT, and CE.

Availability

Inventories of power supplies and factory trained technicians are available in the U.S.A. For complete specifications and the name of your nearest sales representative, contact:

Advance Power, Inc.
32111 Aurora Road
Solon, Ohio 44139
E-Mail: larry.gravis@advancepower.com

Features of Advance Products

- High wattage units are power factor corrected
- Universal inputs
- Cost effective

Power Supplies
Configurable-Output Switched Mode - AC Input

Output Power	Model Number	Main Output	Auxiliary Outputs	Dimensions (inches)
350W	VWF350 Series	5V 50A	12V 12(24)A, 12V 6A, 5V 20A, 12V 10A, 24V 10A, 24V 5A, 5V 1.5A, 5V 5A, 12V 1.5A, 12V 3A, 24V 1.5A	2.5 x 5 x 9.5
750W	AWF1000 Series	3.3/5/12/ 24/48 volts @ 125/125/ 60/30/15 amps	3.3V 15A, 5V 15A, 12V 15A, 15V 15A, 24V 8A, 48V 6A, Dual 5V 2x6A, Dual 12V 2x6A Dual 15V 2x6A 12V 45A	4 X 5 X 11

Power Supplies
Configurable-Output Switched Mode - DC Input

Output Power	Model Number	Main Output	Auxiliary Outputs	Dimensions (inches)
350W	VDF350 Series	5V 50A	12V 12(24)A, 12V 6A, 5V 20A, 12V 10A, 24V 10A, 24V 5A, 5V 1.5A, 5V 5A, 12V 1.5A, 12V 3A, 24V 1.5A	2.5 x 5 x 9.5

Power Supplies
Single-Output Switched Mode & Telecom Rectifiers - DC Input

Output Power	Model Number	Voltages and Currents	Dimensions (inches)
1500W	TDC1500 Series	27V 50A	5.79 x 9.65 x 17.72

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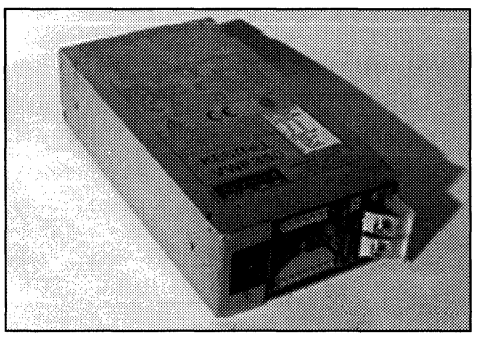
Advance POWER

Power Supplies
Single-Output Switched Mode - AC Input

Output Power	Model Number	Voltages and Currents	Dimensions (inches)
400W	VWS400 Series	12/24/48 volts @ 30/16/8 amps	2.5 x 5 x 9.5
400W	GCS00 Series	12/24/48 volts @ 30/16/8 amps	3.4 x 6.9 x 8.25
700W	NS700 Series	12/24/48/56 volts @ 60/36/20/17 amps	2.95 x 6.89 x 11.81
1000W	AWS1000 Series	3.3/5/12/15/24/ 26/48/56 volts @ 200/200/85/65/42/ 36/21/18 amps	4 x 5 x 11
2700W	F20006 Series	27/54 volts @ 100/60 amps	5 x 8 x 13

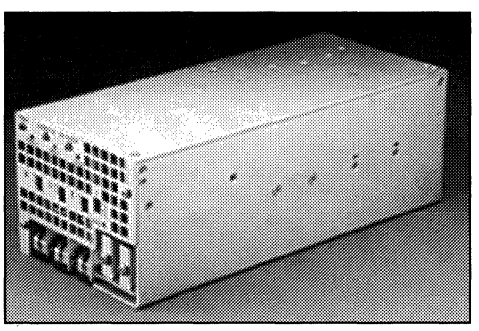


VWF 350 Series

Features
- Compliant to CE safety and EMC directives
- 350W multi-output
- Power factor corrected input IEC 555 compliant

Power Supplies
Telecom Rectifiers - AC Input

Output Power	Model Number	Voltages and Currents	Dimensions (inches)
400W	TWF0400 Series	27/54 volts @ 14/7 amps	3.39 x 7 x 11.22
700W	TWE0700 Series	27/54 volts @ 22/11 amps	3.15 x 6.77 x 10.43
800W	TWC0800 Series	27/54 volts @ 28/14 amps	3.15 x 9.65 x 13.8
1200W	TRE1200 Series	27/54 volts @ 44/22 amps	3.15 x 9.65 x 14.2
1800W	MRC1800	27/54 volts @ 56/33 amps	3.15 x 9.65 x 14.94
2400W	MRE2400	27/54 volts @ 88/44 amps	3.15 x 9.65 x 14.94
2700W	MRF2800	27/54 volts @ 100/50 amps	5.5 x 5 x 13
4200W	TRF4200 Series	27/54 volts @ 150/75 amps	6.91 x 10.47 x 17.72
5600W	TF5600 Series	27/54 volts @ 200/100 amps	5.2 x 14 x 16



AWF 1000

Features
- 750W multi-output up to 7 outputs and many configurations available
- Power factor corrected input IEC 555 compliant
- Compact 4" x 5" x 11" size
- Compliant to CE safety and EMC directives

ADVANCE TEKTRIS, INC.

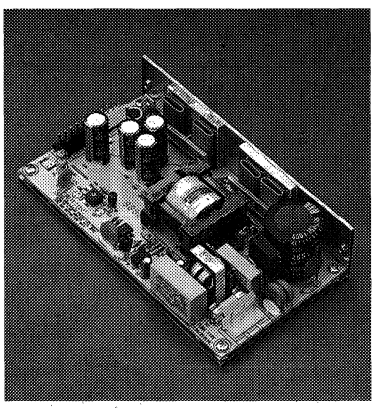
SWITCH MODE POWER SUPPLIES

Advance Tektris Inc. is a manufacturer of switching regulated power supplies, DC-DC converters and battery chargers which range in output power from 10 - 2500 watts and accommodate up to eight outputs. To compliment our standard product offering, we have the capability and facilities to provide unique power solutions that may vary from simple modifications to complex custom designs. These products are used in a wide variety of OEM applications. Our manufacturing capacity currently supports world wide shipments of up to 300,000 units per month. Contact us today to discuss your power requirements.

- Wall Plug
- Desk Top
- PCB
- L Channel
- U Channel
- DC-DC Converters
- Modified Standards
- Customs
- Value Added

TEK100 WATT SERIES

Package Size: 1.5 (H) x 3.5 (W) x 6.5 (L) inches



SPECIFICATIONS

INPUT SPECIFICATIONS

Input Voltage:	90-264VAC
Input Frequency:	47-63 Hz
Input Surge (cold start):	40A max @ 115 VAC 80A max @ 230 VAC

KEY FEATURES

Reliability (MTBF):	100,000 hrs.
Short-Circuit Protection:	Hiccup Type
Overvoltage Protection:	125% typical
Overtemperature Protection	

ENVIRONMENTAL

Operating	
Temperature:	0 to 50°C
Relative Humidity:	0 to 90%, non-condensing
Storage	
Temperature:	-20 to 85°C
Relative Humidity:	5 to 95%, non-condensing

OUTPUT SPECIFICATIONS

Output Voltages:	3.3, 5, 12, 15, 24, 48 VDC
Adjustability:	V1 ±5%
Output Current:	see model table
Power Output:	100W, convection cooling
Efficiency (@ max load):	70% min.
Total Regulation	
Single Output:	±1% (0-100% load)
Multiple Output:	
Main Output:	±3% (20-100% load)
Auxiliary Outputs:	±5%
Temperature Coefficient:	0.1%/°C, max.
Ripple and Noise:	1% p-p
Overshoot (turn on/off):	No overshoot
Step Load Response:	<5% for 20-100% change
Turn-on Delay (120VAC):	1 sec, max.
Hold-up Time (120VAC):	20 ms

DESIGN STANDARDS

Safety:	UL, cUL, TUV, VDE, CE
EMI:	FCC Part 15 Class B VDE 0871 Class A

	Output #1		Output #2		Output #3 (Floating ±)		Output #4 (Floating ±)	
Model	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Current
TEK100S01	5V	20A (30A PK)						
TEK100S02	12V	8.5A (12A PK)						
TEK100S03	15V	7.0A (10A PK)						
TEK100S04	24V	4.5A (6A PK)						
TEK100S09	48V	2.2A (3A PK)						
TEK100D12	5V	10A (15A PK)	12V	5A (9A PK)				
TEK100D13	5V	10A (15A PK)	15V	4A (6A PK)				
TEK100D14	5V	10A (15A PK)	24V	2.5A (6A PK)				
TEK100T16	5V	10A (15A PK)	12V	5A (9A PK)	12V	0.5A (1A PK)		
TEK100T17	5V	10A (15A PK)	15V	4A (6A PK)	15V	0.5A (1A PK)		
TEK100Q56	5V	10A (15A PK)	12V	5A (9A PK)	12V	0.5A (1A PK)	5V	0.5A (1A PK)
TEK100Q57	5V	10A (15A PK)	15V	4A (6A PK)	15V	0.5A (1A PK)	5V	0.5A (1A PK)
TEK100Q86	5V	10A (15A PK)	24V	2A (3A PK)	12V	0.5A (1A PK)	12V	0.5A (1A PK)

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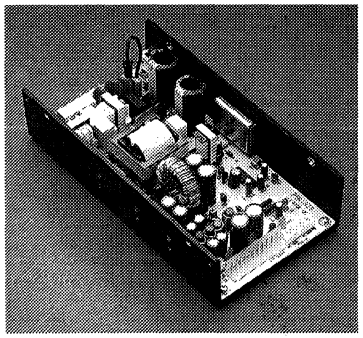

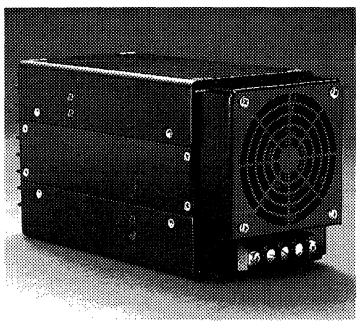

TEK 600, See table next page

SPECIFICATIONS

INPUT SPECIFICATIONS

Input Voltage:	90-132/180-264VAC (auto-selectable)
Input Frequency:	47-63 Hz
Input Surge (cold start):	70A max.

KEY FEATURES

Short-Circuit Protection:	with auto-recovery
Overvoltage Protection	
Hiccup Type Standard:	V1:110-125% programmable
Auxiliary Outputs:	125%
Overtemperature Protection	

ENVIRONMENTAL

Operating	
Temperature:	0 to 40°C
Relative Humidity:	8 to 90%, non-condensing
Storage	
Temperature:	-20 to 85°C
Relative Humidity:	5 to 95%, non-condensing

OPTIONS

115-230 Jumper Selectable

OUTPUT SPECIFICATIONS

Output Voltages:	3.3, 5, 12, 15, 24, 48 VDC
Adjustability:	±5%
Output Current:	see model table
Power Output:	TEK 200: 150W, convection cooling 200W, forced air cooling TEK 300: 200W, convection cooling 300W, forced air cooling
Efficiency (@ max load):	70% min.
Total Regulation	
Single Output:	±1% (20-100% load)
Multiple Output:	
Main Output:	±3% (20-100% load)
Auxiliary Outputs:	±5%
Temperature Coefficient:	0.1%/°C, max.
Ripple and Noise:	1% p-p
Overshoot (turn on/off):	No overshoot
Step Load Response:	<5% for 20-100% change
Turn-on Delay (120VAC):	1 sec, max.
Hold-up Time (120VAC):	20 ms

DESIGN STANDARDS

Safety:	UL, cUL, TUV, VDE, CE
EMI:	FCC Part 15 Class B VDE 0871 Class A, EN55022

Features	200 Watt	300 Watt	400 Watt	600 Watt
Small Size	YES	YES	YES	YES
Remote On/Off	YES	YES	YES	YES
Auxiliary Fan Drive	YES	YES	YES	YES
AC Good (signal & LED)		YES		YES
DC Good (signal & LED)		YES		YES
Power Good (signal & LED)	YES	YES	YES	YES
Multiple Outputs	up to 4	up to 4	up to 8	up to 8
2 High Current Outputs	YES	YES		
Up to 4 High Current Outputs			YES	YES
Cover	optional	optional	STD	STD
Fan	optional	optional	STD	STD

TEK200 WATT SERIES

Package Size: 1.5 (H) x 3.8 (W) x 6.8 (L) inches

	Output V1		Output V3		Output V4 (Floating ±)		Output V2*	
Model	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Current
TEK200SA	3.3V	40A**						
TEK200SB	5V	40A						
TEK200SC	12V	16.7A						
TEK200SC	15V	13.3A						
TEK200SD	24V	8.3A						
TEK200SE	48V	4.2A						
TEK200D12	5V	20A	12V	8A				
TEK200D13	5V	20A	15V	6.6A				
TEK200D14	5V	20A	24V	4.2A				
TEK200T16	5V	18A	12V	8A	12V	1.0A		
TEK200T17	5V	20A	15V	5A	15V	1.0A		
TEK200Q56	5V	20A	12V	6A	12V	1.0A	-5V	1.0A
TEK200Q57	5V	20A	15V	5A	15V	1.0A	-5V	1.0A
TEK200Q86	5V	15A	24V	3A	12V	1.0A	-12V	1.0A

*Factory configurable for (+) or (-) output

(**) With 20 CFM Air

TEK300 WATT SERIES

Package Size: 2.0 (H) x 4.25 (W) x 8.0 (L) inches

	Output V1		Output V4		Output V3 (Floating ±)		Output V2	
Model	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Current
TEK300SA	3.3V	60A**						
TEK300SB	5V	60A						
TEK300SC	12V	25A						
TEK300SC	15V	20A						
TEK300SD	24V	12.5A						
TEK300SE	48V	6.3A						
TEK300D12	5V	30A	12V	12A				
TEK300D13	5V	30A	15V	10A				
TEK300D14	5V	30A	24V	6.2A				
TEK300T16	5V	30A	12V	10A	12V	2A		
TEK300T17	5V	30A	15V	8A	15V	2A		
TEK300Q56	5V	30A	12V	10A	12V	2A	-5V	2A
TEK300Q57	5V	30A	15V	2A	15V	2A	-5V	2A
TEK300Q86	5V	30A	24V	5A	12V	2A	-12V	2A

*Factory configurable for (+) or (-) output

(**) With 20 CFM Air

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TEK400 WATT SERIES

Package Size: 3.5 (H) x 3.95 (W) x 8.5 (L) inches

	Output V1		Output V3		Output V4		Output V2 (Floating ±)	
Model	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Current
TEK400SA	3.3V	80A						
TEK400SB	5V	80A						
TEK400SC	12V	33.4A						
TEK400SC	15V	26.6A						
TEK400SD	24V	16.6A						
TEK400SE	48V	8.4A						
TEK400D11	5V	40A	5V	40A				
TEK400D12	5V	40A	12V	16.5A				
TEK400D13	5V	40A	15V	13.5A				
TEK400D14	5V	40A	24V	8.5A				
TEK400T16	5V	40A	12V	12.5A	12V	4A		
TEK400T17	5V	40A	15V	10A	15V	3A		
TEK400Q56	5V	40A	12V	12.5A	12V	4A	5V	1A
TEK400Q57	5V	40A	15V	10A	15V	3A	5V	1A
TEK400Q86	5V	40A	24V	6A	12V	4A	12V	1A

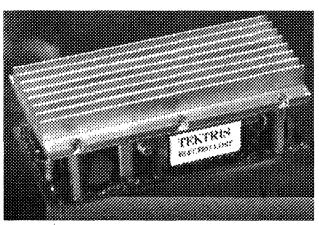
TEK600 WATT SERIES

Package Size: 4.3 (H) x 4.4 (W) x 9.7 (L) inches

	Output V1		Output V3		Output V4		Output V2 (Floating ±)	
Model	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Current
TEK600SA	3.3V	120A						
TEK600SB	5V	120A						
TEK600SC	12V	50A						
TEK600SC	15V	40A						
TEK600SD	24V	25A						
TEK600SE	48V	12.5A						
TEK600D11	5V	60A	5V	60A				
TEK600D12	5V	60A	12V	25A				
TEK600D13	5V	60A	15V	20A				
TEK600D14	5V	60A	24V	12.5A				
TEK600T16	5V	60A	12V	16A	12V	8A		
TEK600T17	5V	60A	15V	13A	15V	6A		
TEK600Q56	5V	60A	12V	16A	12V	8A	5V	2A
TEK600Q57	5V	60A	15V	13A	15V	6A	5V	2A
TEK600Q86	5V	60A	24V	8A	12V	8A	12V	2A

Smart Technology™ ECOM & Micro ECOM

100 & 200 Watt DC-DC Converters



SPECIFICATIONS

INPUT SPECIFICATIONS

Input Voltage (VDC):	12, 24, 48, 150, 300 (for ECOM) 12, 24, 48 (for Micro ECOM)
Nominal Input Voltage:	-15%/+25%, typical
Transient Input Voltage:	-25%/+50%, typical

KEY FEATURES

- Remote Sensing
- Short-Circuit Protection
- Overvoltage Protection
- Overcurrent Protection
- Thermal Protection
- DC Good Signal
- N+1 Redundancy

DESIGN STANDARDS

Safety:	UL, cUL, TUV, VDE
EMI:	FCC Part 15 Class B VDE 0871 Class A

OUTPUT SPECIFICATIONS

Output Voltage:	3.3, 5, 12, 15, 24, 28 VDC
Regulation:	±1%
Adjustment Range:	±10%
Output Current:	see table
Current Limit:	103% to 130% (factory adjusted)
Reliability (MTBF):	500,000 hrs
Efficiency (48 VDC in):	80%, min at full load
Isolation:	1500V
Current Sharing:	active sharing - ±20% under all line, load & environmental conditions

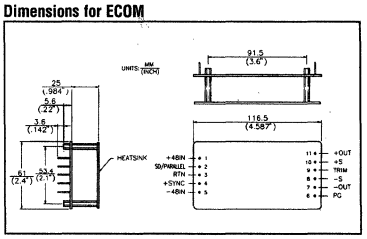
ENVIRONMENTAL

Operating	
Temperature:	0 to 50°C
Relative Humidity:	8 to 95%, non-condensing
Storage	
Temperature:	-40 to 85°C
Vibration:	2-200Hz, 1G X, Y, Z axis • 30 min./axis
Shock:	<30G

Maximum Output Power for ECOM

	Output Voltage	
Input Voltage	3.3V	≥5V
12	50W	75W
24	100W	150W
48	125W	200W
150	125W	200W
300	125W	200W

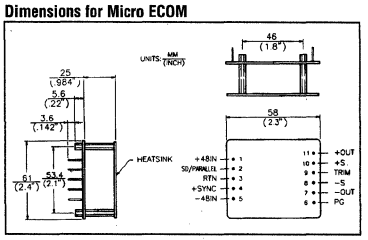
Dimensions for ECOM



Maximum Output Power for Micro ECOM

	Output Voltage		
Input Voltage	<5V	5V	>5V
12	33W	50W	50W
24	66W	75W	100W
48	66W	75W	100W

Dimensions for Micro ECOM



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ADVANCE TEKTRIS, INC.

WALL MOUNT/DESKTOP/PC BOARD SWITCHERS

SPECIFICATIONS

INPUT SPECIFICATIONS

Input Voltage: 90-264VAC
Input Frequency: 47-63 Hz

ENVIRONMENTAL

Operating
Temperature: 0 to 40°C
Relative Humidity: 0 to 95%, non-condensing
Storage
Temperature: -20 to 80°C
Relative Humidity: 0 to 95%, non-condensing

OUTPUT SPECIFICATIONS

Output Voltages: see model table
Output Current: see model table
Power Output: see model table
Peak Load: 150% of rated load
Power Derating: derate linearly to 50% at 70°C
Efficiency (@ max load): 65%, min.

Line Regulation: ±1%
Load Regulation: ±5%
Temperature Coefficient: ±0.02%/°C
Ripple and Noise: 1% p-p

Turn-on Delay: 1 sec, max. at 120VAC
Hold-up Time: 20 ms

KEY FEATURES

Reliability: 50,000 Hrs.
Cooling: free-air convection
Overvoltage Protection
Short-Circuit Protection
HICCUP at 150% load

DESIGN STANDARDS

Safety: UL, CUL, TUV, CE
EMI: FCC Class B, VDE Class B

EXT SERIES

5-100 Watt External Switchers

Wall Mount Models

Model	Output #1		Output #2		Output#3		Output Power	Size	Safety Approvals			
	Voltage	Current	Voltage	Current	Voltage	Current			UL	cUL	TUV	CE
PUAA050	5V	1A					5	2.90" x 1.90" x 1.60"	Y	Y	N	N
PUAA052	5V	1A					5	2.90" x 1.90" x 1.60"	N	N	Y	N
PUAA054	5V	2A					10	2.90" x 1.90" x 1.60"	Y	Y	N	Y
PUAD081	8V	1.2A					9.6	2.90" x 1.90" x 1.60"	Y	Y	N	N
PUAA090	9V	0.6A					5.4	2.90" x 1.90" x 1.60"	Y	Y	N	N
PUAA092	9V	0.6A					5.4	2.90" x 1.90" x 1.60"	N	N	Y	N
PUAA094	9V	1A					9	2.90" x 1.90" x 1.60"	Y	Y	N	N
PUAA120	12V	0.5A					5	2.90" x 1.90" x 1.60"	Y	Y	N	N
PUAA122	12V	0.5A					6	2.90" x 1.90" x 1.60"	N	N	Y	N

Table Top Models

Model	Output #1		Output #2		Output#3		Output Power	Size	Safety Approvals			
	Voltage	Current	Voltage	Current	Voltage	Current			UL	cUL	TUV	CE
PUAA051	5V	1A					5	4.50" x 2.00" x 1.65"	Y	Y	Y	N
PUAA053	5V	2A					10	4.50" x 2.00" x 1.65"	Y	Y	Y	Y
PMIC050	5V	3A					15	4.18" x 2.36" x 1.22"	Y	Y	Y	Y
PUAE050	5V	4A					20	4.33" x 2.48" x 1.50"	Y	Y	Y	Y
PUAE061	5V	6A					30	4.33" x 2.48" x 1.50"	Y	Y	Y	Y
PUAA091	9V	0.5A					5.4	4.50" x 2.00" x 1.65"	Y	Y	Y	N
PUAA093	9V	1A					9	4.50" x 2.00" x 1.65"	Y	Y	Y	N
PUAA121	12V	0.5A					5	4.50" x 2.00" x 1.65"	Y	Y	Y	N
PMIC120	12V	1.5A					18	4.18" x 2.36" x 1.22"	Y	Y	Y	Y
PUAE120	12V	2.5A					30	4.33" x 2.48" x 1.50"	Y	Y	Y	Y
PUAE240	24V	1.5A					36	4.33" x 2.48" x 1.50"	Y	Y	Y	Y
PMIC601	5V	1A	12V	1A			17	4.18" x 2.36" x 1.22"	Y	Y	Y	Y
PUAE601	5V	1.5A	12V	1.5A			26	4.33" x 2.48" x 1.50"	Y	Y	Y	Y
PUAE602	5V	2A	12V	2.5A			34	4.33" x 2.48" x 1.50"	Y	Y	Y	Y
PUAE603	5V	1A	12V	2A			29	4.33" x 2.48" x 1.50"	Y	Y	Y	Y
PUAE604	5V	2.5A	12V	1A			25	4.33" x 2.48" x 1.50"	Y	Y	Y	Y

Plastic Housing Models

Model	Output #1		Output #2		Output#3		Output Power	Size	Safety Approvals			
	Voltage	Current	Voltage	Current	Voltage	Current			UL	cUL	TUV	CE
PUBA050	5V	7A					35	6.08" x 3.33" x 1.97"	Y	Y	Y	Y
PUBA120	12V	3A					36	6.08" x 3.33" x 1.97"	Y	Y	Y	Y
PUDA200	20V	2.5A					50	7.48" x 3.15" x 2.13"	Y	Y	Y	Y
PUBA240	24V	1.6A					38.4	6.08" x 3.33" x 1.97"	Y	Y	Y	Y
PUDA240	24V	2.1A					50	7.48" x 3.15" x 2.13"	Y	Y	Y	Y
PUBA701	5V	4A	12V	2A	-12V	.3A	40	6.08" x 3.33" x 1.97"	Y	Y	Y	Y

Metal Housing Models

Model	Output #1		Output #2		Output#3		Output Power	Size	Safety Approvals			
	Voltage	Current	Voltage	Current	Voltage	Current			UL	cUL	TUV	CE
MPUDA050	5V	15A					80	7.48" x 3.15" x 1.77"	P	P	P	P
MPUDA120	12V	6.7A					80	7.48" x 3.15" x 1.77"	P	P	P	P
MPUDA200	20V	4A					80	7.48" x 3.15" x 1.77"	P	P	P	P
MPUDA240	24V	4.2A					100	7.48" x 3.15" x 1.77"	P	P	P	P
MPUDA480	48V	2.1A					100	7.48" x 3.15" x 1.77"	P	P	P	P

INT SERIES

PC Board Switch Mode Power Supplies

Standard Models

Model	Output #1		Output #2		Output#3		Output Power	Size	Safety Approvals					
	Voltage	Current	Voltage	Current	Voltage	Current			UL	cUL	TUV	CE	Fan	LED
FUAH050	5V	1A					5	1.18" x 4.13" x 0.98"	Y	Y	Y	N	N	Y
FUAC601	5V	1A	9V	0.2A			7	3.54" x 2.36" x 1.18"	Y	Y	Y	N	N	N
FUAC602	5V	1A	12V	0.2A			8	3.54" x 2.36" x 1.18"	Y	Y	Y	N	N	N
FUAG601	5V	1.4A	12V	0.4A			12	5.10" x 1.18" x 1.06"	Y	Y	Y	N	Y	Y
FUAE601	5V	1.5A	12V	1A			20	4.33" x 2.36" x 1.18"	Y	Y	Y	N	N	N
FUBE601	5V	1.5A	12V	1.5A			26	1.57" x 4.72" x 0.98"	Y	Y	Y	N	Y	Y
FUBB604	5V	2A	12V	1.5A			28	5.91" x 1.77" x 1.18"	Y	Y	Y	Y	Y	Y
FUBB607	5V	2A	12V	2.5A			40	5.91" x 1.77" x 1.18"	Y	Y	Y	Y	Y	Y
FUBB608	5V	3A	12V	2A			40	5.91" x 1.77" x 1.18"	Y	Y	Y	Y	Y	Y

Model	Output #1		Output #2		Output#3		Output Power	Size	Safety Approvals					
	Voltage	Current	Voltage	Current	Voltage	Current			UL	cUL	TUV	CE	Fan	LED
FUDA501	5V	5.5A	12V	2.5A			58	3.00" x 5.00" x 1.26"	Y	Y	Y	N	Y	Y
FUDB501	5V	5.5A	12V	2.5A			58	3.50" x 6.00" x 1.50"	Y	Y	Y	N	Y	Y
FUBA601	5V	3A	12V	2A			40	3.00" x 5.00" x 1.26"	Y	Y	Y	N	Y	Y
FUBA602	5V	5A	12V	1A			40	3.00" x 5.00" x 1.26"	Y	Y	Y	N	Y	Y
FUBA704	5V	3A	12V	2A	-5V	0.3A	40	3.00" x 5.00" x 1.26"	Y	Y	Y	N	Y	Y
FUBA703	5V	3A	12V	2A	-12V	0.3A	40	3.00" x 5.00" x 1.26"	Y	Y	Y	N	Y	Y
FUBA702	5V	3A	15V	1.5A	-15V	0.3A	40	3.00" x 5.00" x 1.26"	Y	Y	Y	N	Y	Y
FUBA701	5V	4A	12V	1.5A	-12V	0.3A	40	3.00" x 5.00" x 1.26"	Y	Y	Y	N	Y	Y
FUDA705	5V	5.5A	12V	2.5A	-12V	0.3A	53	3.00" x 5.00" x 1.26"	Y	Y	Y	Y	Y	Y
FUDB701	5V	5.5A	12V	2.5A	-12V	0.3A	61	3.50" x 6.00" x 1.50"	Y	Y	Y	N	Y	Y

Fan: Two pin connector available for powering an external fan: 12VDC @ 300mA. **LED:** Two pin connector available for powering an LED to indicate an output voltage is present.

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Single & Multiple Wall Plug In and Desk Top Power Supplies

Model P100/P500: Unregulated AC/AC, AC/DC Power Supply

Low cost. Voltage inputs are available from 100 to 250VAC 50/60Hz input.

Model P200/P600: Linear AC/DC, DC/DC Voltage Regulator

Available in AC and DC input versions. Regulated voltage can be specified in 0.01A range or better. Maximum current can be specified as required.

Model P250/P650: Linear AC/DC, DC/DC Current Regulator

Available in AC and DC input versions. Regulated current can be specified in 0.001V range or better. Voltage can be specified as a limit of the maximum voltage output.

Model P300/P700: Switching AC/DC, DC/DC Voltage Regulator

Available in AC and DC input versions. Regulated voltage can be specified in 0.1V range or better. Maximum current can also be specified as required.

Model P350/P750: Switching AC/DC, DC/DC Current Regulator

Available in AC and DC input versions. Regulated current can be specified in 0.01A range or better. Voltage can be specified as a limit of the maximum voltage output.

Model P400/P800: Step Up Switching DC/DC Voltage Regulator

Available in DC input versions. Both regulated voltage and maximum current can be specified. It is most suitable for applications, when higher voltage supply is required and is not available at the site. The unit can be ordered with auto cigarette plug or other suitable plug in the input for use with DC power or 12 to 24VDC battery power.

Model P450/P850: Step Up Switching DC/DC Current Regulator

Available in DC input versions. Both regulated current and maximum voltage can be specified. It is most suitable for applications, when higher driving current voltage supply is required and is not available at the site. The unit can be ordered with auto cigarette plug or other suitable plug in the input for use with DC power or 12 to 24VDC battery power.

Model T100: DC Power Supply Loading Tester

DC input loading tester, ideal for testing power supply specification. Loading current is adjustable from 1mA to 5A range. Input voltage is ranging from 1 to 60V. Maximum power dissipation is 100W. Unit has coarse and fine adjustment on loading current, digital readout for input voltage and loading current. Low cost models are available.

Model P100-P450 are single output
Model P500-P850 are multiple outputs

Order Information

Model No.	Conversion Type AA-AC/AC AD-AC/DC DD-DC/DC	Input Voltage	Output#1 Voltage mV (xX)	Output#1 Amp. mA (xX)	Output#6 Volt mV(xX)	Output#6 Amp. mA (xX)	Jack-Factory Type	Jack-Factory Assign Code
XXXX		XXX	±XXXXX	XXXXX	±XXXXX	XXXXX	XX	XXXXX
Example:								
P600	AD	117	-63000	02500	89000	11000	35	
Model P600	AC to DC Converter	117VAC Input	-6300mV x1 =-6.3VDC	250mA x1 =250mA	8900mV x1 =8.9VDC	1100mA x1 =1.1A	5 Pin Din Plug	

On all multiple outputs models, regulated voltage and current can be ordered in mixed combination. All models are available on following form:
Wall plug in type housing, Desk top type housing, LED power on indicator, LED active indicator to indicate the unit is being used, Custom design, Private labels.

Popular Output Plugs Selection:
(Consult the factory for more available styles)

Jack Type	Description
01	2.5mm Male jack plug
02	3.5mm Male jack plug
15	O.D. 5.0mm, I.D. 2.0mm Female barrel plug
16	O.D. 5.0mm, I.D. 2.5mm Female barrel plug
17	O.D. 5.5mm, I.D. 2.1mm Female barrel plug
18	O.D. 5.5mm, I.D. 2.5mm Female barrel plug
35	5 Pin DIN plug
53	Auto Cigarette Lighter plug
54	Auto Cigarette Lighter plug with fuse
55	Auto Cigarette Lighter plug with fuse and LED indicator

ADCON
ELECTRONICS, INC.
2828 Aiello Drive,
San Jose, CA 95111
Tel: 408-362-4900
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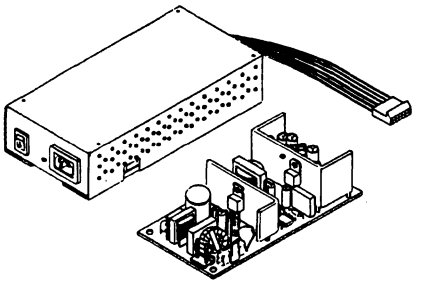
APS ADVANCED POWER SOLUTIONS

7034 COMMERCE CIRCLE, PLEASANTON, CA 94566 • (510) 485-1280 • FAX: (510) 485-1299

Universal Input AC to DC Internal Switch Mode Power Supplies 50 Watts APS48VI Series



Features:

- **Accomodates Universal AC**
- **Small, Compact PCB Open Frame or Enclosure Format.**
- **Universal Safety Standards. UL/CSA/TUV Approvals**
- **EMI/RFI Meet CISPR Pub.22 Class B. & FCC Class B.**

Specifications

Input Specifications:

Input Voltage: Typ. 85-264VAC.
Input Connector:
PCB Format: Molex 5273 (vertical).
Box Format: IEC320 AC inlet receptacle & with AC ON/OFF switch.
Input Frequency: 47-63Hz.
(Consult factory for 440Hz. operation).
Inrush Current: 40A peak at 264VAC.
Input Current:
1.32A@115VAC, 0.65A@230VAC.
Dielectric Withstand: Meet IEC950
3,000VAC - Output/Input.
1,500VAC - Input/GND.
500VAC - Output/GND.
EMI/RFI: Meet CISPR PUB.22 class B. & FCC CLASS B.
No Load Operation: No damage.
Overshoot: No voltage spike.
Hold-up Time: 10ms@115VAC, 50mS@230VAC.
Earth Leakage: Less than 0.3mA@230VAC.

Outputs Specifications:

Output Voltage: See RATING CHARTS.
Output Currents:
See RATING CHARTS.
Output Connection:
PCB Format: Molex 5273 (vertical).
Box Format: Optional in output cord.
Line Regulation: VO1 typ. ± 0.1%.
VO2 ± 0.5% & VO3 ± 0.1% typ.
Load Regulation:
Main O/P VO1 typ. ± 1.0%
Aux. O/P VO2 typ. ± 3.0% stacked on. VO3 typ. ± 1.0% with PR.
Noise & ripple: VO1 50mV peak to peak max. VO2 & VO3 typ. 1% peak to peak
OVP: VO1 Main O/P only, +6.2V ±0.4V
Adj.: VO1 Main O/P only, -10% till OVP.
Overload Protection:
125%-150% max. power.
Max. cont. output power:
With fan cooling typ. 50 Watts.
Without fan cooling 40W Watts.

General Specifications:

Efficiency: Typ. 75%
Switching Frequency: Fixex frq. 38KHz.
Circuit Topology: Fixed freq. flyback circuit.
Transient Response: Output voltage returns in less than 3mS following a 50% load change.
Safety Standard: UL1950/EN60950 class I.
Operating Temperature: 0-50°C.
Storage Temperature: -20 to +85°C.
Temperature Coefficient: 0.03%/°C.
Cooling: Free air convection for 40W. 20CFM fan cooling for 50W.
Construction: Open frame PCB format or enclosure metal box format.

Output Voltage/Current Rating Charts

SINGLE OUTPUT:

Model No.	Main O/P VO1@* Typ.	Volt.	Peak
APS48VI-10	7.0A	5V	9.0A
APS48VI-10B	6.0A	5V	8.0A
APS48VI-11	3.3A	12V	4.0A
APS48VI-12	2.7A	15V	3.4A
APS48VI-13	1.6A	24V	2.1A

DUAL OUTPUT:

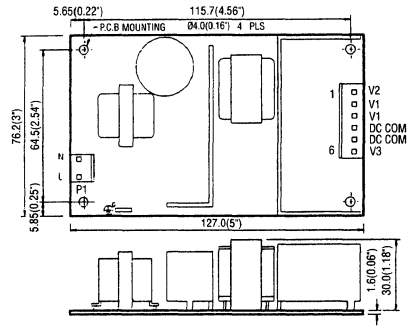
Model No.	Main O/P VO1 @* Typ.	Volt.	Fan	Aux. O/P VO2+or-VO3• Typ.	Volt.	Fan
APS48VI-20	6.0A	+5V	7.0A	0.5A	-5V	1.0A
APS48VI-21	4.0A	+5V	5.0A	1.5A	+12V	1.7A
APS48VI-22	4.0A	+5V	5.0A	1.2A	+15V	1.3A
APS48VI-23	4.0A	+5V	5.0A	0.8A	+24V	0.9A

TRIPLE OUTPUT:

Model No.	Main O/P VO1 @* Typ.	Volt.	Fan	Aux. O/P VO2 + Typ.	Volt.	Fan	Aux. O/P VO3 • Typ.	Volt.	Fan
APS48VI-30	3.5A	+5V	4.0A	1.5A	+12V	2.0A	0.4A	-12V	0.4A
APS48VI-31	3.5A	+5V	4.0A	1.5A	+12V	2.0A	0.5A	-5V	0.4A
APS48VI-32	3.5A	+5V	4.0A	0.8A	+24V	1.0A	0.4A	-12V	0.4A
APS48VI-33	3.5A	+5V	4.0A	1.2A	+15V	1.4A	0.4A	-15V	0.4A

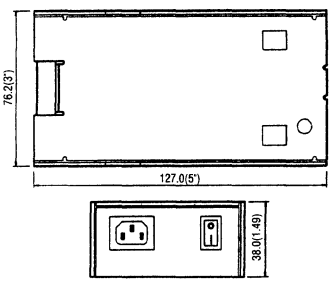
Symbols: "*" OVP built-in. "@" Adjustable. "+" Stacked on main O/P. "•" Installed with Post Regulator (PR).
Remark: (1) At least 20% of typical main output current is required to maintain stated regulation.
(2) FAN: Installed with 20 CFM FAN cooling.

Mechanical Dimensions: *mm (inches)*



PCB FORMAT

Weight: *PCB 262 Grams (9.24 Oz.) BOX 616 Grams (21.7 Oz.)*



BOX FORMAT

Input & Output Connectors Pin Assignment for PCB Version

INPUT CONNECTOR P1

PIN NO.	ASSIGNMENT
P1 - L	AC - Line
P1 - N	AC - Neutral

FASTON TERMINAL: GND. tab
Mating: Molex 5196 or equivalent.

SINGLE OUTPUT CONNECTOR P 2

PIN NO	ASSIGNMENT
P2-1,2,3	VO1+
P2-4,5,6	DC Com

Mating: Molex 5196 or equivalent.

DUAL OUTPUT CONNECTOR P 2

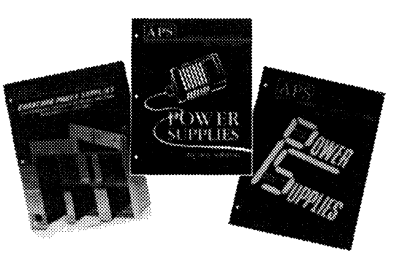
PIN NO	ASSIGNMENT
P2-4,5,6	DC Com
P2-2,3	VO1 +
P2-1	P2-1

Mating: Molex 5196 or equivalent.

TRIPLE OUTPUT CONNECTOR P 2

PIN NO	ASSIGNMENT
P2-4,5	DC Com
P2-2,3	VO1 +
P2-1	P2-1
P2-6	VO3 –

Mating: Molex 5196 or equivalent.



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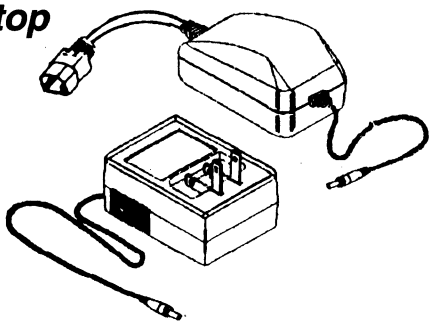
AC to DC External Regulated Wallmount & Desktop Adaptors Switching Power Supplies 10-12 Watts APS10ES Series



Features:

- **Small and Compact Size.**
- **Wallmount or Desktop Adaptor Available.**
- **Designed to Meet Universal Safety Standards.**
- **EMI/RFI Meet CISPR Pub.22 Class B.**
- **CE Marking Compliance.**

Specifications

Input Specifications:

Input Range: Typ. 90-260VAC for APS10ES-3XX/PT7
Typ. 90-130VAC for APS10ES-1XX/WM1
Input Connector: IEC320 receptacle for APS10ES-3XX/PT7
Fold-out 2-prong for APS10ES-1XX/WM1
Input Frequency: 47-440Hz.
Inrush Current: 50 A max.
Dielectric Withstand: Meet IEC950
At output cord end for 1 second.
2,000VAC-Output/Input.
EMI/RFI: Meet CISPR PUB.22 class B.

Outputs Specifications:

Output Voltage:
See RATING CHARTS.
Output Currents:
See RATING CHARTS.
Output Connector: Optional.
Line Regulation: ± 0.1% typ.
Load Regulation: Main O/P VO1 ±3%
Aux. O/P VO2 ±5%
Noise & ripple: Typ. 1% peak to peak.
Over Voltage Protection (OVP): 124%
Adjustability: Factory set.
Hold-up Time: 16ms typ.
Overload Protection: 150% max. power.

General Specifications:

Efficiency: Typ. 75%
Switching Frequency: Approximate 100k Hz.
Circuit Topology: By using TOPswitch IC, Fix-frequency flyback circuit.
Transient Response: Output voltage returns in less than 3ms following a 50% load change.
Safety Standard: UL1950/EN60950.
Operating Temperature: 0-40°C.
Storage Temperature: -20 to +85°C.
Temperature Coefficient: 0.04%/°C.
Cooling: Free air convection.
MTBH: Greater than 100K hours at typical load at 25°C temp. calculated according to MIL-DBK-217F.

Voltage/Current Ratings Chart

A. APS10ES-1XX/WM1 (Fold-Out) Type

SINGLE OUTPUT:

Model No.	Main O/P VO1 Typ.	Volt.	Peak
APS10ES-110	2.0A	5V	2.4A
APS10ES-110A	1.5A	6.2V	2.0A
APS10ES-111	1.0A	12V	1.2A
APS10ES-112	0.8A	15V	1.0A
APS10ES-119	2.7A	3.3V	3.0A

DUAL OUTPUT:

Model No.	Main O/P VO1 Typ.	Volt.	Peak	Aux. O/P VO2+ Typ.	Volt.	Peak
APS10ES-121	1.5A	+5V	2.5A	0.1A	+12V	0.5A
APS10ES-122	1.5A	+5V	2.5A	0.1A	+15V	0.4A
APS10ES-123	1.5A	+5V	2.5A	0.1A	+24V	0.2A

B. APS10ES-3XX/PT7 (Pig Tail, IEC320) Type

SINGLE OUTPUT:

Model No.	Main O/P VO1 Typ.	Volt.	Peak
APS10ES-310	2.0A	5V	2.4A
APS10ES-310A	1.5A	6.2V	2.0A
APS10ES-311	1.0A	12V	1.2A
APS10ES-312	0.8A	15V	1.0A
APS10ES-319	2.7A	3.3V	3.0A

DUAL OUTPUT:

Model No.	Main O/P VO1 Typ.	Volt.	Peak	Aux. O/P VO2+ Typ.	Volt.	Peak
APS10ES-321	1.5A	+5V	2.5A	0.1A	+12V	0.5A
APS10ES-322	1.5A	+5V	2.5A	0.1A	+15V	0.4A
APS10ES-323	1.5A	+5V	2.5A	0.1A	+24V	0.2A

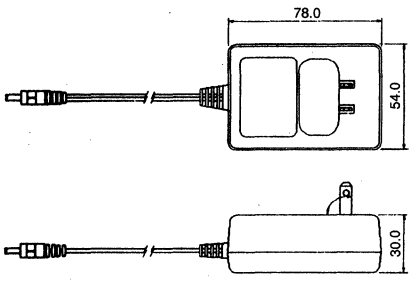
Symbols: "+" stacked on main output.
Remarks: (1) At least 20% of typical main output current is required to maintain stated regulation.
(2) Peak output, less than 60 sec. peak current can not by drawn from all outputs at the same time.

Model No. Explanation

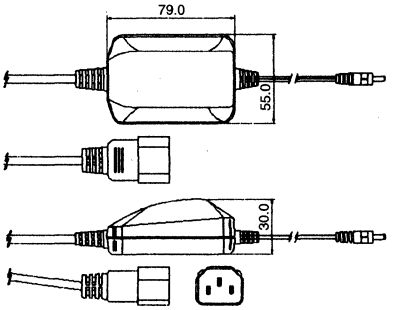
APS 10 ES - X X X / YYX

- Input Plug: PT7 or WM1
- Output configurations. see V/A Ratings.
- No. of O/P: 1 for Single, 2 for Dual output.
- Voltage: 1 for 90-130VAC, 3 for 90-260VAC
- External Switcher PSU.
- Wattage Range: 10-12W

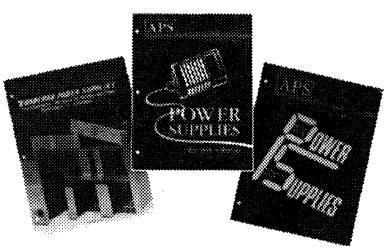
Mechanical Dimensions: *mm (inches)*



APS10ES-1XX/WM1



APS10ES-3XX/PT7



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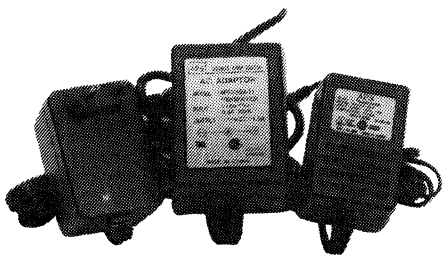
AC DC External Regulated Switching Power Supply



20,40,60&100 Watts Desktop Universal Input APS20-ES, APS40-ES, APS60-ES & APS100ES Series Adapter

Features:

- **Automatically Accommodates Universal ASource**
- **Desktop With IEC 320 Input Connector**
- **Universal Safety Standards**
- **EMI/RFI Meets VDE and FCC Part 15 Level B.**
- **Overvoltage and Overload Protection**

IEC950 IEC380

Specifications

Inputs:

Input Voltage: Typical : 90-260 VAC. Also available:85-265VAC.
Input Frequency: 47-440Hz
Inrush Current: 20A for APS20 & AP40; 25A for APS60
Dielectric Withstand: Meet VDE 0806 for 1 minute 3,750VAC-Output/Input; 1,500VAC-Input/Safety GND; 500VAC-Output SAfety GND
EMI/RFI: Meet VDE 0871-B & FCC Part 15 class B.
Operating Temperature: 0-40°C
Storage Temperature:-20 to+85°C
Cooling: Convention
Efficiency: 65-75%
Hold-Up Time: 20ms at 120VAC. Full load.
Switching Frequency: Approximate 25KHZ. at full load and 90VAC input, higher at increasing input voltage or light load.
Transient Response: Output voltage returns in less than 3ms following a 50% load change.
Case: Impact resistant mold thermoplastic, flame rating 94V-1 for UL, 94V-0 for CSA.
MTBF: Great than 50K hours at typical load at 25°C ambient temperature calculated according to MIL-HDBK-217E..
Temperature Coefficient: 0.04% per degree C on main output.

Outputs:

Output Voltages: See rating charts.
Output Currents: See rating charts.
Load & Cross Regulations:

	Load Regulation	Cross Regulation
At PSU PCB Outputs:		
Main VO1	2.0%	0.2%
AUX. VO2	5.0%	5.0%
AUX. VO3	1.5%	1.5%
At PSU cord connector end:		
Main VO1	5.0%	2.0%
AUX. VO2	5.0%	5.0%
AUX. VO3	1.5%	1.0%

Remark: The exact voltage regulation obtainable depends upon the output cord & connector selected and load current. Upper are for 6 ft.(or 2 meters) cord AWG#18/20 wires with PD-5 connector.

Noise & Ripple: Typical 1% peak to peak.
Over Voltage Protection (OVP): 124% ±8% on main output.
Adjustability: Main output internal adjustable from 4.5V till OVP trip point.
Overload Protection: Max. Current cannot be draw from all out puts simultaneously. The over current protection feature will reduce all output voltage to safe dissipation level when the average power rating exceeds 125%-150% of max. power. The overload feature will also protect against short circuit.

Voltage/Current Rating Chart

Model No.	D.C. Output Current (AMP) at 40°C						Construction	Max. Output	Output Plug
	Main Output Type.	Max.	Selectable Auxiliary Outputs Type.	Max.	Type.	Max.			
	+VO1 *@		+VO2 • OR		-VO3 •		Plastic Box	20W	Option
APS20-ES-10	4A +5V	4A					EI 57/3,4	20W	Opt. B
APS20-ES-11	1.5A +12V	1.7A					EI 57/3,4	20W	Opt.
APS20-ES-20	3A +5A	3A			0.5A 5V	1A	EI 57/3,4	20W	PD,PMD,PMX,PMY
APS20-ES-21	3A +5V	3A			0.5A 12V	1A	EI 57/3,4	20W	PD,PMD,PMX,PMY
APS20-ES-30	2A +5A	3A	0.5A +12A	1A	0.5A -12A	1A	EI 57/3,4	20W	PD,PMD,PSD,PMZ,PMY
APS20-ES-31	2A +5A	3A	0.5A +12V	1A	0.5A -5V	1A	EI 57/3,4	20W	PD,PMD,PSD,PMX,PMY
APS40-ES-10	7A +5A	8A					EI 57/5	40W	Opt.B
APS40-ES-11	3A +12V	3.5A					EI57/5	40W	Opt.B
APS40-ES-20	6A +5A	7A			0.75A 5V	1A	EI 57/5	40W	PD,PMD,PMX,PMY
APS40-ES-21	5A +5V	6A			0.75A 12V	1A	EI 57/5	40W	PD,PMD,PMX,PMY
APS40-ES-30	3A +5V	4A	1.5A +12V	1.5A	0.5A -12V	1A	EI57/5	40W	PD,PMD,PSD,PMX,PMY
APS40-ES-31	3A +5A	4A	1.5A +12V	1.5A	0.5A -5A	1A	EI57/5	40W	PD,PMD,PSD,PMX,PMY
APS60-ES-10	10A +5V	12A					EI66/3	50-60W	PMX,PMY,PD
APS60-ES-11	4.5A +12V	5A					EI66/3	55-60W	PMX,PMY,PD
APS60-ES-20	9A +5V	11A			0.75A -5V	1A	EI66/3	50-60W	PMX,PMY,PD
APS60-ES-21	6A +5A	7A	2A +12V	2A			EI 66/3	55-60W	PMX,PMY,PD
APS60-ES-30	5A +5V	6A	2A +12V	2A	0.5A -12V	1A	EI66/3	55-60W	PD,PSD
APS60-ES-31	5A +5A	6A	2A +12V	1A	0.75A -5V	1A	EI66/3	55-60W	PD,PSD

Note: Alternate case sizes are available, please consult the factory.
Note: Alternate output selection is available, please consult the factory.

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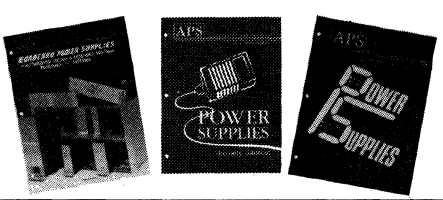

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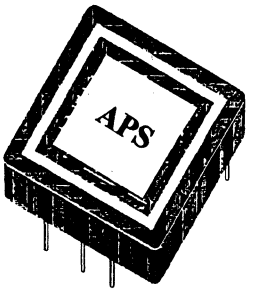
PCB Mounted DC-DC Converter Single Output Encapsulated 15-Watts APS15DM-S Series



Features:

- **Low Profile Single Output.**
- **Wide 2:1 & 4:1 Input Range.**
- **15W Isolated Output.**
- **Six-sided Shield.**

Specifications

Input Specifications:

Input Range: Wide 2:1 & 4:1 input DC range. See RATING CHARTS.
Input Current: Various with input range & load. See RATING CHARTS.
Input Fuse: Use external fuse.
Input Filter: Pi-Network.
Overvoltage Shutdown: Options, factory set.
Undervoltge Shutdown: 8VDC.
Isolation resistor: 1,000 Mega Ohms.
Isolation voltage: 500VDC.
Remote On/Off:
TTL/CMOS logic Compatibility.
Logic input reference: To minus input.
ON = 5.5V or open. OFF = 0-0.8V.

Outputs Specifications:

Output Voltage: See RATING CHARTS.
Output Currents:
See RATING CHARTS.
Voltage Accuracy: Main O/P ± 1% typ.
Line Regulation: ± 0.5% max.
Load Regulation: Main O/P + 0.5% max.
Noise & ripple: Typ. 1% peak to peak.
OVP: Built-in for main +5V output.
Adjustability: Output may optionally be externally trimmed ±5%.
Short Circuit Protection: Fold back.
Overload Protection: Built-in.
EMI/RFI: Six-sided metal shielding.

General Specifications:

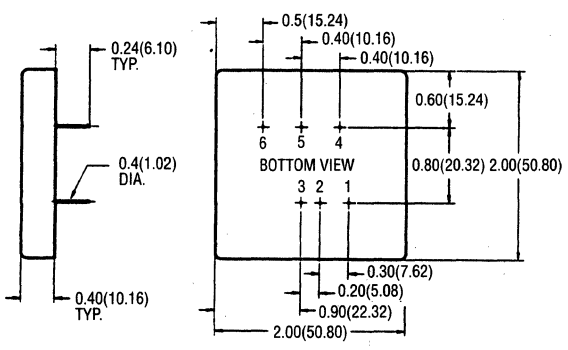
Efficiency: Typ. 84% various with input.
Switching Frequency: Fixed freq. 100k Hz.
Circuit Topology: 100k Hz. forwarder circuit.
Transient Response: Full to 1/2 load <200µSec.
Case: Black coated copper with non-conductive metal base.
Power Density: 10 Watts./Cubic inch.
Operating Temperature: 0-70°C.
Storage Temperature: -20 to +105°C.
Temperature Coefficient: 0.02%/°C.
Cooling: Free air convection.
Humidity: Non-condensing up to 95% RH.
Weight: 65g(2.4Oz.)

Input/Output & Voltage/Current Rating Charts

Model No.	Input VDC	Input Current N.L. (mA)	F.L.	Output VDC	Output (A)	Case Size	Model No.	Input VDC	Input Current N.L. (mA)	F.L.	Output VDC	Output (A)	Case Size
APS15DM-12B-S03	9.0-18.0	10	2,720	3.0V	3.0A	DM2B	**APS15DM-48B-S12**	36-72.0	20	365	12.0V	1.25A	DM2B
APS15DM-12B-S05	9.0-18.0	10	2,620	5.0V	2.0A	DM2B	**APS15DM-48B-S15**	36-72.0	20	365	15.0V	1.0A	DM2B
APS15DM-12B-S09	9.0-18.0	10	2,580	9.0V	1.12A	DM2B	**APS15DM-48B-S24**	36-72.0	20	360	24.0V	0.63A	DM2B
APS15DM-12B-S12	9.0-18.0	10	2,520	12.0V	0.85A	DM2B	**APS15DM-12D-S03**	9.0-36.0	30	1,600	3.0V	4.8A	DM2B
APS15DM-12B-S15	9.0-18.0	10	2,510	15.0V	0.7A	DM2B	**APS15DM-12D-S05**	9.0-36.0	30	1,560	5.0V	3.0A	DM2B
APS15DM-12B-S24	9.0-18.0	10	2,500	24.0V	0.44A	DM2B	**APS15DM-12D-S09**	9.0-36.0	30	1,550	9.0V	1.67A	DM2B
APS15DM-24B-S03	18-36.0	20	850	3.0V	4.5A	DM2B	**APS15DM-12D-S12**	9.0-36.0	30	1,540	12.0V	1.25A	DM2B
APS15DM-24B-S05	18-36.0	20	760	5.0V	2.8A	DM2B	**APS15DM-12D-S15**	9.0-36.0	30	1,525	15.0V	1.0A	DM2B
APS15DM-24B-S09	18-36.0	20	755	9.0V	1.5A	DM2B	**APS15DM-12D-S24**	9.0-36.0	30	1,520	24.0V	0.63A	DM2B
APS15DM-24B-S12	18-36.0	20	750	12.0V	1.2A	DM2B	**APS15DM-24D-S03**	20-72.0	20	780	3.0V	4.8A	DM2B
APS15DM-24B-S15	18-36.0	20	745	15.0V	0.95A	DM2B	**APS15DM-24D-S05**	20-72.0	20	760	5.0V	3.0A	DM2B
APS15DM-24B-S24	18-36.0	20	740	24.0V	0.6A	DM2B	**APS15DM-24D-S09**	20-72.0	20	755	9.0V	1.67A	DM2B
APS15DM-48B-S03	36-72.0	20	380	3.0V	4.8A	DM2B	**APS15DM-24D-S12**	20-72.0	20	750	12.0V	1.25A	DM2B
APS15DM-48B-S05	36-72.0	20	370	5.0V	3.0A	DM2B	**APS15DM-24D-S15**	20-72.0	20	745	15.0V	1.0A	DM2B
APS15DM-48B-S09	36-72.0	20	370	9.0V	1.67A	DM2B	**APS15DM-24D-S24**	20-72.0	20	740	24.0V	0.63A	DM2B

NOTE: (1) Line Regulation measured from High to Low Lines at full load.
(2) Load Regulation measured from Full Load to 1/2 Full Load at nominal input.
(3) Correct fuse size by calculating the max. DC current drain at low Line input & Load and then adding 20-25% for the desired fuse size.
(4) Transient response: 25% step load change.

Mechanical Dimensions: *Inches (mm)*



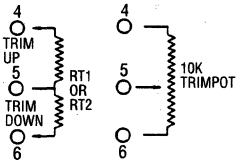
Case Size: *DM2B*

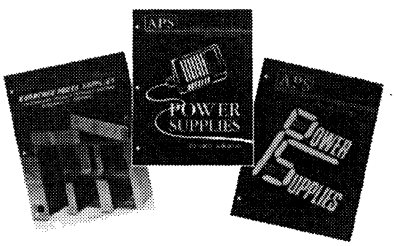
Weight: *65g (2.4 Oz.)*

Pin Connection:

PIN NO	Single
1	Remote On/Off
2	– Input
3	+ Input
4	– Output
5	Trim
6	+ Output

External Output Trimming





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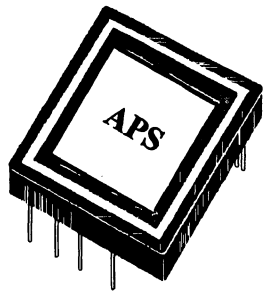
PCB Mounted DC-DC Converter Dual Output Encapsulated 30-Watts APS30DM-D Series



Features:

- **Low Profile Dual Output.**
- **Wide 2:1 & 4:1 Input Range.**
- **30W Isolated Output.**
- **Six-sided Shield.**

Specifications

Input Specifications:

Input Range: Wide 2:1 & 4:1 input DC range. See RATING CHARTS.
Input Current: Various with input range & load. See RATING CHARTS.
Input Fuse: Use external fuse.
Input Filter: Pi-Network.
Overvoltage Shutdown: Options, factory set.
Undervoltge Shutdown: 8VDC.
Isolation resistor: 1,000 Mega Ohms.
Isolation voltage: 500VDC min.
Remote On/Off:
TTL/CMOS logic Compatibility.
Logic input reference: To minus input.
ON = 5.5V or open. OFF = 0-0.8V.

Outputs Specifications:

Output Voltage: See RATING CHARTS.
Output Currents:
See RATING CHARTS.
Voltage Accuracy: Main O/P ± 1.5% typ.
Line Regulation: ± 0.2% max.
Load Regulation: Dual O/P + 2.0% typ.
Noise & ripple: Typ. 5V/100mV, others 1.0%.
OVP: Built-in for main +5V output.
Adjustability: Output may optionally be externally trimmed ±5% with a fixed resistors or trimpot..
Short Circuit Protection: Fold back.
Overload Protection: Built-in.
EMI/RFI: Six-sided metal shielding.

General Specifications:

Efficiency: Typ. 84% various with input.
Switching Frequency: Fixed freq. 100k Hz.
Circuit Topology: 100k Hz. forwarder circuit.
Transient Response: Full to 1/2 load <200 µSec.
Case: Black coated copper with non-conductive metal base.
Power Density: 10 Watts./Cubic inch.
Operating Temperature: 0-70°C.
Storage Temperature: -20 to +105°C.
Temperature Coefficient: 0.02%/°C.
Cooling: Free air convection.
Humidity: Non-condensing up to 95% RH.
Weight: 156g (5.6 Oz.)

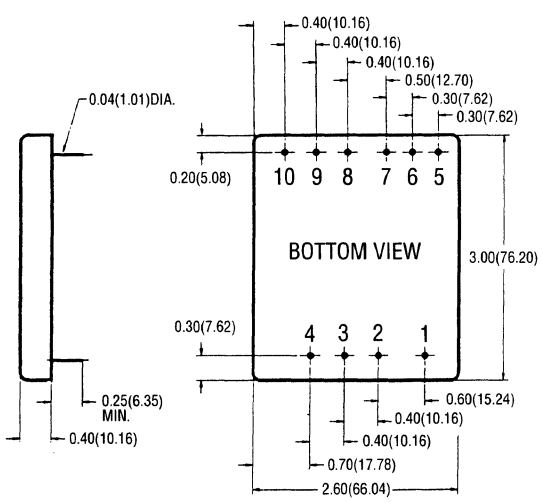
Input/Output & Voltage/Current Rating Charts

Model No.	Input VDC	Input Current N.L. (mA)	F.L.	Output (VDC) +V01, –V02	Output (A)	Case Size
APS30DM-12B-D05	9.0-18.0	30	2,670	+5V, -5V	±2.5A	DM2A
APS30DM-12B-D12	9.0-18.0	30	2,500	+12V, -12V	±1.0A	DM2A
APS30DM-12B-D15	9.0-18.0	30	2,590	+15V, -15V	±0.83A	DM2A
APS30DM-24B-D05	18-36.0	20	1,560	+5V, -5V	±3.0A	DM2A
APS30DM-24B-D12	18-36.0	20	1,525	+12V, -12V	±1.25A	DM2A
APS30DM-24B-D15	18-36.0	20	1,525	+15V, -15V	±1.0A	DM2A
APS30DM-48B-D05	36-72.0	20	760	+5V, -5V	±3.0A	DM2A
APS30DM-48B-D12	36-72.0	20	740	+12V, -12V	±1.25A	DM2A
APS30DM-48B-D15	36-72.0	20	740	+15V, -15V	±1.0A	DM2A

Model No.	Input VDC	Input Current N.L. (mA)	F.L.	Output (VDC) +V01, –V02	Output (A)	Case Size
APS30DM-12D-D05	9.0-36.0	30	2,600	+5V, -5V	±2.5A	DM2A
APS30DM-12D-D12	9.0-36.0	30	2,500	+12V, -12V	±1.0A	DM2A
APS30DM-12D-D15	9.0-36.0	30	2,600	+15V, -15V	±0.83A	DM2A
APS30DM-24D-D05	20-72.0	20	1,560	+5V, -5V	±3.0A	DM2A
APS30DM-24D-D12	20-72.0	20	1,525	+12V, -12V	±1.25A	DM2A
APS30DM-24D-D15	20-72.0	20	1,525	+15V, -15V	±1.0A	DM2A

NOTE: (1) Line Regulation measured from High to Low Lines at full load.
(2) Load Regulation measured from Full Load to 1/2 Full Load at nominal input.
(3) Correct fuse size by calculating the max. DC current drain at low Line input & Load and then adding 20-25% for the desired fuse size.
(4) Transient response: 25% step load change.

Mechanical Dimensions: *Inches (mm)*

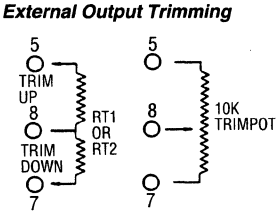


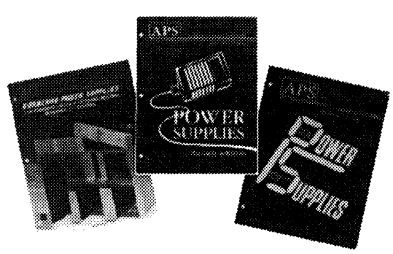
Weight: *156g (5.6 Oz.)*

Pin Connection:

PIN NO	Dual Output
1	Remote On/Off
2	+ Input
3	– Input
4	NC
5	+VO1 Output
6	Common
7	–VO2 Output
8	Output Trim
9	NC
10	NC

External Output Trimming





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Case Size: *DM2A*

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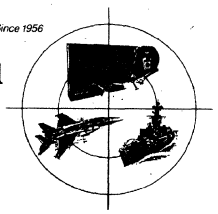
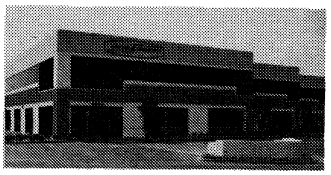


Why Choose Arnold Magnetics?

Company Profile



Founded over 40 years ago, Arnold Magnetics Corporation has grown to a respected position in today's Defense, Aerospace, Scientific, Geophysical, Process Control, Transportation, and Nuclear Industries. Beginning in 1955 by producing transformers and magnetic amplifiers, we quickly expanded into power supplies and converters. Arnold Magnetics soon became known for four basic characteristics:

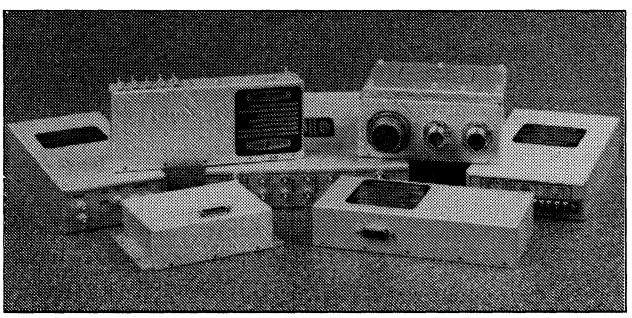
- **Small Package**
- **High Reliability**
- **Modular**
- **Off the Shelf**

In the early 1960's Arnold Magnetics introduced our first full rated AC to DC Power Supplies and DC to DC Converters. Anticipating future technological demands, the first modular power supplies were released in the late 1970's.

Continuously improving and expanding on this concept, we have become a respected modular power conversion company. More recently, Front End power conditioners, Rack Mount, Industrial products, and Custom Power conversion products have been added.

This flexible modular approach allows us to take advantage of various off-the-shelf modules. With over 40 years of power supply expertise, we can produce power conversion products for our customers and keep costs and lead times to a minimum.

The Solution is Within Reach whether your application is for standard "COTS", modular or custom product, we have the solution. Our Applications Engineers are ready to assist you with your power conversion needs!

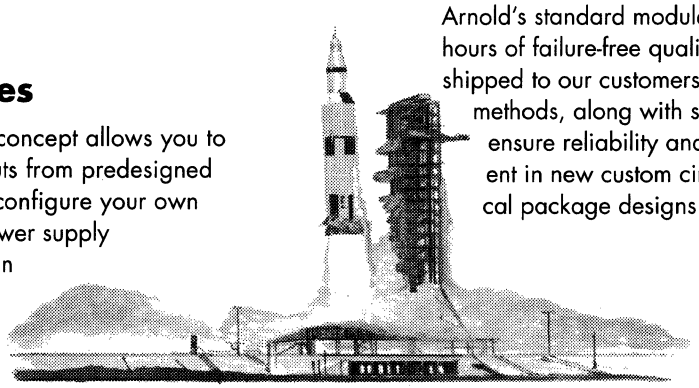


Save Space... Miniaturized Packages

Arnold's complete AC-DC and DC-DC Multi Output Systems are 50% to 75% smaller than previous generation power supplies. Our miniaturized packages provide more power in less space.

Save Time... Quick Deliveries

Arnold's unique design concept allows you to choose inputs and outputs from predesigned standard modules. You configure your own "custom" multi-output power supply system and get delivery in weeks... even with non-standard voltage combinations.



Save Money... Lower Program Costs

With Arnold, there is no additional charge for unique output voltage combinations. Non-recurring engineering and qualification expenses of custom designs are avoided. In addition, our standard modules provide lower cost for production quantities.

Reduce Risk... High Reliability Designs

Arnold's standard modules are proven thru thousands of hours of failure-free qualification before ever being shipped to our customers. NAVMAT derating and testing methods, along with standardized modular designs, ensure reliability and reduce the risk of failure inherent in new custom circuits or thermal and mechanical package designs.

See our Website at : http://www.amcpower.com

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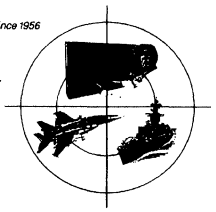
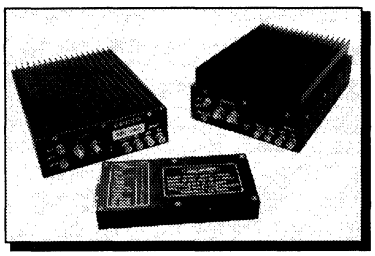


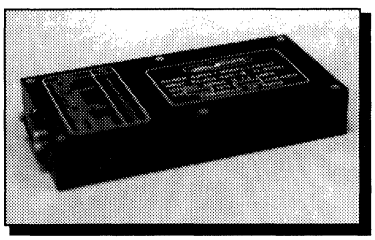
V Series-AC to DC Modular COTS Power Supplies



- **Low profile**
- **Wide range of Inputs**
- **Built from Standard "COTS" modules**
- **Flexible packaging**

The V Series power supplies feature a COTS modular design for easy configuration, proven performance and fast delivery. Low profile design allows for lighter, denser packaging in a variety of case styles. Options are available without NRE. The V series has a wide choice of input ranges, output voltages, power levels and number of outputs. Customize your power supply with standard options and special circuitry as well.

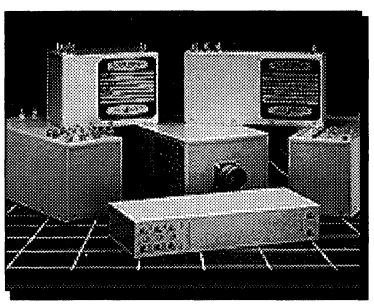
LPBA Series-High Density Low Profile AC to DC Power Supply



- **0.96" Low Profile**
- **N+1 Current Sharing**
- **Wide Range AC Input**
- **Line Isolation and EMI Filtering**

This low profile, high density, 200 watt AC to DC power supply is designed for applications where compact size, high reliability, worldwide power compatibility and harsh environments are encountered. Additional features include active Power Factor Correction, Transient Protection and input EMI Filtering, with an isolated, well regulated output. Next generation packaging and manufacturing techniques provide the reliability, performance and cost effectiveness necessary in today's COTS products.

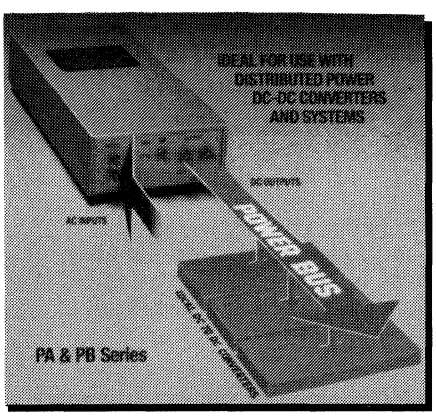
EL 2000 Series-Modular AC to DC and DC to DC Power Supplies



- **Standard High Density Modular Design**
- **1-10 Outputs-** Voltages from 2 to 300 VDC up to 100 amps
- **Wide Variety of Options:** EMI, Wide Temperature Operation, MIL-STD Environments, Transient Protection, Power Factor Correction
- **High Reliability:** Configured to meet the needs of Severe Environment Industrial and Military markets

The EL Series Product line uses a high density, sub-modular building block approach. This allows our customers to configure a unique solution to their power needs without costly NRE! Option modules further expand the capabilities. Units are fully assembled and tested enabling us to provide complete power solutions. These units are qualified to many MIL-SPECS such as Shock, Vibration, Temperature, Humidity and Salt Fog. Used in Military Programs, Commercial Avionics, Transportation, Nuclear controls and other applications requiring high performance and reliability.

PB Series-Conditioned and Isolated Front Ends



- **.99 Power Factor Correction:** Active circuitry allows more usable power to be drawn from your source. Added benefits include low harmonic distortion, longer holdup times and simplified EMI filtering
- **True N+1 Current Sharing:** Single wire connection allows current sharing for loads to kilowatts
- **Line Isolation & EMI Filtering:** EMI suppression to RTCA Spec. DO-160C as well as MIL-STD461C (including CE01, CE03, RE02)
- **Surge & Spike Protection:** Per MIL-STD-704D; MIL-STD-1399 Sect. 300A and RTCA Spec. DO-160C

The PB Series is ideally suited for AC to DC off line applications where Line isolation, EMI filtering and clean reliable power is required. True N+1 current sharing allows for loads to kilowatts, future expansion and redundancy. Operating over the -40 to +85 degree C range, this series can take the punishment of harsh environments.

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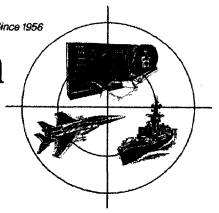
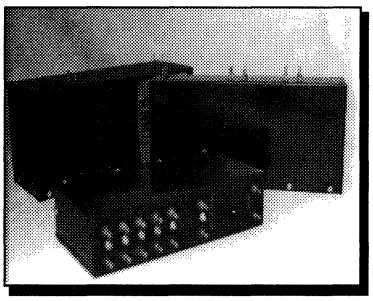


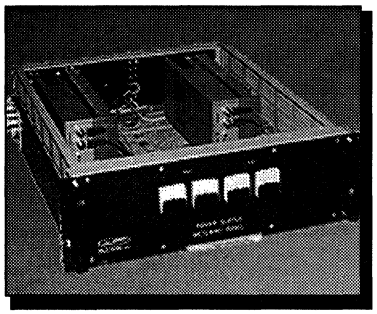
RM Series-Industrial Modular AC to DC Power Supplies



- **Rugged Industrial Design**
- **Modular construction**
- **-10 to 85 Degrees C operation without derating**
- **Wide range of options**

The RM Series power supply line uses a high-density, sub modular building block approach. Our customers can configure a power supply with their unique input and up to 10 outputs, without costly NRE! Option modules further expand the capabilities. Units are assembled and tested, enabling us to provide complete industrial power solutions. These units are qualified to many harsh environment specifications for humidity, shock, vibration and temperature.

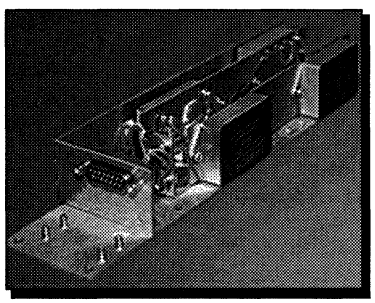
RL Series-Rack And Panel Mount Power Supplies



- **Standard 19" EIA:** Rack or Panel mount versions
- **AC or DC inputs:** Fuse or breaker protection available.
- **Multiple Outputs:** 1 to 10 outputs up to 2000 watts
- **Panel Meters:** Optional meters, rack slides, and test points enhance system monitoring.

The RL Series product line offers rack and panel mount solutions for a wide variety of applications. Using standard power supplies, a rack mount power supply is assembled to meet specific requirements. All configuration, wiring and testing is done at our factory saving you time and money. Configurations are available to customized requirements, complete with a myriad of accessories and off-the-shelf sub modules. Applications range from high grade industrial to severe military environments.

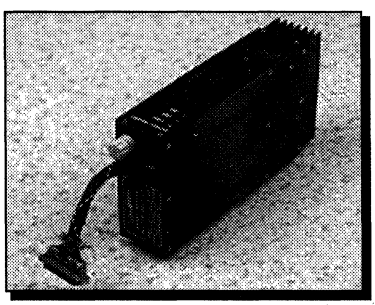
CL Series-Custom High Quality Power Solutions



- **Standard Packaging and Unique I/O Requirements**
- **Low Profile, Light Weight**
- **High Grade Industrial and Military Designs**
- **Special Circuitry**

The CL Series Custom Product Line features designs which are applicable to unique customer requirements. Using a library of standard off-the-shelf designs, option circuitry, and packaging methods, a cost effective custom solution can be provided. This approach produces a power supply that costs much less than a design from scratch approach. Take advantage of our power conversion expertise to provide a complete power solution.

IL Series-High Reliability Industrial Power Supplies



- **MTBF≥500,00 hours:** High Reliability 40 year useful life.
- **Convection Cooling:** No additional heatsink or forced air required.
- **EMI Filtering:** Meets FCC and MIL-STD-461 EMI Filtering
- **No Derating:** The full current is available over the entire 0 to 71 Degrees C Operating Temperature

The IL Series Industrial Grade Power Supplies feature very high reliability operation, with no additional heatsink required. Units are equipped with EMI filtering, Transient Protection, Thermal Shutdown, Inrush Soft-Start, Over Voltage and Over Current Protection. Up to 3 outputs are available from 5 to 28 VDC. Input Voltages of 24 VDC, 48 VDC, 115/230 VAC, 50/60 Hz are available. Applications for the IL Series Range from High Reliability, Industrial Process Control to Nuclear Monitoring and Telecommunications.

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EI-35

Input .....117/120VAC 60 Hz
Type 1
Case Dim .....55(L) x 43(W) x 37(H) (mm)
Weight .....152 g
Type 2
Case Dim .....57(L) x 43(W) x 39(H) (mm)
Weight .....150 g

MODEL	INPUT	OUTPUT	
	W	VDC	mA
AAD350150125-A	6.0	1.5	125
AAD350300500-A	6.0	3.0	500
AAD350300400-A	6.0	3.0	400
AAD350300200-A	6.0	3.0	200
AAD350400300-A	6.0	4.0	300
AAD350440400-A	6.0	4.4	400
AAD350450120-A	6.0	4.5	120
AAD350600200-A	6.0	6.0	200
AAD350600300-A	6.0	6.0	300
AAD350600100-A	6.0	6.0	100
AAD350750100-A	6.0	7.5	100
AAD350750300-A	6.0	7.5	300
AAD350900200-A	6.0	9.0	200
AAD350900300-A	6.0	9.0	300
AAD350900100-A	6.0	9.0	100
AAD350900210-A	6.0	9.0	210
AAD350900250-A	6.0	9.0	250
AAD351200050-A	6.0	12.0	50
AAD351200050-A	6.0	12.0	50
AAD351200200-A	6.0	12.0	200
AAD351200100-A	6.0	12.0	100
AAD351200150-A	6.0	12.0	150
AAD351850080-A	6.0	18.5	80
AAD351800050-A	6.0	18.0	50

MODEL	INPUT	OUTPUT	
	W	VAC	mA
AAA350300300-A	6.0	3.0	300
AAA350450120-A	6.0	4.5	120
AAA350450300-A	6.0	4.5	300
AAA350820130-A	6.0	8.2	130
AAA350900200-A	6.0	9.0	200
AAA351200050-A	6.0	12.0	50
AAA351200100-A	6.0	12.0	100
AAA351200200-A	6.0	12.0	200
AAA351200250-A	6.0	12.0	250
AAA351800100-A	6.0	18.0	100

NOTE: "R" Means "UL R/C"

EI-41

Input .....117/120VAC 60 Hz
Case Dim .....63(L) x 51(W) x 41(H) (mm)
Weight .....253 g

MODEL	INPUT	OUTPUT	
	W	VDC	mA
AAD410250500-A	6.0	2.5	500
AAD410550500-A	8.0	5.5	500
AAD410600600-A	10.0	6.0	600
AAD410600800-A	12.0	6.0	800
AAD410720400-A	10.0	7.2	400
AAD410750300-A	10.0	7.5	300
AAD410860400-A	10.0	8.6	400
AAD410900300-A	10.0	9.0	300
AAD410900500-A	12.0	9.0	500
AAD410900065-A	12.0	9.0	65
AAD410900700-A	13.0	9.0	700
AAD410900600-A	12.0	9.0	600
AAD410900350-A	10.0	9.0	350
AAD411200400-A	12.0	12.0	400
AAD411200300-A	10.0	12.0	300
AAD411200500-A	12.0	12.0	500
AAD411200200-A	4.5	12.0	200
AAD411200350-A	12.0	12.0	350
AAD411300400-A	12.0	13.0	400
AAD411500200-A	10.0	15.0	200

EI-41 (continued)

MODEL	INPUT	OUTPUT	
	W	VAC	mA
AAA410900300-A	10.0	9.0	300
AAA410900500-A	10.0	9.0	500
AAA410900780-A	12.0	9.0	780
AAA411000700-A	12.0	10.0	700
AAA411200500-A	10.0	12.0	500
AAA411600250-A	10.0	16.0	250
AAA411700250-A	10.0	17.0	250
AAA411800300-A	10.0	18.0	300
AAA412400300-A	12.0	24.0	300

NOTE: "R" Means "UL R/C"

EI-48

Input .....117/120VAC 60 Hz
Type 1
Case Dim .....71(L) x 56(W) x 47(H) (mm)
Weight .....500 g
Type 2
Case Dim ...54.5(L) x 54.5(W) x 48.2(H) (mm)
Weight .....500 g
Type 3
Case Dim .....89(L) x 61(W) x 48(H) (mm)
Weight .....500 g

MODEL	INPUT	OUTPUT	
	W	VDC	mA
AAD480601000-A	13.0	6.0	1000
AAD480601200-A	14.0	6.0	1200
AAD480751000-A	15.0	7.5	1000
AAD480851000-A	15.0	8.5	1000
AAD480851000-A	15.0	8.5	1000
AAD480901000-A	15.0	9.0	1000
AAD480901200-A	20.0	9.0	1200
AAD481051000-A	20.0	10.5	1000
AAD481201000-A	22.0	12.0	1000
AAD481200500-A	12.0	12.0	500
AAD481200600-A	14.0	12.0	600
AAD481250800-A	17.0	12.5	800
AAD481450800-A	20.0	14.5	800
AAD481500600-A	15.0	15.0	600

MODEL	INPUT	OUTPUT	
	W	VAC	mA
AAA480901000-A	12.0	9.0	1000
AAA481200850-A	17.0	12.0	850
AAA482050700-A	20.0	20.5	700

NOTE: "R" Means "UL R/C"

EI-57

Input .....117/120VAC 60 Hz
Case Dim .....85(L) x 65(W) x 55(H) (mm)
Weight .....700 g

MODEL	INPUT	OUTPUT	
	W	VDC	mA
AAD570602000-A	24.0	6.0	2000
AAD570751500-A	24.0	7.5	1500
AAD571201200-A	24.0	12.0	1200
AAD571351300-A	30.0	13.5	1300
AAD571351700-A	40.0	13.5	1700
AAD571351700-A	40.0	13.5	1700
AAD571501000-A	24.0	15.0	1000

MODEL	INPUT	OUTPUT	
	W	VAC	mA
AAA570603300-A	30.0	6.0	3300
AAA570903400-A	45.0	9.0	3400

EI-60

Input .....117/120VAC 60 Hz
Case Dim .....95(L) x 72(W) x 57(H) (mm)
Weight .....1 kg

MODEL	INPUT	OUTPUT	
	W	VDC	mA
AAD600902000-A	35	9.0	2000
AAD601351700-A	40	13.5	1700
AAD601352100-A	47	13.5	2100

EI-66

NOTE: All w/Fuse & Cord In/Out

Input .....117/120VAC 60 Hz
Case Dim .....120(L) x 80(W) x 64(H) (mm)
Weight .....1.1 kg

MODEL	INPUT	OUTPUT	
	W	VDC	mA
AAD660903000-A	48	9.0	3000
AAD661202000-A	39	12.0	2000
AAD661202500-A	50	12.0	2500
AAD661203000-A	60	12.0	3000
AAD661352400-A	51	13.5	2400
AAD661502000-A	48	15.0	2000
AAD661802000-A	57	18.0	2000
AAD662401500-A	54	24	1500

NOTE: All w/Fuse & Cord In/Out

Regulated Power Supply

EI-41

Input .....117/120VAC 60 Hz
Case Dim .....63(L) x 51(W) x 41(H) (mm)
Weight .....253 g

MODEL	INPUT	OUTPUT	
	W	VDC	mA
AAD410300350-A	6.0	3.0	350
AAD410900200-A	10.0	9.0	200
AAD411000300-A	12.0	10.0	300
AAD411200200-A	10.0	12.0	200
AAD410900200-A	10.0	9.0	200
AAD411000300-A	10.0	10.0	300
AAD411200200-A	12.0	12.0	200

EI-66

Case Dim ...120(L) x 80(W) x 63.5(H)(mm)
Weight .....1.1 kg

MODEL	INPUT	OUTPUT		
	W	+5	+12	-12
ASI-R005-100	17	1A		
ASI-R005-150	24	1.5A		
ASI-R012-100	28		1A	
ASI-R012-120	33		1.2A	
ASI-R512-820	24	0.8A	0.2A	0.2A
ASI-R512-120	27	1A	0.2A	0.2A
ASI-R512-130	31	1A	0.3A	0.3A

EI-66 Fast Charger for Battery Pack

Input .....117/120VAC 60 Hz
Case Dim .....145(L) x 80(W) x 64(H) (mm)
Weight .....1 kg

MODEL	INPUT	OUTPUT	
	W	VDC	mA
ABC-6	30.0	7.2	1500
ABC-6A	30.0	7.2	1500
ABC-8	35.0	9.6	1500
ABC-8A	35.0	9.6	1500
ABC-10	40.0	15.0	1500

MODEL	VDC	mA
ABC-6S	7.5	1500
ABC-8S	11.0	1500

NOTE: ABC-6, ABC-6A for 1.2ah x 6pcs; ABC-8, ABC-8A for 1.2 ah x 8pcs; ABC-10 for 1.2ah x 10pcs

220V Input

EI-35

Input .....220VAC 50 Hz
Type 1
Case Dim .....55(L) x 43(W) x 36(H) (mm)
Weight .....150 g
Type 2
Case Dim .....57(L) x 43(W) x 39(H) (mm)
Weight .....150 g

MODEL	OUTPUT	
	VDC	mA
AAD350450350-B	4.5	350
AAD350620300-B	6.2	300
AAD350900200-B	9.0	200

MODEL	VAC	mA
AAA350290320-B	2.9	320
AAA350300120-B	3.0	120
AAA350450120-B	4.5	120
AAA350520130-B	5.2	130
AAA350900130-B	9.0	130
AAA350900200-B	9.0	200

EI-41

Input .....220VAC 50 Hz
Case Dim .....63(L) x 51(W) x 41(H) (mm)
Weight .....250 g

MODEL	OUTPUT	
	VDC	mA
AAD410450350-B	4.5	350
AAD410480500-B	4.8	500
AAD410600500-B	6.0	500
AAD410620350-B	6.2	350
AAD410720500-B	7.2	500
AAD410750300-B	7.5	300
AAD410900500-B	9.0	500
AAD410900600-B	9.0	600
AAD410900300-B	9.0	300
AAD410960500-B	9.6	500
AAD411200300-B	12.0	300

MODEL	VAC	mA
AAA410900500	9.0	500

EI-48

Input .....220VAC 50 Hz
Case Dim .....70.5(L) x 56(W) x 47(H) (mm)
Weight .....350 g

MODEL	OUTPUT	
	VDC	mA
AAD480521000-B	5.2	1000
AAD480601000-B	6.0	1000
AAD480901200-B	9.0	1200
AAD480901000-B	9.0	1000
AAD481200500-B	12.0	500
AAD481200600-B	12.0	600
AAD481260800-B	12.6	800
AAD481450800-B	14.5	800

MODEL	VAC	mA
AAA482400400-B	24.0	400

EI-57

Input .....220VAC 50 Hz
Case Dim ....84.5(L) x 64.5(W) x 55(H) (mm)
Weight .....700 g

MODEL	OUTPUT	
	VDC	mA
AAD571201000-B	12.0	1000
AAD571201200-B	12.0	1200
AAD571351300-B	13.5	1300
AAD571501000-B	15.0	1000

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APD is dedicated to providing you with outstanding product designs and innovations that will satisfy your most stringent power specifications and cost constraints. In addition to standard packaging we will provide custom packaging to meet a wide range of design requirements.

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Building today's sophisticated E-Systems is complex enough without worrying about selecting and sourcing the right components. Working with APD you will always be assured of getting the best of available technology in an integrated design which meets your requirements.

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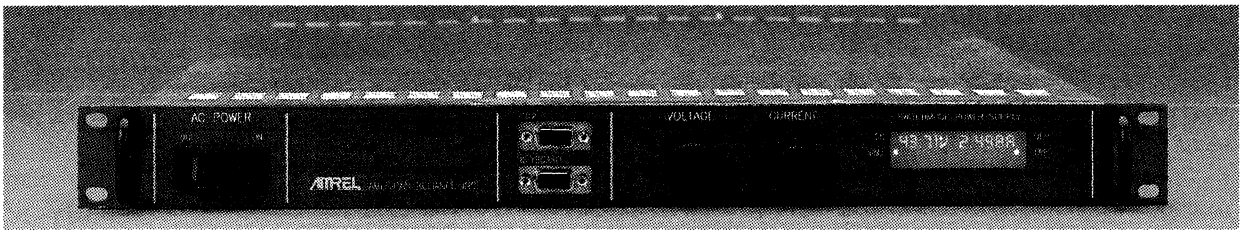

Amrel's SPS Series of switch-mode power supplies are rugged industrial grade programmable DC power supplies. They are designed to provide optimal performance and high reliability at an affordable cost. The SPS Series uses 12-bit DAC circuitry and a feedback circuit to provide excellent programming accuracy, readback resolution, and precise line/load regulation (1mV/1mA). An optocoupler circuit is employed to isolate digital circuits from analog circuits. This allows for up to 1750 volts of isolation. The SPS's output is constantly monitored and displayed on an easy to read backlit LCD. Local operation is performed using simple ten-turn knobs or an external key-pad. For ATE applications, the SPS features built-in protection modes for over-voltage, current and temperature. The SPS Series will operate in local or remote modes. Remote operation is performed via standard GPIB/RS232 interfaces and PC controller. Amrel's SPS Series Power Supplies features a down programming circuit, power-off memory and electronic calibration. Electronic calibration is easily performed through firmware commands without removing the unit from its environment. An optional power factor correction function is available.

Key Features

- Low Profile, high power density
- Low PARD (3mV rms and 30mVp-p)
- Fast Down programming speed (1ms)
- PFC circuit (Option)
- GPIB interface (Option)
- RS232 interface (Option)
- External V/I/R programming capabilities
- 10 turn potentiometer for voltage and current control
- 16x2 LCD display module
- Program Protection Modes (Voltage, Current and Temperature)
- Key pad programming capability (Option)
- Super Low noise filter (as low as 15 mVp-p/ 1.5 mVrms) (Option)
- Low electromagnetic emission
- **CUSTOM UNITS AVAILABLE**

MODEL	VOLTAGE (VDC) (MAX)	CURRENT (ADC) (MAX)	POWER OUTPUT (KW) (MAX)	PROGRAMMABLE RESOLUTION (LSB)	REGULATION LINE & LOAD	RIPPLE & NOISE (RMS) (P-P)
SPS 8-125	8	125	1	2mV/35mA	0.01%	3mV / 30mV
SPS 20-50	20	50	1	4mV/17mA	0.01%	3mV / 30mV
SPS 40-25	40	25	1	10mV/7mA	0.01%	3mV / 30mV
SPS 60-18	60	18	1	16mV/5mA	0.01%	4mV / 40mV
SPS 150-7	150	7	1	40mV/2mA	0.01%	4mV / 50mV
SPS 300-3.5	300	3.5	1	100mV/1mA	0.01%	5mV / 60mV
SPS 600-1.6	600	1.6	1	200mV/0.5mA	0.01%	5mV / 60mV
SPS 8-375	8	375	3	2mV/100mA	0.01%	5mV / 40mV
SPS 20-150	20	150	3	4mV/40mA	0.01%	5mV / 40mV
SPS 40-75	40	75	3	10mV/20mA	0.01%	5mV / 50mV
SPS 60-50	60	50	3	16mV/14mA	0.01%	6mV / 50mV
SPS 150-20	150	20	3	40mV/5mA	0.01%	6mV / 60mV
SPS 300-10	300	10	3	100mV/4mA	0.01%	7mV / 70mV
SPS 600-5	600	5	3	200mV/2mA	0.01%	7mV / 70mV

SEE SECTION 2900 FOR OUR PROGRAMMABLE ELECTRONIC LOADS

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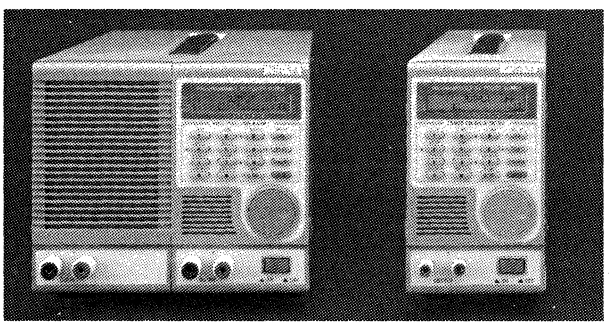
System Programmable DC Power Supplies
PD Series (20-600 Watts)

Linear Performance In A Modular or Stand-Alone Configuration With Virtually Unlimited Combinations

Now you can create the perfect programmable power supply solution for your power instrumentation applications. Whether it be a "stand-alone/benchtop unit" or a "multi-unit modular system". No more compromising...no more overbuying. Get exactly the power you need, with more than 160 models to choose and literally thousands of combinations!

Each model can be ordered to function as either a stand-alone master or auxiliary power device. Only ***AMREL*** offers complete built in interfacing uniformity with all other Amrel lines including the SPS and MPS series.

The PD series integrated master can control up to eight (8) auxilary-slaved power channels... allowing you to save on valuable GPIB address space when necessary.



*The **PD Series** is designed to offer total flexibility to meet your current and future requirements. They are user configurable and expandable for total system flexibility.*

Quality You Can Count On

The ***PD Series*** line has been subjected to extensive testing and burn-in periods, thus assuring long term performance. Mean - Time - Before - Failure (MTBF) exceeds well over 50K hours.

We're committed to meeting your needs. We're leading the way with advanced research and development. Our manufacturing quality controls assure rugged, dependable products, that are built to get the job done...and if you ever need it, you can count on American Reliance Inc. for the finest technical support and customer service anywhere.

To achieve ideal performance and remain well within your budget, American Reliance Inc., offers standard catalog as well as custom designed product sales and support. Your application may require multiple outputs, custom voltage/current combinations, analog or digital programming, and more. Call our friendly and knowledgeable sales and technical support staff to help you choose an ***off-the-shelf*** or ***custom designed*** product.

American Reliance Inc. has made high quality power supplies, test equipment and related products since 1985.

Key Features

- Superior PARD (Ripple & Noise) - 2mVp-p/ 0.3 mVrms (Typical)
- More than 160 model selection providing thousands of different power and power form combinations...From 5V to 250V and 100mA to 40A
- Standard models available from 20 watt, through 600 watts
- One-box solution, featuring standard GPIB (I-EEE 488.1 or 488.2), RS232 Interface and Closed-Case Calibration
- Interchangeable functionality as a "stand-alone master" or "slaved device", either within or outside the PD Series
- Total system expandability - easily and affordably facilitates your growth and changing needs
- Aux Link 1 interfaces 2 outputs (IEEE488.1 Version)
- Aux Link 2 interfaces 8 outputs (IEEE 488-2 SCPI Version)
- Single and dual output available - up to 8 outputs per 19" / 4U high rack
- Visual and Audible Status Indicators
- External Analog Programming Capability
- True RMS output Current Readback (option)
- Remote Sensing Capability
- Series or Parallel Capability
- 12 bit resolution
- Overvoltage Protection Mode
- CV/CC architecture with Auto Crossover
- Overcurrent Protection Mode
- Front and Rear Output terminals
- Backlit LCD
- Standalone Mode Via Front Panel Keypad
- Power-Off Memory
- Compact design saves valuable space
- TTL-Activated Ultrafast ON/OFF Capability (option):
  500µs (ON)
  100µs (OFF)
- **CUSTOM UNITS AVAILABLE**

SEE SECTION 2900 FOR OUR PROGRAMMABLE ELECTRONIC LOADS

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PD Series Specifications

MODEL	VOLTAGE VDC	CURRENT ADC	PROGRAMMING Resolution VDC/ADC	PROGRAMMING Accuracy CV±0.05%+/CC±0.15%+	READBACK Accuracy CV±0.1%+/CC±0.2%+		REGULATION Load CV±0.001%+/CC±0.01%+	REGULATION Line	PROGRAM Up/Down Speed CV/CC	PARD CV/CC Vrms/p-p/Arms
PD5-3	5	3	1.2mV/1mA	3mV/4mA	3mV	4mA	1mV	1mA	10/10mS	0.2mV/3mV/1mA
PD8-2	8	2	2mV/0.5mA	4mV/2.5mA	4mV	2.5mA	1mV	0.5mA	10/10mS	0.2mV/3mV/1mA
PD20-1	20	1	4mV/0.25mA	8mV/1.2mA	8mV	1.2mA	1mV	0.5mA	10/10mS	0.2mV/3mV/1mA
PD30-0.6	30	0.6	8mV/0.15mA	16mV/0.75mA	16mV	0.75mA	1mV	0.1mA	10/10mS	0.2mV/4mV/0.5mA
PD40-0.5	40	0.5	10mV/0.12mA	20mV/0.6mA	20mV	0.6mA	1mV	0.1mA	15/15mS	0.2mA/4mV/0.5mA
PD60-0.3	60	0.3	15mV/0.1mA	30mV/0.4mA	30mV	0.4mA	1mV	0.1mA	30/30mS	0.3mV/5mV/0.3mA
PD80	80	0.25	20mV/0.07mA	40mV/0.3mA	40mV	0.3mA	1mV	50uA	30/30mS	0.3mV/5mV/0.2mA
PD120-0.16	120	0.16	30mV/0.04mA	60mV/0.2mA	60mV	0.2mA	1mV	50uA	100/100mS	0.3mV//6mV/0.2mA
PD250-0.08	250	0.08	45mV/0.02mA	90mV/0.1mA	90mV	0.1mA	2mV	10uA	150/150mS	0.5mV/7mV/0.01mA
PD5-6	5	6	1.5mV/1.5mA	3mV/7.5mA	3mV	7.5mA	1mV	1mA	10/10mS	0.2mV/3mV/2mA
PD8-4	8	4	2mV/1mA	4mV/5mA	4mV	5mA	1mV	1mA	10/10mS	0.2mV/3mV/1mA
PD20-2	20	2	4mV/0.5mA	8mV/2.5mA	8mV	2.5mA	1mV	0.5mA	10/10mS	0.2mV/3mV/1mA
PD30-1.2	30	1.2	8mV/0.3mA	16mV/1.5mA	16mV	1.5mA	1mV	0.5mA	10/10mS	0.2mV/4mV/1mA
PD40-1	40	1	10mV/0.25mA	20mV/1.2mA	20mV	1.2mA	1mV	0.5mA	15/15mS	0.2mA/4mV/1mA
PD60-0.7	60	0.7	15mV/0.18mA	30mV/0.9mA	30mV	0.9mA	1mV	0.1mA	30/30mS	0.3mV/5mV/0.7mA
PD80-0.5	80	0.5	20mV/0.12mA	40mV/0.6mA	40mV	0.6mA	1mV	0.1mA	30/30mS	0.3mV/5mV/0.5mA
PD120-0.3	120	0.3	30mV/0.08mA	60mV/0.4mA	60mV	0.4mA	1mV	0.1mA	100/100mS	0.3mV//6mV/0.3mA
PD250-0.15	250	0.15	45mV/0.05mA	90mV/0.2mA	90mV	0.2mA	2mV	50uA	150/150mS	0.5mV/7mV/0.1mA
PD5-9	5	9	1.5mV/2.4mA	3mV/12mA	3mV	12mA	1mV	1mA	10/10mS	0.2mV/3mV/3mA
PD8-7	8	7	2mV/1.8mA	4mV/9mA	4mV	9mA	1mV	1mA	10/10mS	0.2mV/3mV/2mA
PD20-3	20	3	10mV/0.8mA	8mV/4mA	8mV	4mA	1mV	1mA	10/10mS	0.2mV/3mV/1mA
PD30-2	30	2	8mV/0.5mA	16mV/2.5mA	16mV	2.5mA	1mV	0.5mA	10/10mS	0.2mV/4mV/1mA
PD40-1.5	40	1.5	10mV/0.4mA	20mV/2mA	20mV	2mA	1mV	0.1mA	15/15mS	0.2mA/4mV/1mA
PD60-1	60	1	15mV/0.25mA	30mV/1.2mA	30mV	1.2mA	1mV	0.1mA	30/30mS	0.3mV/5mV/1mA
PD80-0.75	80	0.75	20mV/0.18mA	40mV/0.9mA	40mV	0.9mA	1mV	0.1mA	30/30mS	0.3mV/5mV/0.7mA
PD120-0.5	120	0.5	30mV/0.12mA	60mV/0.6mA	60mV	0.6mA	1mV	0.1mA	100/100mS	0.3mV//6mV/0.5mA
PD250-0.2	250	0.2	45mV/0.04mA	90mV/0.25mA	90mV	0.25mA	2mV	50uA	150/150mS	0.5mV/7mV/0.2mA
PD5-12	5	12	1.5mV/3mA	3mV/15mA	3mV	15mA	1mV	1mA	10/10mS	0.2mV/3mV/4mA
PD8-8.5	8	8.5	2mV/2.2mA	4mV/11mA	4mV	11mA	1mV	1mA	10/10mS	0.2mV/3mV/3mA
PD20-4	20	4	4mV/1mA	8mV/5mA	8mV	5mA	1mV	1mA	10/10mS	0.2mV/3mV/1mA
PD35-2.0	35	2.0	8mV/0.5mA	16mV/2.5mA	16mV	2.5mA	1mV	0.5mA	10/10mS	0.2mV/4mV/1mA
PD40-2	40	2	10mV/0.5mA	20mV/2.5mA	20mV	2.5mA	1mV	0.5mA	15/15mS	0.2mA/4mV/1mA
PD60-1.5	60	1.5	15mV/0.4mA	30mV/2mA	30mV	2mA	1mV	0.5mA	30/30mS	0.3mV/5mV/1mA
PD80-1	80	1	20mV/0.25mA	40mV/1.2mA	40mV	1.2mA	1mV	0.5mA	30/30mS	0.3mV/5mV/1mA
PD120-0.65	120	0.65	30mV/0.12mA	60mV/0.6mA	60mV	0.6mA	1mV	0.1mA	100/100mS	0.3mV//6mV/0.5mA
PD250-0.3	250	0.3	45mV/0.08mA	90mV/0.4mA	90mV	0.4mA	2mV	0.1mA	150/150mS	0.5mV/7mV/0.3mA
PD5-15	5	15	1.5mV/4mA	3mV/20mA	3mV	20mA	1mV	1mA	10/10mS	0.2mV/3mV/5mA
PD8-10	8	10	2mV/2.5mA	4mV/12mA	4mV	12mA	1mV	1mA	10/10mS	0.2mV/3mV/3mA
PD20-5	20	5	4mV/1.2mA	8mV/6mA	8mV	6mA	1mV	1mA	10/10mS	0.2mV/3mV/2mA
PD30-3.5	30	3.5	8mV/0.9mA	16mV/4.5mA	16mV	4.5mA	1mV	1mA	10/10mS	0.2mV/4mV/1mA
PD40-2.5	40	2.5	10mV/0.7mA	20mV/3mA	20mV	3mA	1mV	1mA	15/15mS	0.2mA/4mV/1mA
PD60-1.6	60	1.6	15mV/0.4mA	30mV/2mA	30mV	2mA	1mV	0.5mA	30/30mS	0.3mV/5mV/1mA
PD80-1.2	80	1.2	20mV/0.3mA	40mV/1.5mA	40mV	1.5mA	1mV	0.5mA	30/30mS	0.3mV/5mV/1mA
PD120-0.8	120	0.8	30mV/0.2mA	60mV/1mA	60mV	1mA	1mV	0.1mA	100/100mS	0.3mV//6mV/0.8mA
PD250-0.4	250	0.4	45mV/0.1mA	90mV/0.5mA	90mV	0.5mA	2mV	0.1mA	150/150mS	0.5mV/7mV/0.4mA
PD5-24	5	24	1.5mV/6mA	3mV/30mA	3mV	30mA	1mV	1mA	10/10mS	0.2mV/3mV/5mA
PD8-15	8	15	2mV/4mA	4mV/20mA	4mV	20mA	1mV	1mA	10/10mS	0.2mV/3mV/5mA
PD20-7.5	20	7.5	4mV/2mA	8mV/10mA	8mV	10mA	1mV	1mA	10/10mS	0.2mV/3mV/2mA
PD30-5	30	5	8mV/1.2mA	16mV/6mA	16mV	6mA	1mV	1mA	10/10mS	0.2mV/4mV/1mA
PD40-3.5	40	3.5	10mV/0.9mA	20mV/4.5mA	20mV	4.5mA	1mV	1mA	15/15mS	0.2mA/4mV/1mA
PD60-2.5	60	2.5	15mV/0.7mA	30mV/3mA	30mV	3mA	1mV	1mA	30/30mS	0.3mV/5mV/1mA
PD80-1.8	80	1.8	20mV/0.5mA	40mV/2.5mA	40mV	2.5mA	1mV	0.5mA	30/30mS	0.3mV/5mV/1mA
PD120-1.2	120	1.2	30mV/0.3mA	60mV/1.5mA	60mV	1.5mA	1mV	0.5mA	100/100mS	0.3mV//6mV/1mA
PD250-0.6	250	0.6	45mV/0.12mA	90mV/0.75mA	90mV	0.75mA	2mV	0.1mA	150/150mS	0.5mV/7mV/0.6mA
PD5-30	5	30	1.5mV/8mA	3mV/37.5mA	3mV	37.5mA	1mV	1mA	10/10mS	0.2mV/3mV/5mA
PD 8-20	8	20	2mV/5mA	4mV/25mA	4mV	25mA	1mV	1mA	10/10mS	0.2mV/3mV/3mA
PD20-10	20	10	4mV/2.5mA	8mV/12mA	8mV	12mA	1mV	1mA	10/10mS	0.2mV/3mV/3mA
PD30-6.5	30	6.5	8mV/1.8mA	16mV/8mA	16mV	8mA	1mV	1mA	10/10mS	0.2mV/4mV/2mA
PD40-5	40	5	10mV/1.2mA	20mV/6mA	20mV	6mA	1mV	1mA	15/15mS	0.2mA/4mV/2mA
PD60-3.5	60	3.5	15mV/0.9mA	30mV/4.5mA	30mV	4.5mA	1mV	1mA	30/30mS	0.3mV/5mV/1mA
PD80-2.5	80	2.5	20mV/0.7mA	40mV/3mA	40mV	3mA	1mV	1mA	30/30mS	0.3mV/5mV/1mA
PD120-1.6	120	1.6	30mV/0.4mA	60mV/2mA	60mV	2mA	1mV	0.5mA	100/100mS	0.3mV//6mV/1mA
PD250-0.8	250	0.8	45mV/0.2mA	90mV/1mA	90mV	1mA	2mV	0.1mA	150/150mS	0.5mV/7mV/0.8mA
PD5-40	5	40	1.5mV/10mA	3mV/50mA	3mV	50mA	1mV	1mA	10/10mS	0.2mV/3mV/6mA
PD8-30	8	30	2mV/8mA	4mV/37.5mA	4mV	37.5mA	1mV	1mA	10/10mS	0.2mV/3mV/5mA
PD20-12	20	12	4mV/3mA	8mV/15mA	8mV	15mA	1mV	1mA	10/10mS	0.2mV/3mV/3mA
PD30-8	30	8	8mV/2mA	16mV/10mA	16mV	10mA	1mV	1mA	10/10mS	0.2mV/4mV/2mA
PD40-6	40	6	10mV/1.5mA	20mV/7.5mA	20mV	7.5mA	1mV	1mA	15/15mS	0.2mA/4mV/2mA
PD60-4	60	4	15mV/1mA	30mV/5mA	30mV	5mA	1mV	1mA	30/30mS	0.3mV/5mV/1mA
PD80-3	80	3	20mV/0.8mA	40mV/4mA	40mV	4mA	1mV	1mA	30/30mS	0.3mV/5mV/1mA
PD120-2	120	2	30mV/0.5mA	60mV/2.5mA	60mV	2.5mA	1mV	0.5mA	100/100mS	0.3mV//6mV/1mA
PD250-1	250	1	45mV/0.24mA	90mV/1.2mA	90mV	1.2mA	2mV	0.5mA	150/150mS	0.5mV/7mV/1mA
PD250-2.4	250	2.4	45mV/0.6mA	90mV/3mA	90mV	3mA	2mV	1mA	150/150mS	0.5mV/7mV/1mA

Transient Response: 30us for 50% to 100% load change within 0.1% of rated output.

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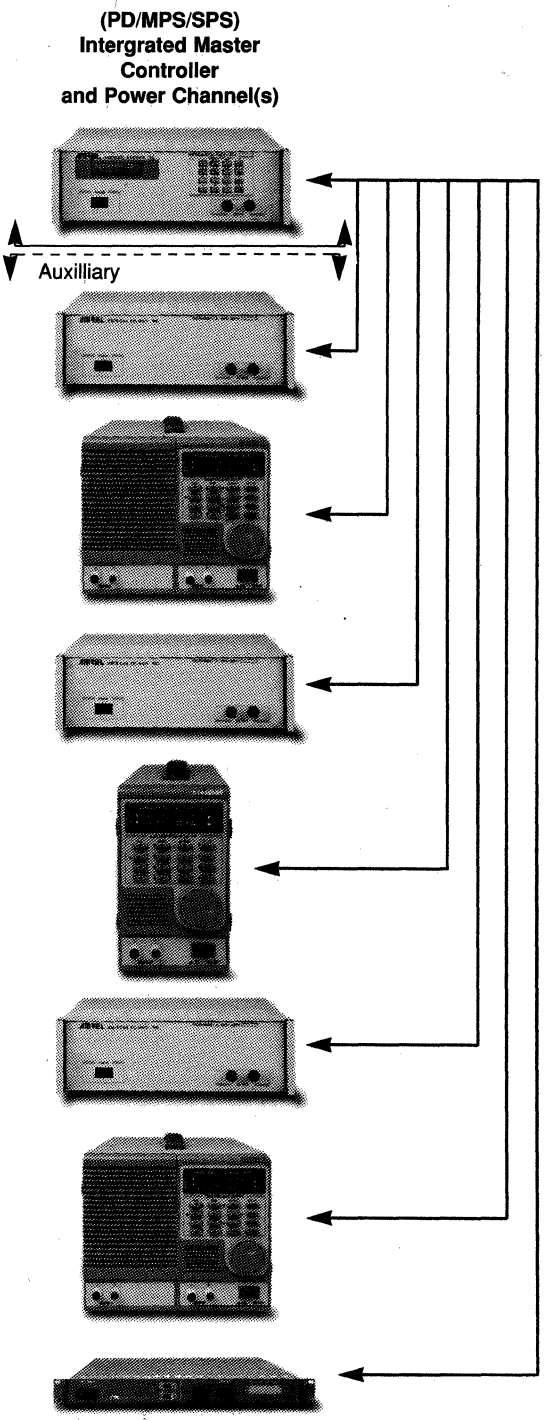
AMERICAN RELIANCE INC., (800) 654-9838 (626) 303-6688 (626) 358-3838 amrel@amrel.com www.amrel.com

PDS Series
Multi-Channel, Custom Design, Programmable Power Supplies

AMREL's PDS Series of Programmable supplies were specifically developed in order to provide the user with a variable alternative to the limitations that are invariably encountered within the standard product marketplace. It also offers a cost effective solution in applications where otherwise expensive multi-channel, custom designs may not be the desired approach.

The PDS Series is a flexible line of user specifiable and configurable product, which uses the standsrd PD Series electrical specifications as the basic reference. These electrictrical specifications can then be modified and integrated into a single compact mechanical package, which ranges from 1/2 to full rack-4U high unit. A master controller can be provided to control up to eight isolated DC output channels, within certain power, number of channels, and space available limits.

If you have applications that may require a more customized approach to what is commonly available, please contact AMREL to discuss your specific needs.



Key Features

- PD series specs as referenced
- Specs modifications and additions available
- Configurable up to eight channels, controlled by a single master
- Compact mechanical design
  (1/2 - 3/4 & Full Rack width, 4U high)

Flexible Turn-Key System Approach

- The SCPI master can control up to 8 outputs with on GPIB address by means of up to 7parallel-link interface cables
- The master slave configuration can also be controlled manually by the master via the front panel keyboard
- Each auxiliary slave can be different voltage, current, and power combination

Any of the SCPI Version PD, SPS, or MPS series models can be ordered as an integrated Master to control any PD, MPS, or SPS series auxiliary module in any configuration of programmable power supplies.

This unique interface uniformity permits unmatched power design flexibility.

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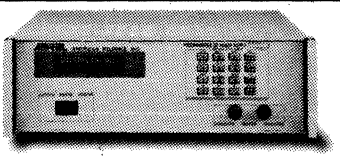
AMERICAN RELIANCE INC., (800) 654-9838 (626) 303-6688 (626) 358-3838 amrel@amrel.com www.amrel.com

Mid-Range System Programmable DC Power Supplies
MPS Series 300, 600, 1000 Watts

◆ Linear Power Supplies ◆ Low PARD (Ripple and Noise) ◆ Internal uProcessor and Firmware ◆ Large Backlit LCD ◆ Standalone Mode Via Front Panel Keypad ◆ GPIB Interface (IEEE488.1 or IEEE488.2 SCPI) ◆ 99 Points Self-Programming Capability (SCPI Version) ◆ Aux Link 1 Interfaces 2 Outputs (IEEE488.1 Version) ◆ Aux Link 2 Interfaces 8 Outputs (SCPI Version)



MODEL	POWER OUTPUT	VOLTAGE (max.)	CURRENT (max.)	PROGRAMMING RESOLUTION (LSB)
MPS8-30	240 WATTS	8VDC	30ADC	2.5mV/10mA
MPS 18-15	270 WATTS	18VDC	15ADC	5mV/5mA
MPS 35-10	350 WATTS	35VDC	10ADC	10mV/5mA
MPS 60-5	300 WATTS	60VDC	5ADC	20mV/2.5mA
MPS 80-4	320 WATTS	80VDC	4ADC	25mV/2.5mA
MPS 120-2.5	300 WATTS	120VDC	2.5ADC	50mV/1mA
MPS 8-60	480 WATTS	8VDC	60ADC	2.5mV/20mA
MPS 18-30	540 WATTS	18VDC	30ADC	5mV/10mA
MPS 60-10	600 WATTS	60VDC	10ADC	20mV/5mA
MPS 80-7.5	600 WATTS	80VDC	7.5ADC	25mA/2.5mA
MPS 120-5	600 WATTS	120VDC	5ADC	50mV/2.5mA
MPS 18-50	900 WATTS	18VDC	50ADC	5mV/20mA
MPS 35-20	700 WATTS	35VDC	20ADC	10mV/10mA
MPS 35-30	1050 WATTS	35VDC	30ADC	10mV/10mA
MPS 60-16	960 WATTS	60VDC	16ADC	20mV/5mA
MPS 80-12.5	1000 WATTS	80VDC	12.5ADC	25mV/5mA
MPS120-8	960 WATTS	120VDC	8ADC	50mV/2.5mA

Specifications 600 Watts

		MPS 8-60	MPS 18-30	MPS 60-10	MPS 80-7.5	MPS 120-5	MPS 250-2.4
Programming Accuracy	VDC: 0.05%+ ADC: 0.15%+	5mV 100mA	10mV 50mA	40mV 25mA	50mV 12.5mA	100mV 12.5mA	200mV 5mA
Readback Accuracy	VDC: 0.1%+ ADC: 0.2%+	5mV 100mA	10mV 50mA	40mV 25mA	50mV 12.5mA	100mV 12.5mA	200mV 5mA
PARD (10Hz to 20MHz)	CV mode CC mode	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms
Load Regulation	CV mode CC mode	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%2mA	0.001%+1mV 0.01%2mA
Line Regulation	CV mode CC mode	0.001%+1mV 0.01%+2mA	0.001%+mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mA 0.01%+2mA	0.001%+1mV 0.01%+2mA
Input Source	–10%	115/230 VAC	115/120VAC	115/230 VAC	115/230 VAC	115/230 VAC	115/230 VAC
Transient Response Time	CV mode	150 s	150 s	150 s	150 s	150 s	150 s
Programming Up/Down Speed		15ms/20ms	15ms/20ms	15ms/20ms	15ms/20ms	15ms/20ms	15ms/20ms
Operating Temperature		0 to 50 C	0 to 50 C	0 to 50 C	0 to 50 C	0 to 50 C	0 to 50 C
Dimensions		19"x7.00"x25.98"	19"x7.00"x25.98"	19"x7.00"x25.98"	19"x7.00"x25.98"	19"x7.00"x25.98"	19"x7.00"x25.98"
Weight		60Lb.s	60Lb.s	60Lb.s	60Lb.s	60Lb.s	60Lb.s

Specifications 1000 Watts

		MPS 18-50	MPS 35-20	MPS 35-30	MPS 60-16	MPS 80-12.5	MPS 120-8	MPS 250-4
Programming Accuracy	VDC: 0.05%+ ADC: 0.15%+	10mV 100mA	20mV 50mA	20mV 50mA	40mV 25mA	50mV 12.5mA	100mV 12.5mA	200mV 5mA
Readback Accuracy	VDC: 0.1%+ ADC: 0.2%+	10mV 100mA	20mV 50mA	20mV 50mA	40mV 25mA	50mV 12.5mA	100mV 12.5mA	200mV 5mA
PARD (10Hz to 20MHz)	CV mode CC mode	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms	1mVrms/10mVpp 10mArms
Load Regulation	CV mode CC mode	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%2mA	0.001%+1mV 0.01%2mA
Line Regulation	CV mode CC mode	0.001%+1mV 0.01%+2mA	0.001%+mV 0.01%+2mA	0.001%+mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mV 0.01%+2mA	0.001%+1mA 0.01%+2mA	0.001%+1mV 0.01%+2mA
Input Source	–10%	115/230 VAC	115/120VAC	115/120VAC	115/230 VAC	115/230 VAC	115/230 VAC	115/230 VAC
Transient Response Time	CV mode	150 s	150 s	150 s	150 s	150 s	150 s	150 s
Programming Up/Down Speed		15ms/20ms	15ms/20ms	15ms/20ms	15ms/20ms	15ms/20ms	15ms/20ms	15ms/20ms
Operating Temperature		0 to 50 C	0 to 50 C	0 to 50 C	0 to 50 C	0 to 50 C	0 to 50 C	0 to 50 C
Dimensions		19"x7.00"x25.98"	19"x7.00"x25.98"	19"x7.00"x25.98"	19"x7.00"x25.98"	19"x7.00"x25.98"	19"x7.00"x25.98"	19"x7.00"x25.98"
Weight		60Lb.s	60Lb.s	60Lb.s	60Lb.s	60Lb.s	60Lb.s	60Lb.s

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APPLIED POWER CONVERSION
a division of
TECHNOLOGY DYNAMICS INC.
"Power Supplies for the New Millennium"

MW Series
ONE TO FOUR OUTPUTS
SWITCHING POWER SUPPLIES
LOW COST, HIGH RELIABILITY
15 - 300 Watts

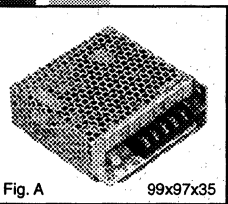
Fig. A 99x97x35

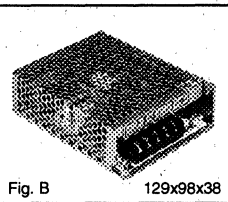
Fig. B 129x98x38

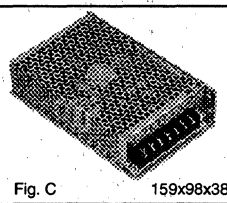
Fig. C 159x98x38

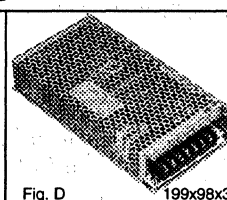
Fig. D 199x98x38

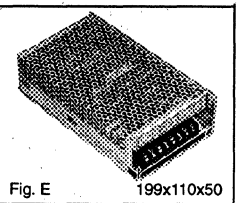
Fig. E 199x110x50

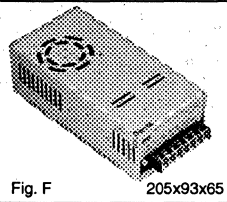
Fig. F 205x93x65

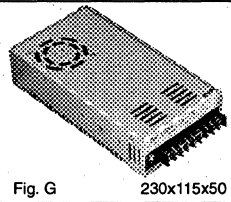
Fig. G 230x115x50

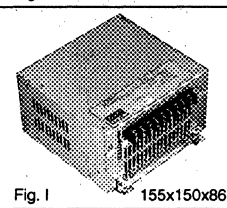
Fig. I 155x150x86

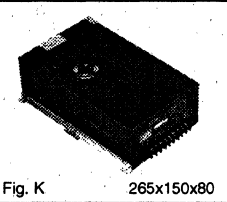
Fig. K 265x150x80

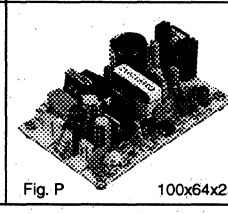
Fig. P 100x64x25

SINGLE OUTPUT

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) 5V	12V	15V	24V	27V	48V	CASE NOTE:2	FUNCTION NOTE:4	SAFETY NOTE:5	FIG.
TS-15-□	15	S	3	1.3		0.7			B2	AK		A
TS-15F-□	15	F	3	1.3		0.7			B2	ABK		P
TS-25-□	25	F	5	2.1	1.7	1.1			B2	ABHK	U.T.E.	A
TS-35-□	35	S	7	3	2.4	1.5			B2	AHK		B
TS-40-□	40	F	8	3.5	2.8	1.8			B2	ABHK	U.T.E.	B
TS-50-□	50	S	10	4.2	3.4	2.1			B2	AHK		C
TS-60-□	60	F	12	5	4	2.5			B2	ABHK	U.T.E.	C
TS-100F-□	100	J	20	8.5	6.7	4.5		2.2	B2	AB	U.T.E.	D
TS-150-□	150	S	30	12.5	10	6.5			B2	ABHK	U.T.E.	E
TS-240-□	216-240	A	40	18	15	10			B2F	ABCDHK	U.T.E.	F
TS-300-□	300	S		25		12.5		6.3	B2F	AK		K
TS-320-□	250-320	S	50	25	20	12.5	11	6.5	B2F	ABCDHK		G
TSP-300-□	300	F	50	24	19	12.5	11	6.25	B2F	ABCDHKL	ⓉT E	G

TRIPLE OUTPUT

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) +5V	+12V	+15V	+24V	-5V	-12V	-15V	CASE NOTE:2	FUNCTION NOTE:4	SAFETY NOTE:5	FIG.
TT-30A	30	S	3	1			0.5			B2	AK		B
TT-30B	30	S	3	1				0.5		B2	AK		B
TT-40A	40	F	3	2			0.5			B2	ABK		B
TT-40B	40	F	3	2				0.5		B2	ABK		B
TT-40C	40	F	3		1.5				0.5	B2	ABK		B
TT-50A	50	S	7	1			1			B2	AK		C
TT-50B	50	S	5	1				1		B2	AK		C
TT-50C	50	S	4		1				1	B2	AK		C
TT-50D	50	S	3	1		1				B2	AK		C
TT-60A	60	F	5	2.5			0.5			B2	ABK	U.T.E.	C
TT-60B	60	F	5	2.5				0.5		B2	ABK	U.T.E.	C
TT-60C	60	F	5		2				0.5	B2	ABK	U.T.E.	C
TT-80D	80	A	4	2		1.5				B2	A		D
TT-100C	100	S	10		2.5				1	B2	A		E
TT-100D	100	S	6	2		2				B2	A		E

DUAL OUTPUT

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) +5V	+12V	+15V	CASE NOTE:2	FUNCTION NOTE:4	SAFETY NOTE:5	FIG.
TD-30A	30	S	4	1		B2	AK		B
TD-30B	30	S	2.2		1	B2	AK		B
TD-50A	50	S	6	2		B2	AK		C
TD-50B	50	S	6		1	B2	AK		C
TD-60A	60	F	4	3		B2	ABK	U.T.E.	C
TD-60B	60	F	3		1.8	B2	ABK	U.T.E.	C
TD-100A	100	S	10	4		B2	AK		E
TD-100B	100	S	6		3	B2	AK		E
TD-120A	120	S	12	5		B2	ABK	U.T.E.	E
TD-120B	120	S	6		4	B2	ABK	U.T.E.	E

QUAD OUTPUT

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) +5V	+12V	+15V	+24V	-5V	-12V	-15V	CASE NOTE:2	FUNCTION NOTE:4	SAFETY NOTE:5	FIG.
TQ-55	55	S	7	1			0.5	0.5		B2	A		C
TQ-60	60	F	5.5	2			0.5	0.5		B2	ABK		E
TQ-100H	100	S	13	2			1	1		B2	A		E
TQ-100B	100	S	8	1		2		0.5		B2	A		E
TQ-120B	120	S	11	4			1	1		B2	ABK	U.T.E.	E
TQ-120C	120	S	10		3.5		1		1	B2	ABK	U.T.E.	E
TQ-120D	120	S	8	2		2		1		B2	ABK	U.T.E.	E
TQ-180	180	S	8	2		4		1		B3F	AK		I

NOTES

1. 85-132/170-264VAC SELECTION [A]: AUTO CHANGE [F]: FULL RANGE [S]: BY SWITCH [J]: BY JUMPER
2. CASE TYPE [B]: BOXED [L] L BRACKET [1]: ONE MOUNTING SURFACE [2]: TWO MOUNTING SURFACE [3]: THREE MOUNTING SURFACE [F]: WITH COOLING FAN
4. FUNCTION [A]: OVERLOAD (OVERCURRENT), SHORT CIRCUIT PROTECTION [B]: OVER VOLTAGE PROTECTION [C]: OVER TEMP. PROTECTION [D]: COOLING FAN ON/OFF CONTROL [E]: POWER SIGNAL CONTROL (PF.PG) [F]: ON/OFF REMOTE CONTROL BY TTL SIGNAL [G]: PARALLEL/SERIES USE [H]: SERIES USE [I]: CHARGER PROTECTION [J]: REMOTE SENSORS [K]: OUTPUT LED INDICATION [L]: POWER FACTOR CORRECTOR
5. SAFETY [T]: TUV EN60950(IEC950, UL1950) APPROVED [U]: UL 1012/1950 APPROVED [E]: EMC, LVD. (CE) CONFORMITY ⓉⓊⒺ : PENDING

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APPLIED POWER CONVERSION
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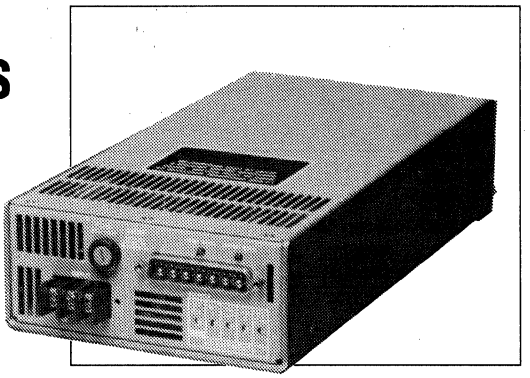
"Power Supplies for the New Millennium"

LTBC Series
One to Four Outputs
SWITCHING POWER SUPPLIES
150-600 WATTS



APPLICATIONS

The LTBC family of power supplies was designed to satisfy a market for low cost, high reliability applications. The LTBC is especially suitable for critical systems in remote locations, severe environment, redundant (N+1) or battery back-up uninterruptible operation.

This versatile design is loaded with options, making it particularly suitable to telecommunications applications.

SPECIFICATIONS

ELECTRICAL

Input: 90-132/180-264 VAC 47-400 Hz
Regulation: Line + .3%
Load + 2%
Ripple: 1% peak to peak, not to exceed 100mV
Efficiency: 80% typical single output units
70% typical 4 multiple output units
Hold-Up Time: 20ms min.
In-Rush Current: 30A max 1/2 cycle
Protections: OV, OL & OT

ENVIRONMENTAL & MECHANICAL

Operating Temperature: 0°C to +65°C standard
-30°C to +75°C optional
Storage Temperature: -30°C to +85°C
Cooling: Internal ball bearing DC fan and/or conduction to base plate
Weight: 6 lbs. (2.7 kg) max
Size: 2.56"(H) x 6.00(W) x 11.50"(L)
2.56"(H) x 5.50"(W) x 11.50"(L) (Optional)

AVAILABLE OPTIONS

- Auto Line Selection (90-264 VAC)
- Redundant Operation (N+1) Configuration
- Wide Temp. Operation (-30°C to +75°C)
- Forced Current Sharing
- Ruggedized for Severe Environment
- Low Voltage Battery Disconnect (LVBD) for Battery Back-up Operation
- **(TBC Series) Size: 3.0" x 5.5" x 10.0"**
Note: Specification same as LTBC series

MODEL SELECTION

Single Output Models

OUTPUT	MAX LOAD	MODEL NO.
5	60	LTBC-5-60
12	40	LTBC-12-40
24	24	LTBC-24-24
28	20	LTBC-28-20
48	12	LTBC-48-12

Option Designations	Suffix Code
REDUNDANT OPERATION	-ORD
WIDE TEMP OPERATION	-WTO
AUTO LINE SELECT	-ALS
FORCED CURRENT SHARING	-FCS
RUGGEDIZED/MILITARIZED	-MIL
BATTERY BACK-UP*	-LVBD

*Backs up main output only. Battery is connected to output.

LTBC Series: Multiple Output Selection Guide

- Select first, second, third or fourth output from the tables below.
- Second and third output must be equal in voltage and share common ground.
- Output four is floating and may be used as positive or negative.

Example: P/N LTBC 5-60 A2B2C1-Suffix
+5V 50A, -12V 3A, +12V 7A, +5V 2A

Low Voltage Battery Disconnect

The LVBD module adds a new dimension to battery backup power supplies. The power supply simultaneously charges the battery and powers the load. If the AC power fails, the battery continues to support the load. However, when the battery voltage drops below a predetermined level, the LVBD module disconnects the battery from the load, thereby protecting the battery from the damaging effects of complete discharge.

MULTIPLE OUTPUT

OUTPUT #1 (V1)			OUTPUT #2 (-V2)	CODE	OUTPUT #3 (+V3)	CODE	OUTPUT #4 (V4)	CODE
VDC	MAX AMP	MODEL	VDC @ MAX AMP		VDC @ MAX AMP		VDC @ MAX AMP	
5	60	LTBC-5-60	-5V @ 3A	A1	+5V @ 6A*	B1	5V @ 2A	C1
12	40	LTBC-12-40	-12V @ 3A	A2	+12V @ 3A	B2	12V @ 2A	C2
24	24	LTBC-24-24	-15V @ 3A	A3	+15V @ 6A	B3	15V @ 2A	C3
28	20	LTBC-28-20	-24V @ 3A	A4	+24V @ 3A	B4	24V @ 2A	C4
48	12	LTBC-48-12					48V @ 1A	C5

NOTE: Other voltages and currents available, contact the factory. Maximum total output power cannot exceed 600 watts. Maximum current per output cannot be exceeded.
*This output can be optionally increased to 10 Amps. *SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE*

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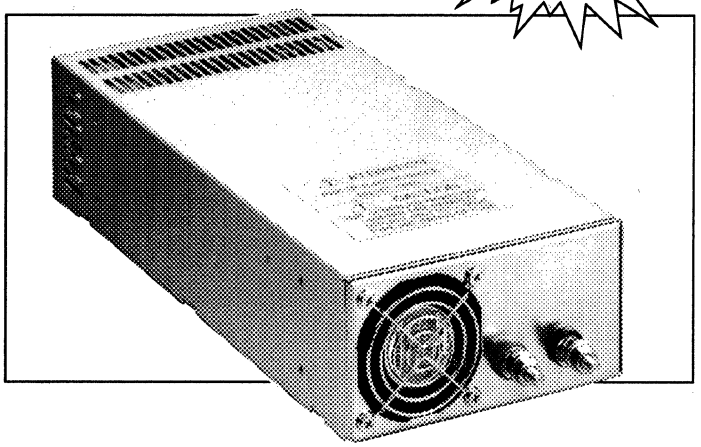
"Power Supplies for the New Millennium"

TCP Series
SINGLE OUTPUT POWER SUPPLIES
400, 600, 1000 WATTS

HIGH POWER LOW COST IN STOCK

STANDARD FEATURES

- Low cost, high reliability
- Compact size, light weight
- Low noise and ripple
- User adjust AC input range
- Terminal block input
- Ruggedly designed
- Built in fan
- Short circuit, overlaod, overvoltage protected
- Full load burn-in test
- Most models agency approved



MODEL SELECTION

Nominal Voltage (VDC)	400 WATTS		600 WATTS		1000 WATTS	
	Maximum Current (ADC)	Model	Maximum Current (ADC)	Model	Maximum Current (ADC)	Model
5V	60A	TCP-5-60	80A	TCP-5-80	Consult Factory	
12V	34A	TCP-12-34	50A	TCP-12-50		
15V	27A	TCP-15-27	40A	TCP-15-40		
24V	17A	TCP-24-17	25A	TCP-24-25	41A	TCP-24-41
28V	14A	TCP-28-14	21A	TCP-28-21	35A	TCP-28-35
36V	11A	TCP-36-11	16A	TCP-36-16	Consult Factory	
48V	8A	TCP-48-8	12A	TCP-48-12	20A	TCP-48-20

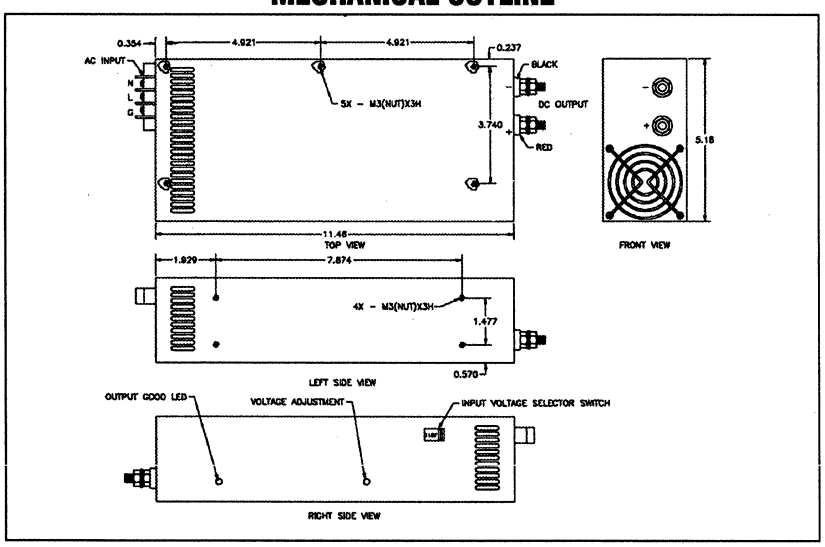
Other voltages available, contact the factory.

SPECIFICATIONS

AC Input Voltage: 110/220 VAC (user select slide switch)
AC Input Frequency: 47-63Hz
Efficiency: 85-90% at full load
Line Regulation: 1% typical
Load Regulation: 1% typical
Output Voltage ADJ: ±10% on main output
Ripple & Noise: 1% peak to peak typical
Overvoltage Protection: Set at 20% of main output, automatic recovery
Overload Protection: Current limiting, automatic recovery
Hold-up Time: 10ms typical at full load
Temperature Coefficient: 0.02%-0.05% Per °C
EMI Requirements: Meets FCC Class A
Safety Requirements: Meets UL 1950, CSA 1402C
Operating Temperature: -10°C to 50°C typical -40° to +75 Optional
Storage Temperature: -20°C to +85°C
Humidity: 90% non condensing
Size: 11.5" (L) x 5.25" (W) x 2.6" (H)
Weight: 6.6 lbs.

- Auto Line Selection (90-264 VAC)
- Power Factor Correction (IEC-1000)
- Redundant Operation (N + 1)
- Forced Current Sharing
- Ruggedized for Severe Environment
- Hot Pluggable in a 3.5" High Rack
- Low Voltage Battery Disconnect (LVBD) for battery back-up operation.

MECHANICAL OUTLINE



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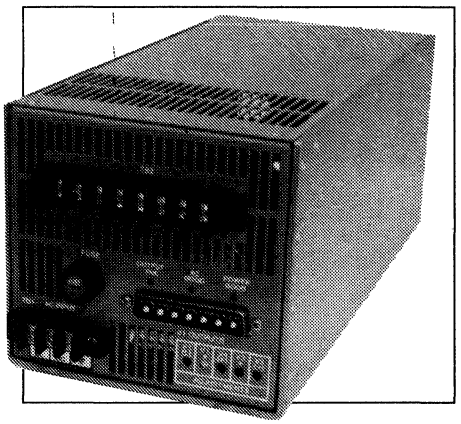
"Power Supplies for the New Millennium"

TDL Series
One to Six Outputs
SWITCHING POWER SUPPLIES
600-1000 WATTS - 5" x 5.5" x 11.5"
WITH BATTERY BACK-UP OPTION



APPLICATIONS

The TDL family of power supplies was designed to satisfy a market for low cost, high reliability applications.

The TDL is especially suitable for critical systems in remote locations, severe environment, and redundant operation. This versatile design is loaded with options, making it particularly suitable to telecommunication applications.

SPECIFICATIONS

ELECTRICAL

Input: 90-132/180-264 VAC 47-400 Hz
Regulation: Line + .3%
Load + 2%
Ripple: 1% peak to peak, not to exceed 100mV
Efficiency: 80% typical single output units
70% typical multiple output units
Hold-Up Time: 20ms min.
In-Rush Current: 40A max 1/2 cycle
Protections: OV, OL & OT

ENVIRONMENTAL & MECHANICAL

Operating Temperature: 0°C to +65°C standard
-30°C to +75°C optional
Storage Temperature: -30°C to +85°C
Cooling: Internal ball bearing DC fan and/or conduction to base plate
Weight: 6.6 lbs. (3.0 kg) max
Size: 5.5"(W) x 5.0"(H) x 11.5"(L)

AVAILABLE OPTIONS

- Redundant Operation (N+1) Configuration
- Wide Temp. Operation (-30°C to +75°C)
- Forced Current Sharing
- Ruggedized for Severe Environment
- Hot Pluggable in 5.25" High Rack
- Power Factor Correction
- Auto Ranging Input

MODEL SELECTION

Single/Main Output		
OUTPUT	MAX LOAD	MODEL NO.
5	60	TDL-5-60
12	50	TDL-12-50
24	42	TDL-24-42
28	36	TDL-28-36
48	22	TDL-48-22

Option Designations	Suffix Code
REDUNDANT OPERATION	-ORD
WIDE TEMP OPERATION	-WTO
AUTO LINE SELECT	-ALS
FORCED CURRENT SHARING	-FCS
RUGGEDIZED/MILITARIZED	-MIL
BATTERY BACK-UP (MAIN OUTPUT ONLY)	-LVBD
BATTERY BACK-UP ALL OUTPUTS	-UPS

TDL Series: Multiple Output Selection Guide

- Select main output from table above.
- Select second, third, fourth, fifth or sixth output from the tables below.
- Second and third output must be equal in voltage and share common ground.
- Output four, five and six are floating and may be used as positive or negative.

Example: P/N TDL5-60 A2B2C1D1E2-Suffix
+5V 60A, -12V 3A, +12V 5A, +5V 3A, 5V 10A, 12V 8A

Low Voltage Battery Disconnect

The LVBD module adds a new dimension to battery backup power supplies. The power supply simultaneously charges the battery and powers the load. If the AC power fails, the battery continues to support the load. However, when the battery voltage drops below a predetermined level, the LVBD module disconnects the battery from the load, thereby protecting the battery from the damaging effects of complete discharge.

MULTIPLE OUTPUT

OUTPUT #2 (-V2)	CODE	OUTPUT #3 (+V3)	CODE	OUTPUT #4 (V4)	CODE	OUTPUT #5 (V5)	CODE	OUTPUT #6 (V6)	CODE
VDC @ MAX AMP		VDC @ MAX AMP		VDC @ MAX AMP		VDC @ MAX AMP		VDC @ MAX AMP	
-5V @ 3A	A1	+5V @ 5A	B1	5V @ 3A	C1	5V @ 10A	D1	5V @ 10A	E1
-12V @ 3A	A2	+12V @ 5A	B2	12V @ 3A	C2	12V @ 8A	D2	12V @ 8A	E2
-15V @ 3A	A3	+15V @ 4A	B3	15V @ 3A	C3	15V @ 7A	D3	15V @ 7A	E3
-24V @ 3A	A4	+24V @ 3A	B4	24V @ 2A	C4	24V @ 4.5A	D4	24V @ 4.5A	E4

NOTE: Other voltages and currents available, contact the factory. Maximum total output power cannot exceed 1000 watts. Maximum current per output cannot be exceeded.

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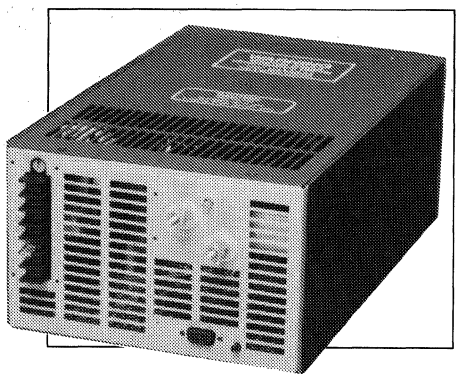
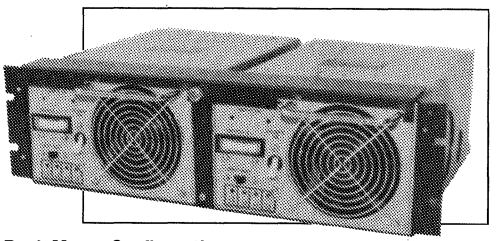
"Power Supplies for the New Millennium"

NTDM Series
SINGLE OUTPUT POWER SUPPLIES
1000-3000 WATTS - 5" x 8" x 12.5"
BATTERY BACK-UP • POWER FACTOR CORRECTION
• UNIVERSAL INPUT • HOT PLUGGABLE
• REDUNDANT (N+1) RACK MOUNT • MILITARIZED





Rack Mount Configuration

STANDARD FEATURES
- MTFB>150,000 Hours
- Remote sense with protection
- ±10% voltage adjust range
- OV/OL/OT protected
- Input power fail/output good TTL signals
- Remote turn-on/turn-off
- Cooling: DC-Operated ball bearing fan
- Operating temperature range: 0-55°C
- Meets FCC Docket 20780
- UL1950, CSA 22.2 No.

APPLICATIONS
The NTDM series is a rugged high power family of Switchmode Power Supplies suitable for the most demanding applications in commercial and military environments. Due to its high reliability, and ability to work in redundancy, the NTDM units are very suitable to telecommunication systems where uninterruptible operation is a must, and where the system operates 24 hours per day unattended. The NTDM is also routinely used in military systems in vehicular and shelter applications.

SPECIFICATIONS
ELECTRICAL
Input: 90-132/180-264 VAC 47-400 Hz
Regulation: Line + .3%
Load + 2%
Ripple: 1% peak to peak, not to exceed 100mV
Efficiency: 80% typical single output units
70% typical multiple output units
Hold-Up Time: 20ms min.
In-Rush Current: 40A max 1/2 cycle
Protections: OV, OL & OT

ENVIRONMENTAL & MECHANICAL
Operating Temperature: 0°C to +65°C standard
-30°C to +75°C optional
Storage Temperature: -30°C to +85°C
Cooling: Internal ball bearing DC fan and/or conduction to base plate
Weight: 15 lbs. (7 kg) max
Size: 8.00"(W) x 5.00"(H) x 12.50"(L)

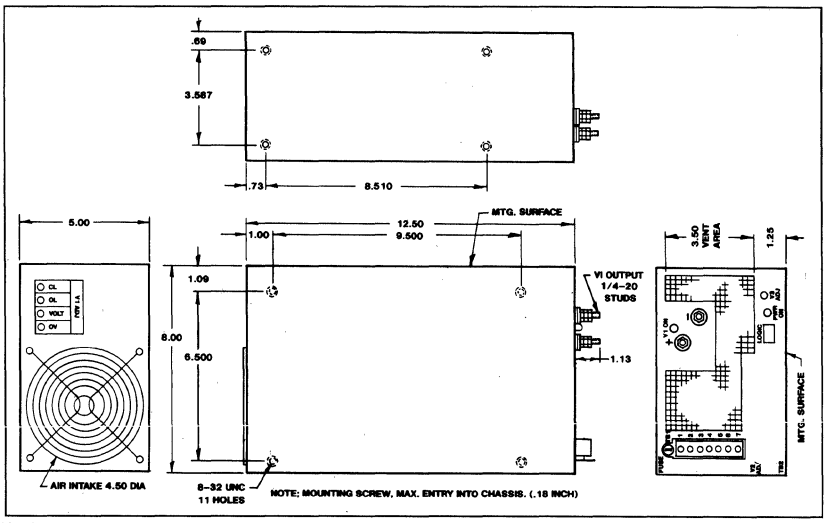
AVAILABLE OPTIONS
- Redundant Operation (N+1) Configuration
- Wide Temp. Operation (-30°C to +75°C)
- Forced Current Sharing
- Ruggedized for Severe Environment
- Hot Pluggable in 5.25" High Rack
- Power Factor Correction
- Auto Ranging Input

MODEL SELECTION

NOMINAL VOLTAGE (VDC)	1000 WATT OUTPUT		1500 WATT OUTPUT		2000 WATT OUTPUT*		3000 WATT OUTPUT*	
	MAXIMUM CURRENT (ADC)	MODEL	MAXIMUM CURRENT (ADC)	MODEL	MAXIMUM CURRENT (ADC)	MODEL	MAXIMUM CURRENT (ADC)	MODEL
5V	200	NTDM-5-200						
12.0	83	NTDM-12-83	125	NTDM-12-125	CONSULT FACTORY		CONSULT FACTORY	
15.0	67	NTDM-15-67	100	NTDM-15-100				
24.0	42	NTDM-24-42	62	NTDM-24-62	84	NTDM-24-84	125	NTDM-24-125
28.0	36	NTDM-28-36	54	NTDM-28-54	72	NTDM-28-72	107	NTDM-28-107
48.0	21	NTDM-48-21	31	NTDM-48-31	42	NTDM-48-42	62	NTDM-48-62
110.0	9	NTDM-110-9	14	NTDM-110-14	18	NTDM-110-18	27	NTDM-110-27

*2 kw and 3 kw units are available only with 220VAC single phase or 115/220VAC 3 phase input
Other voltages available, contact the factory.

MECHANICAL OUTLINE



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"Power Supplies for the New Millennium"

HS SERIES
HOT SWAP / RACK MOUNT
REDUNDANT (N+1) POWER SYSTEMS
1 kW to 75 kW

APPLICATIONS

Technology Dynamics Inc. Hot Swap/Redundant (N+1) Power Systems provides glitch free operation for todays critical telecommunication, medical and industrial applications.. Utilizing inovative Hot Swap technology along with standard power supply modules for maximum flexibility and reduced lead times, Technology Dynamics Inc. leads the way in Hot Swap power conversion.

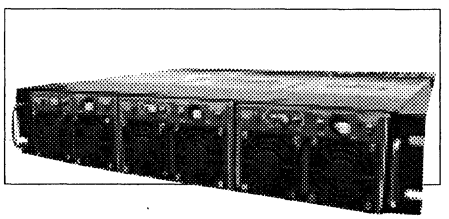
STANDARD FEATURES

- One to three modules per rack.
- Hot Swap or standard rack mount.
- Universal, 110/220, 380 VAC input, single or three phase. DC inputs, 24/48 VDC
- Single or multiple outputs.
- Tightly regulated outputs.
- Front panel monitoring, AC Good, DC Good.
- Standard 19" rack configuration.
- Terminal block input / stud, bus bar output.
- Remote inhibit.
- Sturdy handle for ease of insertion / removal.
- Locking mechanism to ensure complete connection.
- Circuit breaker, on/off switch.
- Isolation diodes for redundant / parallel operation.
- MTBF >150,000 Hrs

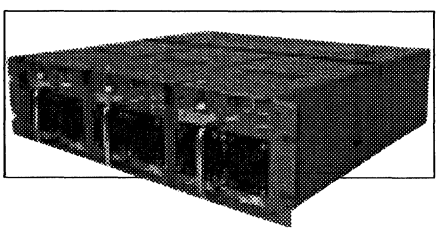
AVAILABLE OPTIONS

- Power Factor Correction (TDL, NTDM Series).
- Militarized for high shock and vibration.
- Low Voltage Battery Disconnect (LVBD) battery back-up operation.
- 400 Hz input.
- Meters (TDL, NTDM Series).
- Circular Connectors (MS type).
- Chassis slides.

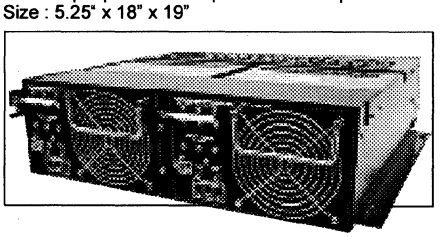
LTBC-HS/TCP-HS SERIES
Total output power 3kW up to 3 modules per rack.
Size : 3.5" x 18" x 19"



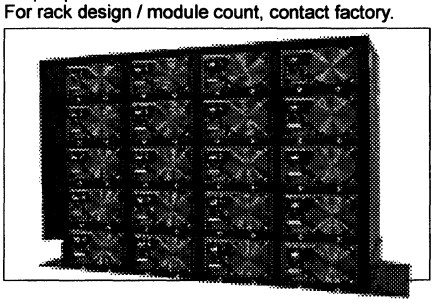
TDL-HS SERIES
Total output power 4.5 kW up to 3 modules per rack.
Size : 5.25" x 18" x 19"



NTDM-HS SERIES
Total output power 6kW up to 2 modules per rack.
Size : 5.25" x 18" x 19"



CUSTOM CONFIGURATIONS
Output power from 1kW to 75kW.
For rack design / module count, contact factory.



SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

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Fax on Demand 1-800-548-2183

ISO 9002
A5269

APPLIED POWER CONVERSION
a division of
TECHNOLOGY DYNAMICS INC.
100 School Street, Bergenfield, NJ 07621
Phone (201) 385-0500 FAX (201) 385-0702

apx TECHNOLOGIES INC.

Introduction

APX and its staff have been extensively involved in transformers and packaged power since the inception of the external power supply concept, more than 20 years ago.

We are a global manufacturing company with local engineering support. As such, we are recognized experts in producing specialized custom and standard products, all in our facilities in the Far East.

Facilities

Manufacturing is performed in modern, cost-effective plants at APX Taiwan and China to insure you competitive benefits with rigid quality control.

APX is headquartered in New York and represented nationally, providing you with convenient easy access to product design, ongoing engineering support, customer service, and shipment control.

Products

Audio Transformers
Telecom Coupling Transformers
Modem Transformers
Power Transformers
Pulse Transformers
HF Transformers and Toroids
AC Output Adapters
DC Output Adapters
Regulated Linear Power Supplies
Battery Chargers
International Power Supplies
External Switchmode Power

Capabilities

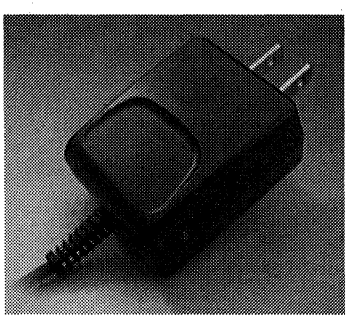
We have successfully supported our client base for 20 years with:

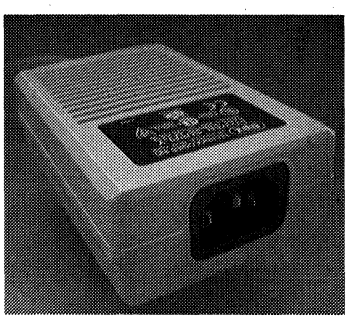
- Design and Engineering
- Product and Application Analysis
- Custom Tooling and Package Molding
- Safety Agency Certification

Applications

Hand Held Products
Data Storage
Card Readers
Bar Code Equipment
Power Supplies
Timing Devices
Security Systems
Modems
Networking Hardware
Medical Instrumentation
Computer Peripherals
Voice Band Telephony Products
High Frequency, Data Transmission
Set-Top TV/Cable Converters

EXTERNAL SWITCHING POWER SUPPLIES





Features

Smallest Case Sizes for Output Levels
Overvoltage Protection
Overcurrent Protection
Input Surge Current Protection
100% Burn-In
Meet IEC Class B Emission Limits
Typical Line Regulation +/- 0.5%
Typical Load Regulation +/- 5%
Ripple and Noise 1% Max

Configuration

Bladed Plug-In for Power Strips, all country specific plugs. Desk Top with IEC 320 Input Connector
Choice of Output Connectors

Output Power

5 Watts
10 Watts
15 Watts
20 Watts
30 Watts
40 Watts
50 Watts
60 Watts

Input Voltage

120 VAC
230 VAC
Universal Input - 90 to 264 VAC

Output Voltage

Single Output from 5 through 40 VDC
Dual and Triple Outputs

See Our Transformers
Vol. A, Section 5600
Pages
A-2116—A-2119

Call Your APX Representative for Details

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Tel. (516) 433-1313 • Fax: (516) 433-1457 • E-Mail: apx@apxonline.com

apx TECHNOLOGIES INC.

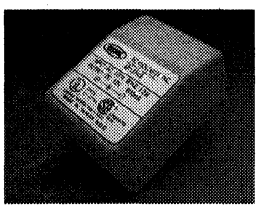
AC AND DC OUTPUT UNREGULATED ADAPTERS

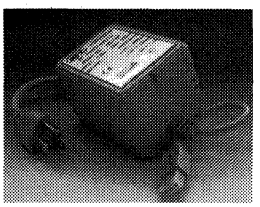
Standard Products, North American Applications, Input 120VAC, 60Hz

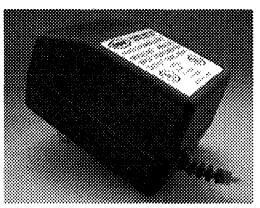
APX Manufactures a comprehensive family of standard adapters. A representative list is shown here...

Bold face listings are generally readily available from distribution. These are off-the-shelf standard, wall plug-ins with 2.5 x 5.5 x 11mm female connectors. Many in-between voltages and currents are also available, with safety agency approvals. Where indicated, desk top cases are available by adding "D" to the part model number. All are available with a variety of output connectors.

Consult your APX representative for international input voltage types and options.







AC to AC Adapters

OUTPUT VAC	CASE	SIZE	MODEL	UL	CSA/CUL
4.5 @ 300mA	WPI	35	APA0403	X	X
4.5 @ 500	WPI	35	APA0405	X	X
4.5 @ 1200	WPI, DT	41	APA0412	X	X
6 @ 200	WPI	35	APA0602	X	X
6 @ 400	WPI	35	APA0604	X	X
6 @ 800	WPI, DT	41	APA0608	X	X
6 @ 1200	WPI, DT	41	APA0612	X	X
6 @ 1500	WPI, DT	48	APA0615	X	X
7.5 @ 200	WPI	35	APA0702	X	X
7.5 @ 400	WPI	35	APA0704	X	X
7.5 @ 600	WPI, DT	41	APA0706	X	X
7.5 @ 1000	**WPI,** DT	41	**AP3379W**	**X**	**X**
7.5 @ 1200	WPI, DT	41	APA0712	X	X
9 @ 200	WPI	35	APA0902	X	X
9 @ 300	WPI	35	APA0903	X	X
9 @ 400	WPI	35	AP2855	X	X
9 @ 600	WPI, DT	41	APA0906	X	X
9 @ 700	WPI, DT	41	APA0907	X	X
9 @ 1000	**WPI,** DT	41	**AP3141W**	**X**	**X**
9 @ 1200	WPI, DT	48	APA0912	X	X
9 @ 1500	**WPI**	57	**AP3305W**	**X**	**X**
12 @ 150	WPI	35	APA1201	X	X
12 @ 200	WPI	35	APA1202	X	X
12 @ 300	**WPI**	35	**AP3070W**	**X**	**X**
12 @ 500	WPI, DT	41	APA1205	X	X
12 @ 800	**WPI,** DT	41	**AP3378W**	**X**	**X**
12 @ 1000	**WPI,** DT	48	**AP1795W**	**X**	**X**
12 @ 1670	**WPI**	**57**	**AP2013W**	**X**	**X**
12 @ 4500	DT	66	AP1985	X	X
13.5 @ 1000	WPI, DT	48	APA1310	X	X
14 @ 2800	WPI	57	AP3125	X	X
15 @ 200	WPI	35	APA1502	X	X
15 @ 500	**WPI,** DT	41	**AP3377W**	**X**	**X**
15 @ 600	WPI, DT	41	AP2540	X	X
15 @ 700	WPI, DT	48	APA1507	X	X
15 @ 1000	WPI	57	APA1510	X	X
18 @ 200	WPI	35	APA1802	X	X
18 @ 500	WPI, DT	41	APA1805	X	X
18 @ 600	WPI, DT	48	APA1806	X	X
18 @ 1000	WPI	57	APA1810	X	X
19.5 @ 800	**WPI**	57	**AP2513W**	**X**	**X**
22 @ 1500	DT	57	AP2217	X	X
24 @ 150	WPI	35	APA2401	X	X
24 @ 400	WPI, DT	41	APA2404	X	X
24 @ 570	**WPI,** DT	48	**AP3376W**	**X**	**X**
26 @ 2250	**DT**	66	**AP3569W**	**X**	**X**

Case designations: WPI = Wall Plug-In
DT = Desk Top (cable to cable)

Call Your APX Representative for Variations

AC to DC Adapters

OUTPUT VDC	CASE	SIZE	MODEL	UL	CSA/cUL
3 @ 500mA	WPI	35	APD0305	X	X
3 @ 1500	WPI, DT	41	APD0315	X	X
4.2 @ 100	WPI	35	APD0401	X	X
4.5 @ 500	WPI	35	APD0405	X	X
4.5 @ 1200	WPI, DT	41	APD0412	X	X
6 @ 200	WPI	35	APD0602	X	X
6 @ 400	**WPI**	**35**	**AP3155W**	**X**	**X**
6 @ 800	WPI, DT	41	APD0608	X	X
6 @ 1000	**WPI,** DT	**41**	**AP3374W**	**X**	**X**
6 @ 1200	WPI, DT	48	APD0612	X	X
6 @ 1500	WPI, DT	48	APD0615	X	X
7.5 @ 200	WPI	35	APD0702	X	X
7.5 @ 400	WPI	35	APD0704	X	X
7.5 @ 600	WPI, DT	41	APD0706	X	X
7.5 @ 900	WPI, DT	41	APD0709	X	X
7.5 @ 1200	WPI, DT	48	APD0712	X	X
8 @ 1200	WPI, DT	48	APD0812	X	X
9 @ 200	WPI	35	AP2911	X	X
9 @ 300	WPI	35	APD0903	X	X
9 @ 400	WPI	35	APD0904	X	X
9 @ 500	**WPI,** DT	**41**	**AP1325W**	**X**	**X**
9 @ 700	WPI, DT	41	APD0907	X	X
9 @ 800	WPI, DT	41	APD0908	X	X
9 @ 1000	**WPI,** DT	**48**	**AP2072W**	**X**	**X**
9 @ 1200	WPI, DT	48	APD0912	X	X
9 @ 1500	WPI	57	APD0915	X	X
10 @ 1000	WPI, DT	48	APD1010	X	X
12 @ 100	WPI	35	APD1201	X	X
12 @ 300	**WPI**	**35**	**AP2974W**	**X**	**X**
12 @ 500	**WPI,** DT	**41**	**AP3745W**	**X**	**X**
12 @ 600	**WPI,** DT	**41**	**AP3375W**	**X**	**X**
12 @ 800	WPI, DT	48	APD1208	X	X
12 @ 1000	**WPI,** DT	**48**	**AP3745W**	**X**	**X**
12 @ 1500	WPI	57	AP1828	X	X
12 @ 2500	DT	66	AP2410	X	X
13 @ 700	WPI, DT	48	APD1307	X	X
13.5 @ 1300	WPI	57	APD1313	X	X
15 @ 200	WPI	35	APD1502	X	X
15 @ 400	**WPI,** DT	**41**	**AP2848W**	**X**	**X**
15 @ 700	WPI, DT	48	APD1507	X	X
15 @ 900	**WPI**	**57**	**AP2637W**	**X**	**X**
15 @ 1000	WPI	57	APD1510	X	X
15 @ 2000	DT	66	AP2783	X	X
18 @ 200	WPI	35	APD1802	X	X
18 @ 400	WPI, DT	41	AP2925	X	X
18 @ 600	WPI, DT	48	APD1806	X	X
18 @ 800	**WPI**	**57**	**AP2990W**	**X**	**X**
18 @ 1000	WPI	57	APD1810	X	X
24 @ 100	WPI	35	APD2401	X	X
24 @ 300	WPI, DT	41	APD2403	X	X
24 @ 570	**WPI,** DT	**48**	**AP2654W**	**X**	**X**
26 @ 750	WPI	57	AP3029W	X	X

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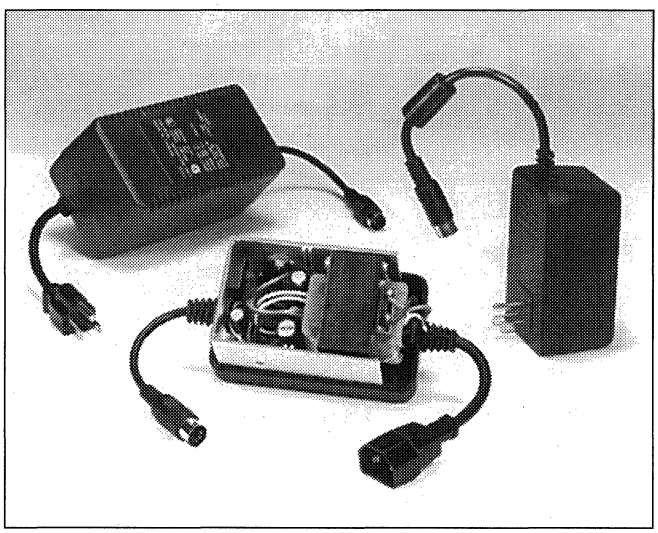
apx TECHNOLOGIES INC.

REGULATED LINEAR EXTERNAL POWER SUPPLIES

APX Manufactures a comprehensive range of linear, regulated power supplies, and with the extensive options available we can optimize a design to your applications.



Benefits

- Regulation is external to your product. You reduce size, weight, heat and increase reliability.
- Removes line voltage from your product, simplifying safety issues.
- You can market your product worldwide without modification, and can update or redesign without safety agency issues. They are our responsibility.

Typical Features & Specifications

- Single or multiple outputs
- Typical North American input: 120VAC +/-10%, 60Hz
- Typical line regulation: less than 1%
- Typical load regulation: less than 5%
- No minimum load requirement for regulation
- Very low noise, typically 10mV peak to peak
- Inherently low EMI, RFI
- Typical operating temperature: 0 to 40 degrees C
- One Year Warranty

A representative list is presented here of standard models, readily available from distribution.

NORTH AMERICAN APPLICATION 120VAC 60HZ INPUT

Consult your APX representative for international input voltage types and options.

Bold face listings are generally readily available from distribution.

Standard Single Output

Part Number	DC O/P 1	Case	Size	Agency*			
				UL	CSA	NRTL	C
AP2771W	**+5V @ 300mA**	**WPI**	**41**	**X**	**X**		
AP3291W	**+5V @ 600mA**	**WPI**	**48**	**X**	**X**		
AP3360W	**+5V @ 1000mA**	**WPI, DT**	**57**	**X**	**X**		
AP3370W	**+5V @ 1500mA**	**WPI, DT**	**57**	**X**	**X**		
AP3549	+5V @ 1750mA	DT	57	X	X		
AP2990	+8V @ 700mA	WPI	48			X	X
AP2107W	**+9V @ 500mA**	**DT**	**48**			**X**	**X**
AP3551	+9V @ 700mA	WPI	48			X	X
AP3390W	**+9V @ 1000mA**	**WPI**	**57**	**P**	**P**		
AP2164W	**+12V @ 500mA**	**WPI, DT**	**48**	**X**	**X**		
AP3550W	**+12V @ 1000mA**	**WPI**	**57**	**X**	**P**		
AP3720W	**+12V @ 1200mA**	**DT**	**60**	**X**	**P**		
AP3380	+15V @ 1000mA	DT	60	P	P		
AP1957W	**+24V @ 250mA**	**DT**	**48**	**X**	**P**		

Standard Dual Output

Part No.	DC O/P 1	DC O/P 2	Case	Size	Agency*	
					UL	CSA
AP3552	5V @ 400mA	+12V @ 500mA	DT	57	X	X
AP3810	+5V @ 500mA	+10V @ 100mA	WPI	48	X	X
AP3236	+5V @ 600mA	+12V @ 1000mA	DT	60	X	X
AP3555W	**+5V @ 1000mA**	**+12V @ 400mA**	**DT**	**57**	**X**	**X**
AP3553	+5V @ 1500mA	+12V @ 200mA	DT	57	X	X
AP3606W	**+5.1V @ 750mA**	**+12V @ 700mA**	**DT**	**60**	**X**	**X**
AP3554	+6.25V @ 500mA	+12V @ 700mA	DT	57	X	X
AP1914W	**+6.25V @ 1000mA**	**+12V @ 500mA**	**DT**	**57**	**X**	**X**
AP3556	+6.25V @ 1750mA	+12V @ 100mA	DT	57	X	X
AP3166	+15V @ 600mA	-15V @600mA	DT	66	P	P

Standard Triple Output

Part No.	DC O/P 1	DC O/P 2	DC O/P3	Case	Size	Agency*	
						UL	CSA
AP3718W	**+5V @ 450mA**	**+12V @ 100mA**	**-12V @ 100mA**	**WPI**	**48**	**X**	**X**
AP3263W	**+5V @ 700mA**	**+12V @ 400mA**	**-12V @ 100mA**	**DT**	**60**	**X**	**P**
AP2808W	**+5V @ 800mA**	**+12V @ 300mA**	**-12V @ 300mA**	**DT**	**57**	**X**	**X**
AP3271W	**+5V @ 1100mA**	**+12V @ 900mA**	**-12V @ 100mA**	**DT**	**66**	**X**	**X**
AP3363W	**+5V @ 1000mA**	**+12V @ 500mA**	**-12V @ 500mA**	**DT**	**66**	**X**	**X**
AP3665	+5V @ 1500mA	+12V @ 1100mA	-12V @ 100mA	DT	66	X	X
AP2700W	**+5V @ 500mA**	**+15V @ 200mA**	**-15V @ 200mA**	**WPI**	**57**	**P**	**P**
AP2844	+5V @ 1000mA	+15V @ 120mA	-15V @ 120mA	WPI	57	P	P
AP2759	+5V @ 1000mA	+15V @ 400mA	-15V @ 400mA	DT	66	P	P
AP3039	+5V @ 1500mA	+15V @ 500mA	-15V @ 200mA	DT	66	P	P
AP3297	+8V @ 850mA	+12V @ 150mA	-12V @ 150mA	DT	48	X	X

Higher current output available as regulated switchmode supply — consult sales.

*P = Pending

See Our Transformers
Vol. A, Section 5600
Pages
A-2116 — A-2119

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apx TECHNOLOGIES INC.

REGULATED LINEAR EXTERNAL POWER SUPPLIES

International Application 230VAC, 50Hz Input

All European and Pacific Rim input voltages and plugs available.
Consult your APX representative for availability of international input unregulated adapters.
Bold face listings are generally readily available from distribution.

Standard Single Output

Part Number	Output	Case	Size	Agency*
AP2771EW	**5V @ 300mA**	**DT**	**48**	**TUV**
AP2703EW	**5V @ 750mA**	**DT**	**48**	**TUV**
AP2865EW	**12V @ 300mA**	**WPI**	**48**	**TUV**
AP3820EW	**12V @ 1200mA**	**DT**	**60**	**TUV**

Standard Dual Output

Part No.	Output 1	Output 2	Case	Size	Agency*
AP3237E	+5V @ 500mA	+12V @ 100mA	DT	48	P
AP3548E	+5V @ 600mA	+12V @ 1000mA	DT	60	TUV
AP3606E	+5V @ 750mA	+12V @ 700mA	DT	60	TUV
AP3166E	+15V @ 600mA	-15V @ 600mA	DT	66	TUV

Standard Triple Output

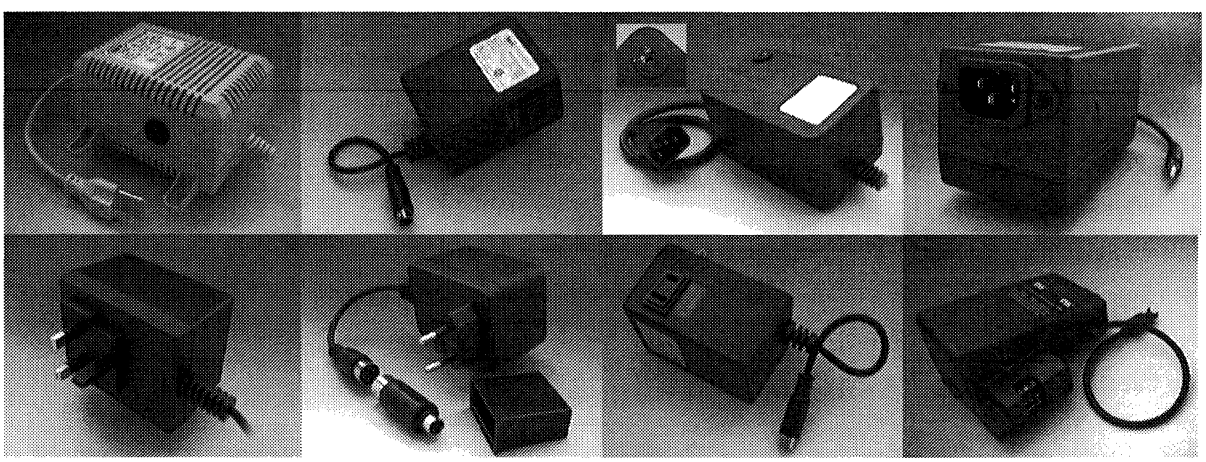
Part Number	Output 1	Output 2	Output 3	Case	Size	Agency*
AP2583EW	**+5V @ 450mA**	**+12V @ 100mA**	**-12V @ 100mA**	**DT**	**EI48**	**TUV**
AP3264EW	**+5V @ 700mA**	**+12V @ 400mA**	**-12V @ 100mA**	**DT**	**EI60**	**TUV**
AP3272EW	**+5V @ 1100mA**	**+12V @ 900mA**	**-12V @ 100mA**	**DT**	**EI66**	**TUV**

Higher current available as regulated switchmode supply — consult sales. *P = Pending

BABT IEC

CUSTOM DESIGN

We are external power supply specialists and provide product development and excellence, to uniquely optimize to your needs, and at a very effective cost.



CUSTOM OPTIONS INCLUDE:

- Single or multiple outputs
- All European and Pacific Rim input voltages and plugs available
- IEC-320 input
- International plug styles
  - Molded in base of wall plug-in or
  - Cord-set input on desk top units
  - Available for all countries
- Switchable input
- Ground to core and/or output
- Power-on switch
- Power-on LED
- Screw-down mounting tabs on desk top case
- Center tap designs available on AC output models
- RF/EMI and transient protection
- Custom tooling and molding available for cases, as well as output connectors for your product interface
- Custom colors for cases and cables
- Custom labels with your artwork
- Externally resettable circuit breaker
- Output connector filtering for EMI containment
- Huge variety of input and output voltage combinations
- Huge variety of output connectors
- Special designs to medical/dental UL544 standards

See our additonal pages in Section D•4000

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(860) 354 6975 or Fax (860) 354 6865 Advance INTERNATIONAL

Advance Hivolt

For over 25 years Advance Hivolt has been the world's leading innovator in high voltage power.

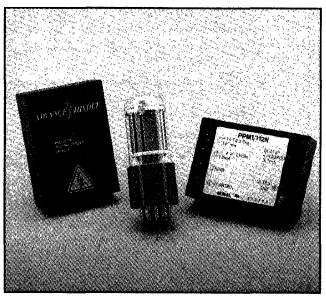
Meeting all latest legislation regarding EMC and LVD, Advance Hivolt is one of the few high voltage companies to hold ISO9001 accreditation.

Our products range from simple modules to sophisticated high voltage systems; our understanding of your requirements is your guarantee of cost-effective results.
Our product range includes:

- **Custom designs from 100V - 500kV.**
- **DC-DC Converters.**
- **Ink-Jet Printer Supplies.**
- **Photomultiplier Modules.**
- **Precision Scientific Modules.**
- **Bench Supplies.**
- **Laser Supplies.**
- **X-Ray Supplies.**
- **Electron Gun Supplies.**
- **CRT Supplies.**
- **Ion Implantation Power Supplies.**
- **High Voltage Instruments.**

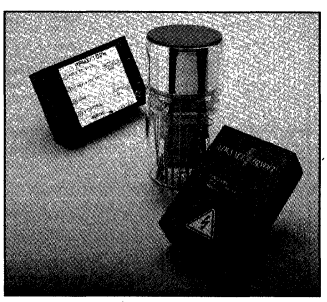
PPM1/112 This compact, high reliability, 1 watt photomultiplier power supply module has considerable advantages in size, weight and specification over other competitive units for Photomultiplier applications and has a wide supply voltage range.

Input:	14V to 23VDC.
Input Current:	140mA max.
Output Voltage:	-1100V max.
Output Current:	700uA max.
Load Regulation:	<0.1V (100ppm) output change, for a change from 0 to full load current..
Line Regulation:	<0.1V (100ppm) output change, for a change of input supply from 14V to 23V.
Output Ripple:	<25mV peak to peak at - 1100V 700uA.



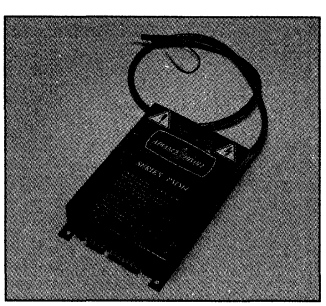
PPM3/102 This compact, high reliability, 3 watt photomultiplier power supply module has considerable advantages in size, weight and specification over competitive units for Photomultiplier applications and has a wide supply voltage range.

Input Voltage:	21V to 27V DC.
Input Current:	240mA max.
Output Voltage:	1000V max in positive or negative polarity.
Output Current:	3mA (minimum load impedance 50kΩ).
Load Regulation:	<0.1V (100ppm) output change, for a change from 0 to full load current.
Line Regulation:	<0.1V (100ppm) output change, for a change of input supply from 14V to 23V.
Output Ripple:	<15mV peak to peak, typically 5mV.



PMM4 The Series PMM4 is a range of versatile high voltage modules which have extremely low output ripple, and exceptionally good voltage regulation. All models are UL and UL(C) approved.

Input Voltage:	Standard: +23V to +30V DC. Option 1: ±12V to ±18V DC.
Input Current:	400mA max.
Output Voltage:	500V, 1kV or 2kV modules are available in both negative or positive polarity.
Output Power:	4 Watts.
Load Regulation:	<0.001% for a 0 to 100% load change.
Line Regulation:	<0.001% for a 0.3V change in input voltage.



PSM10 The Series PSM10 is a range of versatile high voltage modules equally suited to laboratory and development work and for specification in OEM equipment.

Input Voltage:	22V to 26V DC.
Input Current:	1A max. (650mA typical).
Output Voltage:	2, 5, 10 and 15kV modules are available in both negative or positive polarity.
Load Regulation:	<0.005% for a change in output current from 0 to max output current at maximum output voltage.
Line Regulation:	<0.005% for a 22 to 26V change in input voltage at maximum output power.

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FOR LOW VOLTAGE POWER SUPPLIES CONTACT:
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Facsimile **(440) 349 0142**

FOR INSTRUMENTS AND ATE CONTACT:
Wayne Kerr, Inc.
Telephone **(781) 938 8390**
Facsimile **(781) 933 9523**

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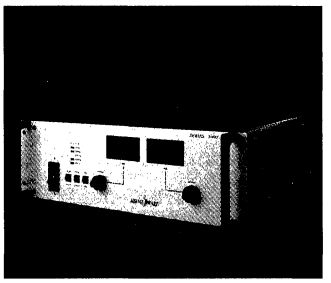
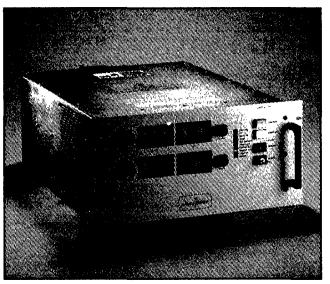
Advance INTERNATIONAL

OL1000 The series OL1000 incorporates the latest switch-mode technology to achieve a high performance and excellent reliability within a compact and lightweight assembly.



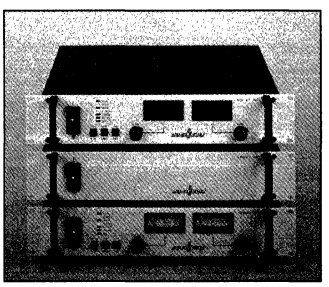
Input :	99V to 132V or 187V to 264V AC factory set options. 47Hz to 63Hz single phase.
Output Power:	1000W.
Output Voltages:	1,2,5,10,20,30,40,60 and 80KV models are available in both negative and positive polarity.
Load Regulation:	Voltage mode: 0.1% of rated output voltage +1V for 0 to 100% change in current.
	Current mode: 0.5% of rated output current +0.5%mA for 0 to 100% change in voltage.
Ripple:	0.1% pk to pk (0.035% rms) of rated voltage +2V, peak to peak.

XR4000 The Series XR4000 is intended for use in industrial analytical X-ray systems and low energy industrial radiography applications. The XR4000 features Advance Hivolt's proven IGBT converter design, and lightweight, air-insulated, high voltage assembly. Tube arc suppression and numerous safety interlocks are standard.



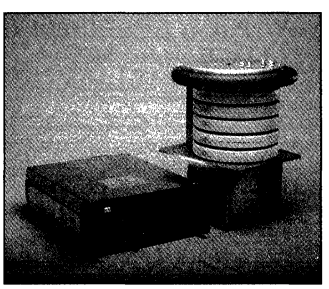
Input Supply:	47 to 63Hz, 187 to 242VAC single phase at 32A rms max.
Input Power:	4kW maximum.
Efficiency:	>85% at 60kV 66mA.
Output Voltage:	0 to 60kv supplied via Federal Standard X-ray connector available in both negative and positive polaritys.
Output Current:	66mA maximum at 60kV, rising to 120mA maximum at 33kV.
Load Regulation:	<0.005% of rated voltage for full load range.
Line Regulation:	<0.005% of rated voltage over specified input range.

OL330/400 The Series OL330 and OL400 incorporate the latest switch-mode technology to achieve a high performance and excellent reliability within a compact and lightweight assembly. The design utilises high frequency, Mosfet switching techniques, incorporating low RDS (ON) Mosfets switched at 50kHz, combined with non-dissipative snubbing to achieve a high power to volume ratio.



Input Supply:	47 to 440Hz single phase, 99V to 132V AC or 187V to 262V AC.
Efficiency:	>80% at full power.
Output Power:	330W or 400W.
Output Voltage:	10, 20, 30, 40, 60 and 80kV models are available in both negative and positive polaritys.
Line Regulation:	0.05% of rated maximum output voltage for 10% line change.
Load Regulation:	Voltage mode: 0.05% change at maximum output voltage for 0 to 100% change in current.
	Current mode: 0.5% of rated output for 0 to 100% change in voltage.
Ripple:	0.1% pk to pk (0.035% rms) of rated voltage.

OL8000 The series OL8000 is a high reliability product designed to meet the rigorous requirements of Ion and Electron Beam systems within a compact assembly. The power converter uses a unique NON-DISSIPATIVE snubber which keeps the main power IGBT's cool, enhancing their long term reliability. The high voltage modules are based on Advance Hivolt's proprietary DISC technology, to achieve the ultimate performance and reliability.



Input Supply:	48 to 62Hz 3-phase and earth, 187V to 229V AC rms at 34A per phase.
Efficiency:	>80% at full load and rated output voltage.
Output Power:	8kW.
Output Voltage:	80, 100, 120, 160, 180 and 200kV models are available in both negative and positive polaritys.
Load Regulation:	0.02% of rated output voltage for 10% variation in supply voltage.
Load Regulation:	0.05% of rated output for 1% to 100% change in load current. Where 100% is the rated current at rated voltage.
Ripple:	Standard unit: 0.2% peak to peak of rated output voltage.

Series GM The Series GM is a unique range of low cost, general-purpose high voltage DC to DC converters. Output voltages are available in the range 100V to 3kV depending on model. All units are configured for direct PCB mounting, thus enabling them to be "designed in" to equipment as a component.

Input Voltage:	12V to 24DC
Efficiency:	>50% at 1.5W load
Output Power:	1.5W max
Output Voltage:	100V, 200V, 300V, 500V, 1kV, 1.5V, 2kV and 3kV models are available in both negative and positive polaritys
Line Regulation:	Output is proportional to Input over a 10% to 100% input range, with a variation of ± 10% of rated output voltage
Load Regulation:	Typically <10% (for a zero to 1.5W load change) maximum 20%
Ripple:	1% pk to pk (0.1% screened case version)

For further information please contact Doug Steers on:

(860) 354 6975

Fax: (860) 354 6865 Email: sales@advance-hivolt.com

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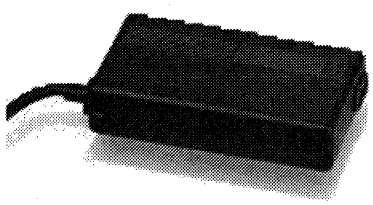
Expect More From Artesyn Technologies

Artesyn Technologies is a newly formed company that combines the vast resources of Computer Products, Zytec, Elba of Germany and KRP of Holland. Artesyn Technologies has eleven dedicated design centers that span three continents in six countries. Our range of power products with AC or DC input include open frame, enclosed and encapsulated supplies with output power levels from 0.5 to 4,000 Watts. Artesyn Technologies' focus is on providing the lowest total cost of ownership through quality manufacturing, reliable product design, superior technical support and on-time delivery.

SSL External Supplies



- 20W & 40W external power supplies
- 20W: 4.21 x 2.24 x 0.98 inch enclosure
- 40W: 4.21 x 1.77 x 0.98 inch enclosure
- Molded UL94V-0 plastic enclosure
- Output connector options
- Stand alone 'listed' equipment
- Overvoltage and short circuit protection
- EN55022, EN55011, FCC conducted and radiated emissions level B
- UL, CSA and VDE safety approvals

NEW

[2 YEAR WARRANTY]

CE (LVD & EMC) (Pending)

SSL20

OUTPUT VOLTAGE	OUTPUT CURRENT MIN	OUTPUT CURRENT MAX	PEAK (1)	RIPPLE(2)	TOTAL(3) REGULATION	MODEL (4) NUMBER
+5V	0A	4.0A	4.5A	50mV	±2.0%	SSL20-7605
+12V	0A	1.67A	1.9A	120mV	±2.0%	SSL20-7612
+24V	0A	0.83A	1.0A	150mV	±2.0%	SSL20-7624
+48V	0A	0.42A	0.5A	150mV	±2.0%	SSL20-7617
+5V	0.2A	1.2A	1.5A	50mV	±2.0%	SSL20-7629
+12V	0.1A	0.8A	1.2A	120mV	±5.0%	
+5V	0.2A	1.0A	1.5A	50mV	±2.0%	SSL20-7607
+12V	0.1A	0.8A	1.2A	120mV	±5.0%	
-5V	0A	0.1A	1.0A	50mV	±5.0%	

SSL40

OUTPUT VOLTAGE	OUTPUT CURRENT MIN	OUTPUT CURRENT MAX	PEAK(1)	RIPPLE (2)	TOTAL (3) REGULATION	MODEL (4) NUMBER
+12V	0A	3.0A	3.5A	250mV	±2.0%	SSL40-7612
+14V	0A	2.7A	3.2A	250mV	±2.0%	SSL40-7614
+15V	0A	2.6A	3.0A	250mV	±2.0%	SSL40-7615
+18V	0A	2.2A	2.6A	250mV	±2.0%	SSL40-7618
+24V	0A	1.6A	1.9A	250mV	±2.0%	SSL40-7624
+48V	0A	0.83A	1.0A	250mV	±2.0%	SSL40-7617

NOTES: (1) Peak output current lasting less than 60 seconds with duty cycle less than 50%. During peak loading, output voltage may exceed total regulation limits. (2) 20MHz bandwidth, peak to peak, measured differentially with a twelve inch twisted pair of number 16 AWG copper wire, terminated with a 47µF capacitor of proper polarity and voltage rating. (3) Total regulation is defined as the static output regulation at 25°C including initial tolerance, line voltage within stated limit, load current within stated limit, and output voltage adjusted to their factory settings. (4) Single output SSL models have a 2.5mm jack plug connector. Multiple output SSL20 models have an 8 pin mini-DIN connector. Other connectors are available, please contact Artesyn Technologies for details.

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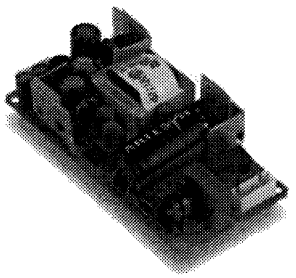
NLP25



3.86 x 1.81 x 0.91 inch package
Overvoltage protection and short circuit protection
25W with free air convection cooling
EN55022, EN55011 conducted emissions level B
EN61000-4-2, -3, -4, -5, -6 compliant
UL, VDE and CSA safety approvals

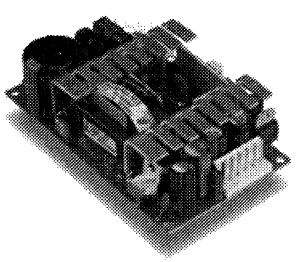
NEW

[2 YEAR WARRANTY]
CE (LVD)

OUTPUT VOLTAGE	OUTPUT CURRENT MIN	OUTPUT CURRENT MAX	PEAK (1)	RIPPLE (2)	TOTAL REGULATION (3)	MODEL NUMBER
+5V	0.2A	2.0A	2.5A	50mV	±2.0%	NLP25-7608
+12V	0.1A	0.8A	1.2A	120mV	±5.0%	
-12V	0A	0.1A	1.0A	50mV	±5.0%	
+5V	0.2A	2.0A	2.5A	50mV	±2.0%	NLP25 -7629
+12V	0.1A	0.8A	1.2A	120mV	±5.0%	
+5V	0A	5.0A	6.0A	50mV	±2.0%	NLP25 - 7605
+12V	0A	2.08A	3.0A	120mV	±2.0%	NLP25 - 7612
+24V	0A	1.04A	1.5A	150mV	±2.0%	NLP25 - 7624
+48V	0A	0.52A	0.6A	150mV	±2.0%	NLP25 - 7617

NOTES: (1) Peak output current lasting less than 60 seconds with duty cycle less than 50%. During peak loading, output voltage may exceed total regulation limits. (2) 20MHz bandwidth, peak to peak, measured differentially with a twelve inch twisted pair of number 16 AWG copper wire, terminated with a 47µF capacitor of proper polarity and voltage rating. (3) Total regulation is defined as the static output regulation at 25°C including initial tolerance, line voltage within stated limit, load current within stated limit, and output voltage adjusted to their factory settings.

NLP40



- 4.25 x 2.5 x 1.15 inch package (1U applications)
- Smallest industry package
- Overvoltage and short circuit protection
- 40W with free air convection
- EN61000-4-2, -3, -4, -5, -6 immunity compliant
- EN55022, EN55011 conducted emission level B
- UL, VDE, CSA and BABT safety approvals

[2 YEAR WARRANTY]
CE (LVD)

OUTPUT VOLTAGE	OUTPUT CURRENT MAX(1)	OUTPUT CURRENT PEAK (2)	OUTPUT CURRENT FAN (1)	RIPPLE (3)	TOTAL REGULATION	MODEL NUMBER
+5V	4.0A	5.0A	4.5A	50mV	±2.0%	NLP40-7608(4)
+12V	2.0A	3.0A	3.0A	120mV	±5.0%	
-12V	0.2A	1.0A	0.5A	120mV	±5.0%	
+5V	4.0A	5.0A	4.5A	50mV	±2.0%	NLP40-7610(4)
+15V	1.6A	2.0A	2.0A	150mV	±5.0%	
-15V	0.2A	1.0A	0.5A	150mV	±5.0%	
+12V	1.8A	2.2A	2.1A	120mV	±2.0%	NLP40-7627(4)
-12V	1.8A	2.2A	2.1A	120mV	±5.0%	
+5V	4.0A	5.0A	4.5A	50mV	±2.0%	NLP40-7629(4)
+12V	2.0A	3.0A	3.0A	120mV	±5.0%	
5V	8.0A	10A	9.0A	50mV	±2.0%	NLP40-7605
12V	3.3A	4.5A	4.0A	120mV	±2.0%	NLP40-7612
15V	2.6A	3.6A	3.3A	150mV	±2.0%	NLP40-7615
24V	1.6A	2.5A	2.0A	240mV	±2.0%	NLP40-7624
48V	0.8A	1.1A	1.0A	300mV	±2.0%	NLP40-7617

NOTES: (1) Natural convection cooling (40W maximum).20CFM forced air cooling (50W max.). (2)Peak output current lasting less than 60 seconds with duty cycle less than 5%. During peak loading, output voltage may exceed total regulation limits. (3) Figure is peak-to-peak. Output noise measurements are made across a 50MHz bandwidth using a 12" twisted pair, terminated with a 47µF capacitor. (4) For multiple output units to maintain their stated regulation then: $0.25 \leq I(A)\backslash I(B) \leq 5$, for $I(B) > 0.3A$; $0.5 \leq I(A)\backslash I(B) \leq 5$, for $I(B) > 0.3A$. For maximum output current I(C) on triple output models, i.e. for I(C)=IMax, I(A) min. $\geq$0.5A and I(B)$\geq$ I(C).

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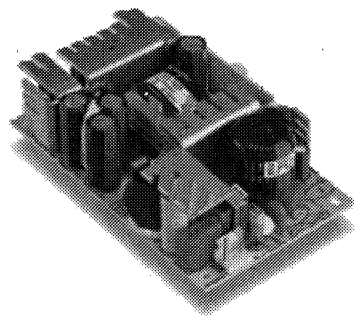
NLP65



[2 YEAR WARRANTY]

CE (LVD)

- 5.0 x 3.0 inch card and 1.26 inch package (1U applications)
- Smallest industry package
- EN61000-3-2 compliance option
- Overvoltage and short circuit protection
- 65W with free air convection cooling
- EN55011 conducted emissions level B EN61000-4-2-3, -4, -5, -6 immunity compliant Enclosure and cover kit options

OUTPUT VOLTAGE	OUTPUT CURRENT MAX (1)	OUTPUT CURRENT PEAK (2)	FAN	RIPPLE (3)	TOTAL REGULATION(4)	MODEL NUMBER (5) Non-Harmonic Corrected	MODEL NUMBER (5) Harmonic Corrected
+5V +12V -12V	7.0A 2.5A 0.65A	9.1A 3.3A 0.81A	8.0A 3.0A 0.8A	50mV 150mV 120mV	±2.0% ±5.0% ±5.0%	NLP65-7608	NLP65-9608
+5V +15V -15V	7.0A 2.2A 0.65A	9.1A 2.9A 0.85A	8.0A 2.5A 0.8A	50mV 150mV 150mV	±2.0% ±5.0% ±5.0%	NLP65-7610	NLP65-9610
+5V +24V	7.0A 2.0A	9.1A 2.6A	8.0A 2.0A	50mV 240mV	±2.0% ±5.0%	NLP65-7620	NLP65-9620
+5V +12V	7.0A 2.5A	9.1A 3.3A	8.0A 3.0A	50mV 150mV	±2.0% ±5.0%	NLP65-7629	NLP65-9629
5V	10.0A	13.0A	12.0A	50mV	±2.0%	NLP65-7605	NLP65-9605
12V	5.4A	7.0A	6.5A	120mV	±2.0%	NLP65-7612	NLP65-9612
15V	4.4A	5.7A	5.3A	150mV	±2.0%	NLP65-7615	NLP65-9615
24V	2.7A	3.5A	3.25A	240mV	±2.0%	NLP65-7624	NLP65-9624

NOTES: (1) Natural convection cooling. Models NLP65-X629, NLP65-X608, NLP65-X610 must not exceed 62.5 watts continuous output power with natural convection. Model NLP65-X620 not to exceed 65 Watts continuous output power with natural convection. (2)Peak output current lasting less than 60 seconds with duty cycle less than 5%. During peak loading, output voltage may exceed total regulation limits. (3) Figure is peak-to-peak for convection power rating. Output noise measurements are made across a 20MHz bandwidth using a 6" twisted pair, terminated with a 10µF electrolytic capacitor and a 0.1µF ceramic capacitor, 150mV for +12 output on NLP65-7608 and NLP65-7629. (4)To maintain stated regulation then: for single output units $I \geq 0.2A$; for multiple output units $0.25 \leq I(A)/I(B) \leq 5$, for $I(A) \geq 0.2A$.

NLP65 Telco Series

- EN61000-3-2 compliant
- EN55022, EN55011 conducted emissions level B
- EN61000-4-2, -3, -5, -6 immunity compliant
- UL, VDE and CSA safety approvals
- 5.0 x 3.0 x 1.26 package (1U applications)
- Individually regulated outputs
- No minimum load required
- EN61000-3-2 compliance option

[2 YEAR WARRANTY]

CE (LVD)

OUTPUT VOLTAGE	OUTPUT CURRENT MIN	OUTPUT CURRENT MAX (1)	OUTPUT CURRENT PEAK (2)	FAN	RIPPLE (3)	TOTAL REGULATION	MODEL NUMBERS Non-Harmonic Corrected	MODEL NUMBERS Harmonic Corrected	MODEL NUMBERS Ground Pin
+5V +12V -12V	0.A 0.A 0.A	7.5A 1.0A 0.65A	9.1A 1.0A 0.65A	9.0A 1.25A 0.8A	50mV 120mV 120mV	±2.0% ±5.0% ±5.0%	NLP65-7308	NLP65-9308	NLP65-X308G
+5V +15V -15V	0.A 0.A 0.A	7.5A 1.0A 0.65A	9.1A 1.0A 0.65A	9.0A 1.25A 0.8A	50mV 150mV 150mV	±2.0% ±5.0% ±5.0%	NLP65-7310	NLP65-9310	NLP65-X310G
+5V +24V	0.A 0.A	7.5A 0.5A	9.1A 0.5A	9.0A 0.65A	50mV 240mV	±2.0% ±5.0%	NLP65-7320	NLP65-9320	NLP65-X320G
+5V +12V	0.A 0.A	7.5A 1.0A	9.1A 1A	9.0A 1.25A	50mV 120mV	±2.0% ±5.0%	NLP65-7329	NLP65-9329	NLP65-X329G

Notes: (1) Natural convection cooling. Models NLP65-X320, NLP65-X329 must not exceed 47 watts continuous output power with natural convection. Model NLP65-X310 not to exceed 49.5 watts continuous output power with natural convection. Model NLP65-X308 must not exceed 47 watts continuous output power with natural convection. (2) Peak output current lasting less than 60 seconds with duty cycle less than 5%. During peak loading, output voltage may exceed total regulation limits. (3) Figure in peak-to-peak for convection power rating. Output noise measurements are made across a 20MHz bandwidth using a 6" twisted pair, terminated with a 10µF electrolytic capacitor and a 0.1µF ceramic capacitor. (4) The suffix 'X' in the model number designation may be the number 7 or 9 indicating non-harmonic corrected and harmonic corrected units respectively.

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NLP65 Enclosed

- Metal enclosure
- Output connector on 5 inch flying leads
- IEC320 AC inlet
- Compliance to EN61000-3-2 option
- On/off switch
- Tight auxiliary regulation on TELCO series
- UL, CSA and VDE safety approvals pending

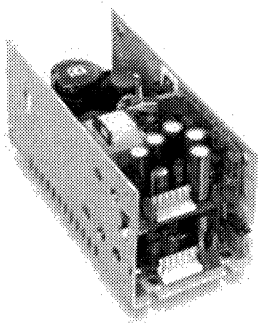
NLP65 TELCO SERIES

OUTPUT VOLTAGE	CURRENT MAX.	CURRENT FAN	POWER MAX.	POWER FAN	MODEL NUMBER
+5V +12V	7.50A 1.00A	9.00A 1.25A	47W	60W	NLP65-X329E
+5V +24V	7.50A 0.5A	9.00A 0.65A	49.5W	75W	NLP65-X320E
+5V +12V - 12V	7.50A 1.00A 0.65A	9.00A 1.25A 0.80A	49.5W	69.8W	NLP65-X308E
+5V +15V -15V	7.50A 1.00A 0.65A	9.00A 1.25A 0.80A	49.5W	75W	NLP65-X310E

NLP65 STANDARD SERIES

OUTPUT VOLTAGE	CURRENT MAX.	CURRENT FAN	POWER MAX.	POWER FAN	MODEL NUMBER
+5V	8.50A	12.0A	42.5W	60W	NLP65-X605E
+12V	3.75A	6.50A	45W	78W	NLP65-X612E
+15V	3.00A	5.30A	45W	79.5W	NLP65-X615E
+24V	2.00A	3.50A	48W	84W	NLP65-X624E
+5V +12V	3.00A 2.00A	3.00A 3.00A	48W	76W	NLP65-X629E
+5V +24V	6.50A 1.00A	8.00A 2.00A	45W	70W	NLP65-X620E
+5V +12V -12V	6.50A 2.00A 0.50A	8.00A 3.00A 0.80A	43W	70W	NLP65-X608E
+5V +15V -15V	6.50A 2.00A 0.50A	8.00A 2.50A 0.80A	43W	70W	NLP65-X610E

NLP150H



6.5 x 3.0 x 3.06 package (2U applications)
Smallest industry footprint
EN61000-3-2 compliant
Overvoltage and short circuit protection
150W with 150LFM
EN55022, EN55011 conducted emissions level B
EN61000-4-2, -3, -5, 06 immunity compliant
UL, VDE and CSA safety approvals

Patent No. 5400246 and 5452200

[2 YEAR WARRANTY]

CE (LVD)

OUTPUT VOLTAGE	OUTPUT CURRENT MIN	OUTPUT CURRENT MAX (1)	PEAK (2)	RIPPLE (3)	TOTAL REGULATION	MODEL NUMBER (4)
5V	3A	30A	36A	50mV	±2.0%	NLP150H-9605
12V	1.25A	12.5A	15A	120mV	±2.0%	NLP150H-9612
13.8V	1.1A	11A	13A	120mV	±2.0%	NLP150H-9614
24V	0.63A	6.3A	7.5A	240mV	±2.0%	NLP150H-9624
48V	0.32A	3.2A	3.75A	480mV	±2.0%	NLP150H-9617
5V 3.3V	1.5A 1.5A	15A 15A	18A 18A	50mV 50mV	±2.0% ±2.0%	NLP150H-9690
5V 12V -12V	1.5A 0.63A 0A	15A 6.3A 0.8A	18A 7.5A 1.0A	50mV 120mV 120mV	±2.0% ±2.0% ±5.0%	NLP150H-9608
5V 15V -15V	1.5A 0.5A 0A	15A 5A 0.8A	18A 6A 1.0A	50mV 150mV 150mV	±2.0% ±2.0% ±5.0%	NLP150H-9610
5V 3.3V 12V -12V	1.5A 1.2A 0A 0A	15A 12A 1.25A 0.8A	18A 15A 1.25A 1.0A	50mV 50mV 120mV 120mV	±2.0% ±2.0% ±5.0% ±5.0%	NLP150H-9691
5V 12V 24V -12V	1.5A 0.63A 0A 0A	15A 6.3A 0.8A 0.8A	18A 7.5A 1.0A 1.0A	50mV 120mV 240mV 120mV	±2.0% ±2.0% ±5.0% ±5.0%	NLP150H-9602

NOTES: (1) 150LFM forced air cooling (150W max.). (2) Peak output current lasting less than 60 seconds with duty cycle less than 5%. During peak loading output voltage may exceed total regulation limits. (3) Figure is peak-to-peak. Ouput noise measurements are made across a 20MHz bandwidth using a 12" twisted pair, terminated with a 47µF capacitor. (4) To order the NLP150 with an enclosure, IEC320 AC inlet, fan and output connector on flying leads, add the suffix 'E' to the model number e.g. NLP150H-96XXE.

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NFS Series

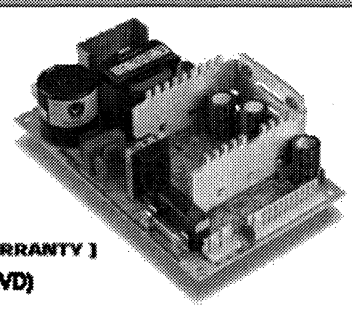
NFS40 Series - Medical Versions Available

- 5.0 x 3.0 x 1.2 inch package (1U applications)
- Industry standard package
- Overvoltage and short circuit protection
- UL, VDE, CSA and BABT safety approvals
- 40W with free air convection

OUTPUT VOLTAGE	OUTPUT CURRENT MAX	PEAK	FAN	RIPPLE	TOTAL REGULATION	MODEL NUMBER
+5.1V	3.0A	7.0A	5.0A	50mV	±2.0%	NFS40-7608
+12.0V	2.0A	3.0A	2.0A	120mV	±5.0%	
-12.0V	0.35A	1.0A	0.5A	120mV	±5.0%	
+5.1V	4.0A	7.0A	5.0A	50mV	±2.0%	NFS40-7628
+12.0V	0.35A	1.0A	0.5A	120mV	±5.0%	
-12.0V	0.35A	1.0A	0.5A	120mV	±5.0%	
+5.1V	3.0A	7.0A	5.0A	50mV	±2.0%	NFS40-7607
+12.0V	2.0A	3.0A	2.0A	120mV	±5.0%	
-5.0V	0.35A	1.0A	0.5A	50mV	±5.0%	
+5.1V	3.0A	7.0A	5.0A	50mV	±2.0%	NFS40-7610
+15.0V	2.0A	2.5A	2.0A	150mV	+10.0%/-3.0%	
-15.0V	0.35A	1.0A	0.5A	150mV	±5.0%	
+5.1V	6.0A	12.0A	8.0A	100mV	±2.0%	NFS40-7605
+12.0V	3.3A	5.0A	4.0A	120mV	±2.0%	NFS40-7612
+15.0V	2.6A	4.0A	3.3A	150mV	±2.0%	NFS40-7615
+24.0V	1.6A	2.5A	2.0A	240mV	±2.0%	NFS40-7624

NFS110 Series - Medical Versions Available

- 7.0 x 4.25 x 1.8 inch package
- Overvoltage and short circuit protection
- 110W with 20CFM
- Adjustable outputs
- EN55022, EN55011 conducted emsissions level B
- UL, VDE, CSA and BABT safety approvals



[2 YEAR WARRANTY]

CE (LVD)

OUTPUT VOLTAGE	OUTPUT CURRENT MAX	PEAK	FAN	RIPPLE	TOTAL REGULATION	MODEL NUMBER
+5.1V	8.0A	20.0A	10.0A	50mV	±2.0%	NFS110-7601P
+12.0V	4.5A	9.0A	5.0A	120mV	±3.0%	
-12.0V	0.5A	1.5A	1.0A	120mV	±3.0%	
-5.0V	0.5A	1.5A	1.0A	50mV	±3.0%	
+5.1A	8.0A	20.0A	10.0A	50mV	±2.0%	NFS110-7602P
+24.0V	3.5A	4.5A	4.5A	240mV	+10/-5.0%	
+12.0V	4.5A	9.0A	5.0A\	120mV	±3.0%	
-12.0V	0.5A	1.5A	1.0A	120mV	±3.0%	
+5.1V	8.0A	20.0A	10.0A	50mV	±2.0%	NFS110-7604P
+15.0V	4.0A	7.5A	5.0A	150mV	±3.0%	
-15.0V	0.5A	1.5A	1.0A	150mV	±3.0%	
-5.0V	0.5A	1.5A	1.0A	50mV	±3.0%	
5.1V	16.0A	22.0A	20.0A	50mV	±2.0%	NFS110-7605
12V	7.0A	9.0A	9.0A	120mV	±2.0%	NFS110-7612
15V	5.0A	7.3A	7.3A	150mV	±2.0%	NFS110-7615
24V	3.5A	4.5A	4.5A	240mV	±2.0%	NFS110-7624

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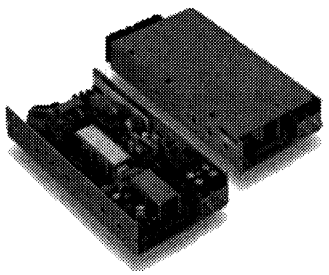
CMP350



- 10 x 5 inch footprint with 1.75 inch low profile
- EN61000-3-2 compliant
- Current sharing
- Individually protected outputs
- Power fail signals
- 350 W with 300LFM
- EN55022, EN55011 conducted emissions level B
- UL, VDE and CSA safety approvals

[2 YEAR WARRANTY]

CE (LVD)

OUTPUT VOLTAGE	OUTPUT CURRENT MIN	OUTPUT CURRENT MAX	RIPPLE	TOTAL REGULATION	OVP THRESHOLD (1)	ADJUST RANGE (2,3)	MODEL NUMBERS (4)
5V	0A	50A	50mV	±1.0%	5.75 to 6.75V	+10, -5%	CMP350-9604
3.3V	1.0A	20A	50mV	±1.0%	4.15V to 4.35V	+20, -5%	
12V	1.0A	10A	120mV	±1.0%	13.2 to 14.5V	±5%	
12V	0.5A	5.0A	120mV	±5.0%	12.6 to 15.2V(1)	(3)	
5V	0A	50A	50mV	±1.0%	5.75 to 6.75V	+10, -5%	CMP350-9601
12V	1.0A	10A	120mV	±1.0%	13.2 to 14.5V	±5%	
12V	0.5A	5.0A	120mV	±5.0%	12.6 to 15.2V (1)	(2)	
5V	0.5A	5.0A	50mV	±1.0%	5.75 to 6.5V		
5V	0A	50A	50mV	±1.0%	5.75 to 6.5V	+10, -5%	CMP350-9602
12V	1.0A	10A	120mV	±1.0%	13.2 to 14.5V	±5%	
12V	0.5A	5.0A	120mV	±5.0%	12.6 to 15.2V	(2)	
24V	0.2A	2.0A	240mV	±1.0%	26.4 to 28.8V		
5V	0A	50A	50mV	±1.0%	5.75 to 6.75V	+10, -5%	CMP350-9606
15V	0.8A	8.0A	150mV	±1.0%	16.5 to 18.0V	±5%	
15V	0.4A	4.0A	150mV	±5.0%	15.7 to 19.0V(1)	(2)	
24V	0.2A	2.0A	240mV	±1.0%	26.4 to 28.8V		
24V	0A	10A	240mV	±1.0%	26.4 to 28.8V	±5%	CMP350-9623
5V	1.0A	20A	50mV	±1.0%	5.75 to 6.75V	+10, -5%	
12V	1.0A	10A	120mV	±1.0%	13.2 to 14.5V	±5%	
12V	0.5A	5.0A	120mV	±5.0%	12.6 to 15.2V(1)	(3)	
5V	0A	50A	50mV	±1.0%	5.75 to 6.75V	+10, -5%	CMP350-9603
12V	1.0A	10A	120mV	±1.0%	13.2 to 14.5	±5%	
12V	0.5A	5.0A	120mV	±5.0%	12.6 to 15.2V (1)	(2)	
12V	0.3A	3.0A	120mV	±1.0%	13.2 to 14.5V		
3.3V	0A	50A	50mV	±1.0%	4.15V to 4.35	+20, -5%	CMP350-9692
5V	1.0A	15A	50mV	±1.0%	5.75 to 6.75V	+10, -5%	
12V	0.5A	5A	120mV	±1.0%	13.2 to 14.5V	±5%	
12V	0.5A	5A	120mV	±5.0%	12.6 tto 15.2V(1)	(3)	

NOTES: (1) No Shutdown or latch-up occurs; voltage is internally limited to specified range. (2) Output number 3 tracks output number 2, output 4 not adjustable. (3) Output number 4 tracks ouput number 3. (4) A standard fan and cover assembly can be added during manufacturing. To order, add a suffix 'CF' to the model number. e.g., CMP350-9601CF.

High Power -600 - 4000 Watts

M3000/4000 Series - 3000W/4000W-180 to 264VAC

Output Voltage	Output Current	Model # without PFC 1 PHASE	Model #with PFC 3 PHASE
2V	600A	M3000-26-0	M3000-86-0
3.3V	600A	M3000-26-9	M3000-86-9
5V	600A	M3000-26-1	M3000-86-1
12V	250A	M3000-26-2	M3000-86-2
15V	200A	M3000-26-3	M3000-86-3
24V	125A	M3000-26-4	M3000-86-4
28V	107A	M3000-26-5	M3000-86-5
48V	63A	M3000-26-6	M3000-86-6
2V	800A		M4000-86-0
3.3V	800A		M4000-86-9

- 3Ø or single Ø input
- Missing phase shutdown
- Single wire current share to 5%
- Ideal for N+1 applications
- 3Ø power factor correction
- UL, CSA and TüV safety approvals

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High Power -600 - 4000 Watts

P600 Series -600W - 90-264 VAC

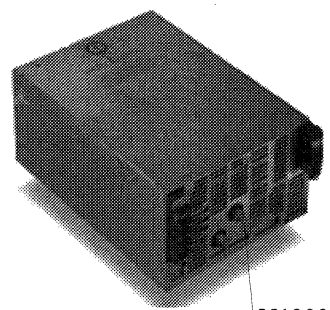
Voltage/ Current V1	Voltage/ Current V2	Voltage/ Current V3	Voltage/ Current V4	Model Number
3.3V/120A				P600-96-9
5V/120A				P600-96-1
12V/50A				P600-96-2
15V/40A				P600-96-3
24V/25A				P600-96-4
28V/21A				P600-96-5
48V/12.5A				P600-96-6

N1000 Series -1000W - 90-264 VAC

Voltage/ Current V1	Voltage/ Current V2	Voltage/ Current V3	Voltage/ Current V4	Model Number
3.3V/200A				N1000-96-9
5V/200A				N1000-96-1
5V/150A	12V/25A	12V/20A		N1000-96-122
5V/150A	12V/30A	5V/10A		N1000-96-121
5V/150A	12V/25A	12V/15A	5V/10A	N1000-96-1221
5V/150A	12V/25A	12V/10A	24V/5A	N1000-96-1224
5V/150A	5V/30A	12V/20A	12V/10A	N1000-96-1122
5V/150A	3.3V/30A	12V/20A	12V/10A	N1000-96-1922
5V/150A	24V/15A	12V/10A	12V/5A	N1000-96-1422

N1200 Series - 1200W 90-264 VAC

Voltage/ Current V1	Voltage/ Current V2	Voltage/ Current V3	Voltage/ Current V4	Model Number
2V/240A				N1200-96-0
3.3V/240A				N1200-96-9
5V/240A				N1200-96-1
12V/100A				N1200-96-2
24V/50A				N1200-96-4
28V/43A				N1200-96-5
48V/25A				N1200-96-6
5V/200A	12V/40A			N1200-96-12
5V/200A	24V/20A			N1200-96-14
48V/25A	24V/20A			N1200-96-64
5V/175A	12V/30A	12V/20A		N1200-96-122
5V/175A	12V/35A	5V/20A		N1200-96-121
5V/175A	12V/30A	24V/15A		N1200-96-124
5V/175A	3.3V/40A	12V/20A		N1200-96-192
5V/175A	12V/30A	12V/20A	5V/10A	N1200-96-1221
5V/175A	12V/30A	12V/10A	24V/5A	N1200-96-1224
5V/175A	15V/30A	15V/10A	5V/10A	N1200-96-1331
5V/175A	5V/40A	12V/20A	12V/10A	N1200-96-1122
5V/175A	3.3V/40A	12V/20A	12V/10A	N1200-96-1922
5V/175A	24V/20A	12V/10A	12V/5A	N1200-96-1422
24V/42A	5V/40A	12V/20A	12V/10A	N1200-96-4122



N1000

P600, N1000, N1200, N1500, L2000

- Active harmonic correction to EN61000-3-2
- Forced current sharing, all outputs
- DC OK (including LED)
- UL, CSA and TüV safety approvals

N2000 Series -2000W - 180-264 VAC

Voltage/ Current V1	Voltage/ Current V2	Model Number
5V/360A		N2000-96-1
12V/150A		N2000-96-2
24V/83A		N2000-96-4
28V/71A		N2000-96-5
48V/42A		N2000-96-6
5V/240A	12V/66A	N2000-96-12
5V/240A	24V/33A	N2000-96-14
5V/240A	3.3V/120A	N2000-96-19

[2 YEAR WARRANTY]

CE (LVD)

L2000Series -2000W - 180 to 264 VAC

Output Voltage	Output Current	Model # without PFC 1 PHASE	Model # with PFC 3 PHASE
2V	400A	L2000-26-0	L2000-86-0
3.3V	400A	L2000-26-9	L2000-86-9
5V	400A	L2000-26-1	L2000-86-1
12V	166A	L2000-26-2	L2000-86-2
15V	133A	L2000-26-3	L2000-86-3
24V	83A	L2000-26-4	L2000-86-4
28V	71A	L2000-26-5	L2000-86-5
48V	42A	L2000-26-6	L2000-86-6

N1500 Series - 1500W - 180-264 VAC

Voltage/ Current V1	Voltage/ Current V2	Model Number
3.3V/300A		N1500-96-9
5V/200A		N1500-96-1
12V/125A		N1500-96-2
24V/62A		N1500-96-4
28V/54A		N1500-96-5
48V/31A		N1500-96-6
5V/200A	12V/50A	N1500-96-12
5V/200A	24V/24A	N1500-96-14

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Custom Power Supply Design

Artesyn Technologies' capability in custom product offerings represents a dedicated approach to applications requiring unique power supply specs. Our global engineering and manufacturing capabilities provide customers with the flexibility necessary to address demanding power requirements while ensuring the most cost-effective solution. Artesyn Technologies is uniquely qualified to address virtually any technical requirements. These designs satisfy demanding power system installations in data processing, industrial process control, telecommunications, instrumentation, transportation, and medical equipment applications.

ISO9001 approved facilities ensure our customers of the highest quality and consistency that they have come to expect. Innovative design techniques, including extensive design verification testing ensures the highest reliability for years of continuous service. Focus on development cycle time reduction and process quality improvement insures that the custom power supply development will support your demanding end-product development cycles. Full documentation, engineering controls, and environmental stress screening complement the total quality and statistical control policies that we have used to ensure superior performance.

Over thirty years of experience allows us to select the most suitable power supply topology and architecture to meet a particular requirement. Whether the application demands a forward converter, flyback, push-pull, half-bridge, or resonant circuit, our expertise enables us to quickly respond with proposed solutions. Our design capability spans a broad range of AC/DC and DC/DC products from less than 0.5 to 4,000 watts, from single to multiple outputs, operating from any input voltage in the world. A broad range of chassis configurations, features, interconnection options and status circuitry are available to customer specifications. Modification of existing standard product designs is an alternative to a total custom design.

Quality at Artesyn Technologies

At Artesyn Technologies, quality is not a program or a department, it is our culture. We are process oriented, data driven and focused on continuous improvement. We seek to provide our customers with the lowest total cost of ownership for the products we deliver. For Artesyn Technologies, this means providing our customers with a quality product, in a timely manner, at a competitive price, backed up by world-class service. Following are the key elements of our quality strategy.

Process Standardization

All of our key manufacturing facilities around the world are ISO9000 certified. Some of the recently acquired facilities are in the process of being certified with the intent of having this completed by 1999. All of our development organizations around the world utilize our PACE methodology which is designed to ensure quality design in a timely manner.

Corrective Action Process

Dedicated Quality Engineers work to ensure timely resolution to any and all field failures. All such failures are analyzed to a root cause and corrective actions implemented. We also utilize our QIS reports to develop corrective action plans for yield improvement.

Manufacturing Process Control

An On-Line Quality Information System (QIS) helps track test data and conduct on-going yield analyses. This provides a good barometer of field performances and factory cost effectiveness. It provides the necessary data for Product and Process Engineers and helps direct process improvement teams

New Product Integrity

We begin with a rigorous set of preferred practices and design for manufacturability guidelines. The design is subjected to a number of verification tests, stress analyses, MTBF calculations/demonstrated reliability, and a Highly Accelerated Life Test (HALT). Upon introduction to manufacturing we perform Cpk Analyses and first article inspections.

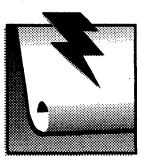
Supply Line Management

A dedicated Supply Line Management department manages cross-functional and cross-divisional teams to ensure that a steady supply of quality materials is delivered to our facilities around the world. A supplier measurement system helps to gather the necessary data. These efforts are further supported by programs to reduce the total number of suppliers and parts used.

ASTEC

AC/DC Switchers 15-3000W Power Supplies

- **LP Series 25-350 watts**
- **SA Series 35-450 watts**
- **MVP Series 400-800 watts**
- **VS Series 800-2500 watts**
- **9R 1400-3000 watts**
- **Custom Hot Plug Racks**
- **Linears 15-115 watts**



PowerFAX
760-930-0881

For the complete product specifications, please call PowerFAX. Thanks to Astec's PowerFAX automated fax retrieval system, you can instantly receive data sheets and application notes, around the clock.

- *Make note of the document number of the product for which you are requesting information. These numbers are listed by each product.*
- *Call 1-760-930-0881 using a touchtone phone.*
- *The PowerFAX system will provide you with voice prompts for entering the document number and fax number.*
- *Within a few minutes, your fax machine will begin printing the product information you request.*

Internet
http://www.astec.com

Astec's entire product catalog, application notes, product specifications, drawings and pin assignments are available in Adobe® Acrobat® format. The entire contents are searchable, and can be downloaded for future use.

Local Support

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Factory Support

*For order placement and delivery status, call **Inside Sales** at:*
760-930-4600
*For returns or repairs, please call **Product Support Group** at:*
760-930-4600
*For **Technical Support on AC/DC Products**, please call:*
West *760-930-4716*
East *781-238-8811*

Astec America, Inc., 6339 Paseo del Lago, Carlsbad, California 92009

PowerFAX
760-930-0881

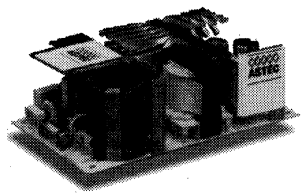
Astec America, Inc.
6339 Paseo Del Lago
Carlsbad, CA 92009
tel: 760-930-4600
fax: 760-930-4700

ASTEC

25-350W Low Power Switchers

Total Power	Model Number	Output One	Output Two	Output Three	Output Four	Dimensions (inches)	Doc. No.
25W	LPS22	5 V - 5 A (8)	--	--	--	3 x 5 x 1.2	1021
25W	LPS23	12 V - 2.1 A (3.3)	--	--	--	3 x 5 x 1.2	
25W	LPS24	15 V - 1.7 A (2.7)	--	--	--	3 x 5 x 1.2	
25W	LPS25	24 V - 1.1 A (1.8)	--	--	--	3 x 5 x 1.2	
25W	LPT22	5 V - 3 A (4)	12 V - 1.5 A (2)	-12 V - 0.5 A (0.7)	--	3 x 5 x 1.2	1022
25W	LPT23	5 V - 4 A (5)	12 V - 0.5 A (0.7)	-12 V - 0.5 A (0.7)	--	3 x 5 x 1.2	
25W	LPT24	5 V - 3 A (4)	12 V - 1.5 A (2)	-5 V - 0.5 A (0.7)	--	3 x 5 x 1.2	
25W	LPT25	5 V - 3 A (4)	15 V - 1.5 A (2)	-15 V - 0.5 A (0.7)	--	3 x 5 x 1.2	
40W	LPS41	3.3V - 8A (11)	--	--	--	3 x 5 x 1.2	1015
40W	LPS42	5 V - 8 A (11)	--	--	--	3 x 5 x 1.2	
40W	LPS43	12 V - 3.3 A (4.5)	--	--	--	3 x 5 x 1.2	
40W	LPS44	15 V - 2.6 A (3.6)	--	--	--	3 x 5 x 1.2	
40W	LPS45	24 V - 1.6 A (2.3)	--	--	--	3 x 5 x 1.2	
40W	LPS48	48V - 0.9A (1.2)	--	--	--	3 x 5 x 1.2	
40W	LPT41	3.3V -6A (7)	5V - 1.5A (2)	12V - 0.7A (1)		3 x 5 x 1.2	1016
40W	LPT42	5 V - 4 A (5)	12 V - 2 A (2.5)	-12 V - 0.5 A (0.7)	--	3 x 5 x 1.2	
40W	LPT43	5 V - 5 A (6)	12 V - 0.5 A (0.7)	-12 V - 0.5 A (0.7)	--	3 x 5 x 1.2	
40W	LPT44	5 V - 4 A (5)	12 V - 2 A (2.5)	-5 V - 0.5 A (0.7)	--	3 x 5 x 1.2	
40W	LPT45	5 V - 4 A (5)	15 V - 2 A (2.5)	-15 V - 0.5 A (0.7)	--	3 x 5 x 1.2	
40W	LPT46	5 V - 4 A (5)	24 V - 1 A (1.5)	12 V - 0.5A (0.7)		3 x 5 x 1.2	
40W	LPT47	5 V - 4 A (5)	24 V - 1 A (1.5)	-12 V - 0.5A (0.7)		3 x 5 x 1.2	
40W	LPT48	5 V - 4 A (5)	24 V - 1 A (1.5)	-5 V - 0.5A (0.7)		3 x 5 x 1.2	
60W	LPS61	3.3V - 12A (16)	--	--	--	3 x 5 x 1.65	1017
60W	LPS62	5 V - 12A (16)	--	--	--	3 x 5 x 1.65	
60W	LPS63	12 V - 5A (6.7)	--	--	--	3 x 5 x 1.65	
60W	LPS64	15 V - 4A (5.3)	--	--	--	3 x 5 x 1.65	
60W	LPS65	24 V - 2.5A (3.3)	--	--	--	3 x 5 x 1.65	
60W	LPS68	48 V - 1.3 A (1.7)	--	--	--	3 x 5 x 1.65	
60W	LPT61	3.3V - 7A (8.5)	5V - 2.5A (3)	12 - 1A (1.5)		3 x 5 x 1.65	1018
60W	LPT62	5 V - 7A (8)	12 V - 3 A (3.5)	-12 V - 0.7 A (1)	--	3 x 5 x 1.65	
60W	LPT63	5 V - 7A (8)	15 V - 2.8 A (3.3)	-15 V - 0. 7 A (1)	--	3 x 5 x 1.65	
60W	LPT64	5 V - 7A (8)	12 V - 3 A (3.5)	-5 V - 0.7 A (1)	--	3 x 5 x 1.65	
60W	LPT65	5 V - 7A (8)	24 V - 1.5 A (2)	12 V - 0.7 A (1)	--	3 x 5 x 1.65	
60W	LPT66	5 V - 7A (8)	24 V - 1.5 A (2)	-12 V - 0.7 A (1)	--	3 x 5 x 1.65	
60W	LPT67	5 V - 7A (8)	24 V - 1.5 A (2)	-5 V - 0.7 A (1)	--	3 x 5 x 1.65	
110W	LPS112	5 V - 16 A (22)	--	--	--	4 x 7 x 1.8	1019
110W	LPS113	12 V - 6.7 A (9.2)	--	--	--	4 x 7 x 1.8	
110W	LPS114	15 V - 5.3 A (7.3)	--	--	--	4 x 7 x 1.8	
110W	LPS115	24 V - 3.3 A (4.6)	--	--	--	4 x 7 x 1.8	
110W	LPS118	48 V - 1.7 A (2.3)	--	--	--	4 x 7 x 1.8	
110W	LPQ112	5 V - 9 A (11)	12 V - 4.5 A (5)	-12 V - 0.7 A (1)	±5-25 V - 2.5 A (3)	4 x 7 x 1.8	1020
110W	LPQ113	5 V - 9 A (11)	15 V - 3.2 A (4)	-15 V - 0.56 A (0.8)	±5-25 V - 2.5 A (3)	4 x 7 x 1.8	
110W	LPQ114	5 V - 9 A (11)	12 V - 4.5 A (5)	-12 V - 0.7 A (1)	24 V - 3.5 A (4)	4 x 7 x 1.8	
120W	NTQ120	+3.3V - 14A	+5V - 12.5A	+12V - 1A	-12V - 0.5A	4 x 7 x 1.5	1040

( ) Indicates forced air rating



LP Series Switchers

Features

- *High efficiency*
- *Built-in EMI filter*
- *Universal input*
- *Low output ripple*
- *Adjustable output*
- *Overvoltage protections*
- *Overload protections*
- *Enclosure kits available (PowerFAX Doc. 1025)*

Description

The LP Series of power supplies is an AC/DC universal input, single and multiple output design offering the latest in high technology performance. This rugged design features class B EMI, high efficiency, and very high reliability. The LP Series is ideal for telecommunication and computer peripheral applications, test and industrial equipment, medical instrumentation, and business machines.

(continues)

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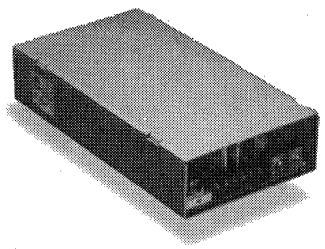
25-350W Low Power Switchers



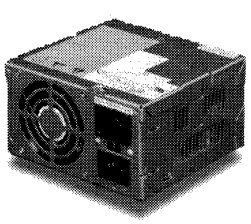
LP Series Switchers

(continued)

Total Power	Model Number	Output One	Output Two	Output Three	Output Four	Dimensions (inches)	Doc. No.
150W	LPS152	5 V - 22 A (30)	--	--	--	4.25 x 8.5 x 1.5	1023
150W	LPS153	12-15 V - 9.1 A (12.5)	--	--	--	4.25 x 8.5 x 1.5	
150W	LPS155	24-28 V - 4.5 A (6.2)	--	--	--	4.25 x 8.5 x 1.5	
150W	LPS156	36-48 V - 2.3 A (3.1)	--	--	--	4.25 x 8.5 x 1.5	
150W	LPQ152	5 V - 15 A (22)	12 V - 6 A (8)	-12 V - 2 A (2.5)	±5-25 V - 2.5 A(3)	4.25 x 8.5 x 1.5	1024
150W	LPQ153	5 V - 15 A (22)	15 V - 4.8 A (6.4)	-15 V - 1.6 A (2)	±5-25 V - 2.5 A(3)	4.25 x 8.5 x 1.5	
150W	LPQ154	5 V - 15 A (22)	12 V - 6 A (8)	-12 V - 2 A (2.5)	24 V - 3.5 A (4.5)	4.25 x 8.5 x 1.5	
250W	LPS252	3-6 V - (50)A	--	--	--	5 x 9 x 2	1026
250W	LPS253	6-12 V - (21)A	--	--	--	5 x 9 x 2	
250W	LPS254	12-24V - (16.7)A	--	--	--	5 x 9 x 2	
250W	LPS255	24-48 V - (10.4)A	--	--	--	5 x 9 x 2	
250W	LPQ252	5 V - (35) A	12 V - (10) A	-12 V - (6) A	±5-25 V - (6) A	5 x 9 x 2	1027
250W	LPQ253	5 V - (35) A	15 V - (10) A	-15 V - (6) A	±5-25 V - (6) A	5 x 9 x 2	
350W	LPS352	3-6 V - (70) A	--	--	--	5 x 9 x 2.5	1028
350W	LPS353	6-12 V - (29.2) A	--	--	--	5 x 9 x 2.5	
350W	LPS354	12-24V - (23.3) A	--	--	--	5 x 9 x 2.5	
350W	LPS355	24-48 V - (14.6) A	--	--	--	5 x 9 x 2.5	
350W	LPQ352	5 V - (50) A	12 V - (12) A	-12 V - (6) A	±3.3-24 V - (6) A	5 x 9 x 2.5	1029
350W	LPQ353	5 V - (50) A	15 V - (12) A	-15 V - (6) A	±3.3-24 V - (6) A	5 x 9 x 2.5	

( ) Indicates forced air rating

35-450W PC Power Supplies



SA Series

Features

- *High efficiency*
- *Built-in EMI filter (VDE Level B)*
- *UL, CSA, and VDE approvals*
- *Outputs fully protected*
- *Power good signal*

Description

The SA Series includes four output, fan cooled, switching power supplies which are ideally suited and packaged for personal computer and workstation applications. This desktop PC model design is complete with an input voltage selection switch, cable harnesses, AC input receptacle and an AC convenience outlet.

Total Power	Model Number	Output One	Output Two	Output Three	Output Four	Output Five	Output Six	Case Style	Dimensions (inches)	Doc. No.
40W	SA40-1313	—	0 - 5.0A	—	0 - 0.35A	—	N/A	PCB	5.0x3.01x1.34	1126
145W	SA145-3480	—	2.5 - 18A	0 - 0.3A	0.3 - 4.2A(6A)	0 - 0.3A	0 - 0.1A	Slim L	5.51x5.9x3.39	1113
145W	SA145-3490	—	2.5 - 18A	0 - 0.3A	0.3 - 4.2A(6A)	0 - 0.8A	—	Slim L	5.51x5.9x3.39	1114
145W	SA147-3500	*2.0 - 13A	*2.5 - 18A	0 - 0.3A	0.3 - 4.2A	0 - 0.5A	0 - 50mA	Slim L	5.51x5.9x3.39	1127
200W	ATX200-3505-226	*0.3 - 14A	*1.0 - 22A	*0 - 0.5A	0.05 - 6A(10A)	*0 - 0.8A	0 - 10A	ATX	5.51x5.9x3.39	1034
	SA201-3450	—	3.0 - 22A	0 - 0.3A	0.05 - 8.0A(10A)	0 - 0.5A	—	Slim L	5.51x5.9x3.39	1117
	SA202-3520	*0 - 14A	*1.5A-22A	0 - 0.5A	0 - 8.0A	0 - 0.5A	0 - 0.2A	Slim L	5.51x5.9x3.39	1128
	SA202-3520-288	*0 - 14A	*1.5 - 22A	0 - 0.5A	0 - 8.0A	0 - 0.5A	0 - 0.2A	Slim L	5.51x5.9x3.39	1129
	SA202-3500	*0 - 14A	*1.5 - 22A	*0 - 0.5A	0 - 8.0A(11A)	*0 - 0.8A	0 - 0.2A	Slim L	5.51x5.9x3.39	1127
	SA202-3530-288	*0 - 14A	*1.5 - 22A	*0 - 0.5A	0 - 8.0A(11A)	*0 - 0.8A	0 - 0.2A	Slim L	5.51x5.9x3.39	1130
300W	SA301-3400	—	4.0 - 32A	0 - 0.5A	1 - 12A(15A)	0 - 1.0A	0 - 0.1A	Slim L	5.51x5.9x3.39	1120
	SA302-3500	*0.3 - 23A	*4.0 - 32A	0 - 0.5A	1 - 12A(15A)	0 - 1.0A	0 - 0.1A	Slim L	5.51x5.9x3.39	1135
	SA302-3500-288	*0.3 - 23A	*4.0 - 32A	0 - 0.5A	1 - 12A(15A)	0 - 1.0A	0 - 0.1A	Slim L	5.51x5.9x3.39	1136
450W	SA451-3500-288	*3.0 - 35A	*5.0 - 55A	*0 - 0.3A	1 - 17A(19A)	*0 - 1.0A	0 - 0.2A	Std. AT	8.35x5.9x5.9	1121

1. All models are UL/CSA (or NRTL/C) & VDE (or TUV) approved.
2. Some models may have other safety agencies approval, call Astec sales offices for more information.
3. SA451-3500 has Remote Sense for +3.3V which must be connected before PSU turn On.
4. (*) Refer to Product Specification for maximum combined output power or current.
5. All "PC" models have AC outlet, except ATX200-3505-226.
6. Models with () are Energy Star Model.
7. All "PC" models are NEMKO Approved.
8. For detail Product Specification, please contact ASTEC sales offices.
10. Above specifications subject to engineering change without notice.

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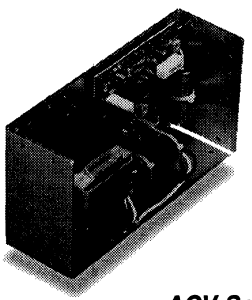
15-115W Linear Power Supplies

Model Number	Output One	Output Two	Output Three	Dimensions (inches)	Doc. No.
ACV 5N3-1	5V/3A			4.8x4.0x2.0	1551
ACV 5N6-1	5V/6A			4.8x5.6x2.9	1551
ACV 5N9-1	5V/9A			4.8x7.0x3.3	1551
ACV 5N12-1	5V/12A			4.8x9.0x3.3	1551
ACV 12N1.7	12V/1.7A			4.8x4.0x2.0	1551
ACV 12N3.4	12V/3.4A			4.8x5.6x2.9	1551
ACV 12N5	12V/5A			4.8x7.0x3.3	1551
ACV 12N6.8	12V/6.8A			4.8x9.0x3.3	1551
ACV 15N1.5	15V/1.5A			4.8x4.0x2.0	1551
ACV 15N3	15V/3A			4.8x5.6x2.9	1551
ACV 15N4.5	15V/4.5A			4.8x7.0x3.3	1551
ACV 15N6	15V/6A			4.8x9.0x3.3	1551
ACV 24N1.2	24V/1.2A			4.8x4.0x2.0	1551
ACV 24N2.4	24V/2.4A			4.8x5.6x2.9	1551
ACV 24N3.6	24V/3.6A			4.8x7.0x3.3	1551
ACV 24N4.8	24V/4.8A			4.8x9.0x3.3	1551
ACV 101	+5V1,2/3A	+12V1 to+15V/1.5A (0.75)	4.8x7.0x3.3	1551	
ACV 103	+5V1,2/6A	+12V1,2/3.4A (0.75)		4.8x9.0x3.3	1551
ATV 12D1	+12V/1A	-12V/1A		4.0x6.5x2.0	1551
ACV 12D1.7	+12V/1.7A	-12V/1.7A		4.8x7.0x2.9	1551
ACV 12D3.4	+12V1,2/3.4A	-12V1,2/3.4A		4.8x9.0x3.3	1551
ACV 15D0.8	+15V/0.8A	-15V/0.8A		4.0x6.5x2.0	1551
ACV 15D1.5	+15V/1.5A	-15V/1.5A		4.8x7.0x2.9	1551
ACV 15D3.0	+15V1,2/3A	-15V1,2/3A		4.8x9.0x3.3	1551
ATV 251	+5V1,2/2A	+12V1 to +15V/0.4A	-12V1 to +15V/0.4A	4.0x6.5x2.0	1551
ATV 351	5V1,2/3A	+12V to +15V/1A	-12V to +15V/1A	4.0x10.2x2.9	1551
ATV 401	5V2/6A	+12V to +15V/1A	-12V2 to +15V/1A	4.8x9.0x3.3	1551
ATV 451	5V1,2/6A	+12V to +15V/1.8A	-12V to +15V/1.8A	4.8x11.0x3.3	1551
ATV 551	5V1,2/9A	+12V to +15V/1.8A	-12V to +15V/1.8A	4.8x11.0x3.3	1551
ATV 101	5V/3A	-5V/0.5A	24V1 to +15V/3A	4.8x11.0x3.3	1551
A-OVP-1	Overvoltage Protection Module				1551

1 - ISOLATED OUTPUT 2 - WITH REMOTE SENSE



ACV Series

Features

- *100% Burn-in*
- *100% vacuum transformer*
- *Cross references with other manufacturers*
- *Installation instructions / specification sheet with each unit*
- *World wide voltage taps*
- *Built-in OVP on 5V output*

Description

The ACV/ATV Series of linear regulation power supplies provides single, dual, and triple output models with wattages from 15 watts to 115 watts. The linear regulation design offers extremely low output ripple and high reliability in a relatively low cost package. Standard features include full rating to 50° C, convection operation, wide AC input voltage range, industry standard packages, and a two year warranty.

Custom Racks

Racks – RPS Series

The Astec RPS (Rack Power System) Series incorporates standard power supplies into RETMA enclosures to create custom power systems. Three standard RETMA configurations are available: 1) 51/4" x 19" x 21", 2) 5 1/4" x 19" x 21", and 3) 7" x 19" x 21". Customized enclosures are also available to meet unique specifications. A wide range of standard options offers the benefit of maximum design flexibility. Astec provides full mechanical and electrical assembly system testing. Each Rack Power System (RPS) can provide up to twelve individual outputs from Astec's broad line of linear and switching power supplies. Your specific connectors and terminators can be incorporated into custom rack design. Engineering support is available to assist you in specifying your RPS requirements.

RPS1-P3-115-XXX

- *5 1/4" x 19" x 14" Rack*
- *Front panel with a lighted circuit breaker and handles*
- *The suffix 'XXX' denotes all customized features in your Rack Power System. Contact the factory for assistance*

Hot Plug Racks

Hot Plug Racks from Astec offer high power plug capability for critical systems. Each Hot Plug Rack provides up to 3000 watts total. Separate plug-in modules are internally paralleled and will automatically current share for load distribution. This system is designed for easy installation and maintenance. Modules can be replaced with no system down time. Each module can provide 2000 watts of power, which allows for cost effective system upgrades.

- *Fault tolerance system*
- *No system down time*
- *Internal paralleling of outputs*
- *Automatic current sharing*
- *Internal isolation diodes*
- *Front panel status LED's*
- *Adjustment pots*
- *TTL alarm circuitry*
- *Easy connect/disconnect*
- *Remote sense on all outputs*
- *500 to 2000 watts per module*
- *AC input with P.F.C.*
- *Up to four isolated outputs*
- *Output meters available*

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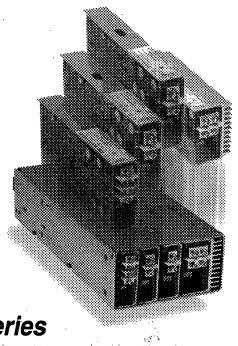
400-600W Medium Power Switchers



MVP Series

Features

- *Power factor correction*
- *IEC EN61000-3-2 harmonic distortion compliance*
- *CISPR 22, EN55022 Curve B conducted / radiated EMI*
- *IEC 1000 immunity standards*
- *European CE Mark requirements*
- *Current share on all outputs with ratings of 10A or greater*
- *Remote sense on all outputs with ratings greater than 2A*
- *Overload protection on all outputs*
- *Voltage adjustment on all outputs*
- *Margining on all single output modules*
- *Input OK signal and status indicator LED*
- *Global DC OK signal and status indicator LED*
- *Global inhibit, optional enable and isolated module inhibit*
- *1 year warranty standard / extended warranty available*
- *Forced air cooling, with field replaceable fan*
- *Isolated standby 5V @ 250 mA bias voltage*

Description

The MVP Series is the industry's most versatile medium power solution. The standard features of the MVP Series are considered options by other suppliers. MVP is a full-featured medium power modular product, with a PFC front end as a standard input utilizing SMT and innovative magnetic designs. Five standard DC to DC modules combined with PFC cases can be configured with 1 to 10 outputs ranging from 2 to 60 volts. MVP is available in both single and multiple output versions with millions of different output combinations as standard.

Astec's MVP series carries global safety agency approvals. The MVP Series is CE Marked and has the most complete safety package in the industry.

Electrical Specifications

Input

Input voltage	85 to 264 VAC 120 to 350 VDC
Frequency	47 to 440 Hz
Inrush current	40 A peak max
Efficiency	70% - 80% @ full case load 115VAC
Power factor	0.99 typical meets EN61000-3-2
Turn-on time	AC on 1.5 sec typical, Inhibit / Enable 150 ms typical
EMI filter standard	CISPR 22, EN55022 Level "B"
EMI filter (low leakage)	CISPR 22, EN55022 Level "A"
Leakage current std.	2.0 mA max @ 264 VAC
Leakage current (low leakage)	300µA max @ 264 VAC
Radiated EMI	CISPR 22, EN55022 Level "B"
Holdover storage	20 ms minimum (independent of input VAC)
AC OK	>5 ms early warning min. before outputs lose regulation Full cycle ride thru (50 Hz)
Harmonic distortion	Meets EN61000-3-2
Isolation	Meets EN60950
Global Inhibit/Enable	TTL, Logic "1" and Logic "0"
Input fuse (internal)	15A

Output

Adjustment range	± 10% minimum
Margining	± 4-6% nominal*
Overall reg	0.4% or 20 mV max (36W modules 4% max)
Ripple RMS:	0.1% or 10 mV whichever is greater
Ripple Pk-Pk:	1.0% or 50 mV whichever is greater Bandwidth limited to 20 MHz
Dynamic response	<2% or 100 mV with 25% load step.
Recovery time	To within 1% in < 300µsec
Overcurrent protection	*Single, main of dual output module* 105-120% of rated output current *Aux output of dual output module* 105-140% of rated output current *Triple output module* Internally protected
Short circuit protection	Protected for continuous short circuit. Recovery is automatic upon removal of short
Overvoltage protection	*Single output modules* 2-5.5V 122-134% 6-60V 110-120% *Dual output module* 2-6V 122-134% 8-28V 110-120% *Triple output module* No overvoltage protection provided. Recycle the AC input voltage to reset OVP circuit
Reverse voltage protection	100% of rated output current

(continued)

*Single output modules only

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400-800W Medium Power Switchers

Electrical Specifications

Output (continued)

Thermal protection . . . . All outputs disabled when internal temp exceeds safe operating range. >5mSec warning (AC OK signal) before shutdown
Remote sense . . . . . Up to 0.5 V total drop
Single wire parallel. . . . Current share to within 2% of total rated current**
DC OK. . . . . Single and main of dual outputs -2% to - 8% of nominal of any monitored output
Minimum load . . . . . Not required on single or triple output modules. 10% required on main of dual output modules
Bias voltage . . . . . 5VDC @250 mA max present whenever AC input is applied
Module inhibit . . . . . TTL, isolated, singles and dual (both outputs) only
Switching frequency. . . 250k Hz
Output/Output isolation >1 meg ohm

** Single and main of dual output modules only

Parallel Code

MP4 & MP6 5 available slots: Slot 5, Slot 4, Slot 3, Slot 2, Slot 1
MP8 6 available slots: Slot 6, Slot 5, Slot 4, Slot 3, Slot 2, Slot 1

†Standard Parallel Codes

	6	5	4	3	2	1
0 = no parallel	o	o	o	o	o	o
1 = 1 & 2	o	o	o	o	—	—
2 = 2 & 3	o	o	o	—	—	o
3 = 3 & 4	o	o	—	—	o	o
4 = 4 & 5	o	—	—	o	o	o
5 = 3 & 4 & 5	o	—	—	—	o	o
6 = 5 & 6	—	—	o	o	o	o
7 = 4, 5 & 6	—	—	—	o	o	o

† For custom parallel configurations, contact your Astec Service Professional.

Case size

4 = 2.5" x5" x10", 5 available slots, 400 W max
6 = 2.5" x5" x11", 5 available slots, 600 W max
8 = 2.5" x 7" x 10", 6 available slots, 800 W max

USE ONLY FOR MODIFIED STANDARD, Consult your Astec Service Professional

CASE SIZE | Slot #1 | Slot #2 | Slot #3 | Slot #4 | Slot #5 | OPTION CODE

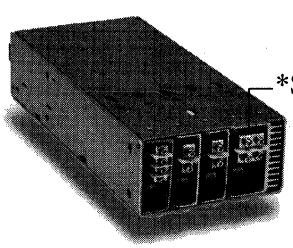
M P ☐ - ☐☐☐ - ☐☐☐ - ☐☐☐ - ☐☐☐ - ☐☐☐ - ☐☐ - XXX

2 or 3 digit code

Use "—" for standard remote sense
Use "/" when using remote sense with OR-ING diode (redundancy)
Single output modules only

Option Codes

0 = no options
1 = rear air exhaust (40°C)
3 = global enable
5 = option package (options 1 & 3)
M = low leakage
N = low leakage plus option 1
P = low leakage plus option 3
R = low leakage plus option 5



*Slot 1

2.5" X 5" X 11" (5 slots available)

Slot 3
Output 2: 12V @ 17A

Slot 5
Output 5: 12V @ 1A
Output 6: 12V @ 1A
Output 7: 5V @ 2A

low leakage

M P 6 - 2 F / 1 L - 4 L E - L L E - 0 M

Slot 1&2
Output 1: 5.2V @ 60A
Modified for use with redundant "OR-ING" diodes

Slot 4
Output 3: 12V @ 10A
Output 4: 5V @ 10A

No paralleling

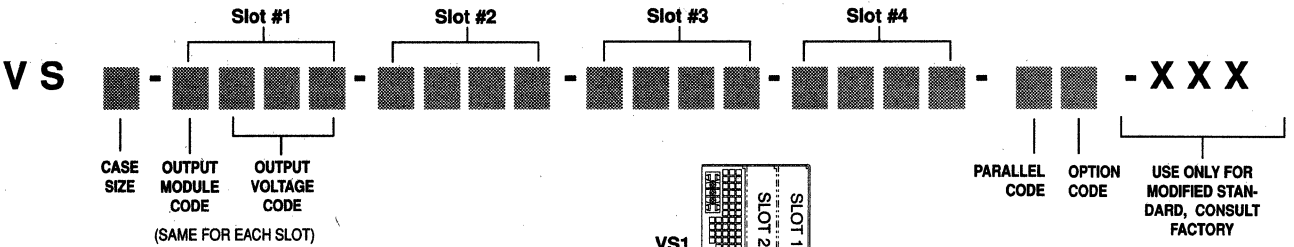
For complete product specifications, call PowerFAX at 760-930-0881 and request document number 1058. Or visit our website at www.astec.com.

PowerFAX 760-930-0881

Astec America, Inc.
6339 Paseo Del Lago
Carlsbad, CA 92009
tel: 760-930-4600
fax: 760-930-4700

800-2500W High Power – 1-12 Outputs

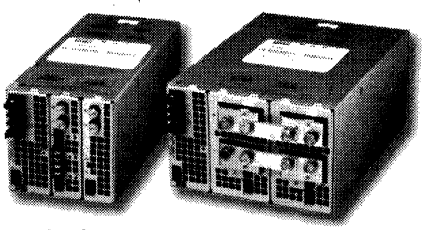
Model Configuration


Slot #1
Slot #2
Slot #3
Slot #4
V S - - -

Astec America, Inc.
6339 Paseo Del Lago
Carlsbad, CA 92009
tel: 760-930-4600
fax: 760-930-4700

PowerFAX
760-930-0881

800-2500W High Power – 1-12 Outputs



VS Series

Features

- *Power factor correction*
- *IEC 555-2 harmonic distortion compliance*
- *CISPR 22, EN55022 Level A conducted / radiated EMI*
- *IEC 801 immunity standards*
- *European CE Mark*
- *Current share on all outputs*
- *Remote sense on all outputs*
- *Overload protection on all outputs*
- *Voltage adjustment on all outputs*
- *Margining on all outputs*
- *AC OK signal (two logics)*
- *Global DC OK (two logics)*
- *DC OK signal and status indicator LED on all outputs*
- *Global and individual module inhibits/enable*
- *3 year warranty*

Description

VS is the first full-featured high power product with a PFC front end as a standard input. It is available in both single and multiple output versions with over one million different output combinations as standard. Offering a very compact footprint, the 1500 watt package measures 5" x 5" x 11", and the 2500 watt package measures 5" x 8" x 11".

For complete product specifications, call PowerFAX at 760-930-0881 and request document number 1150. Or visit our website at www.astec.com.

Electrical Specifications

Input

Fuse rating	600 V/25 A (internal)
Input voltage	85 to 264 VAC single or 3 Phase
Frequency	47 to 440 Hz
Inrush current	40 A peak max
Efficiency	75% - 82%
Power factor	0.99 typical
Turn-on time	AC / 1 sec; Inhibit / 100 ms max
EMI filter	CISPR 22, EN55022 Level B
Leakage current	2 mA max at 264 VAC
Holdover storage	20 ms minimum/40 ms typical independent of VAC
AC OK warning time	> 5ms (power fail)

Output

Adjustment range	± 10% minimum
Margining	± 4-6% nominal
Line/load reg.	0.2% or 5 mV max
Ripple	RMS: 0.1% or 10 mV P-P: 1.0% or 50 mV Bandwidth limited to 20 MHz
Dynamic response	2% or 100 mV with 25% load step (any output)
Recovery time	To within 1% in < 300µsec
Overvoltage protection	2 to 5 V 122% to 134% of output voltage; 12 to 28 V 110% to 120%; recycle AC
Overload protection	Main: 105% to 120% of rated current Auxiliaries: 105% to 140%
Short circuit protection	Protected for continuous short circuit, recovery automatic
Reverse voltage protection	100% of rated output current
Thermal protection	Each module thermally protected. Input module: auto recovery. Output modules; recycle AC.
Remote sense	Up to 0.5 V total drop
Single wire parallel	Current share to 2% of total rated current
Switching frequency	200 KHz(900-1500 watt module, 400 KHz)
DC OK	-2% to -6% of nominal

AULT INC. — EXTERNAL POWER SPECIALIST

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Visit our web site: www.aultinc.com, or contact us by e-mail: info@aultinc.com

IEC 9001 CERTIFIED

SWITCHING POWER SUPPLIES

SINGLE OUTPUT MODELS

MODEL	MAX POWER	OUTPUT VOLT	OUTPUT CURRENT	CASE SIZE
SC100	15W	+5	3.00	LP6
SW108	25W	+5	5.00	LP7
PW100	50W	+5	10.00	LP10
SC101	20W	+9	2.22	LP6
SW109	25W	+9	2.78	LP7
PW100	63W	+9	7.00	LP10
SC102	20W	+12	1.66	LP6
SW110	25W	+12	2.08	LP7
SW101	42W	+12	3.50	LP8
PW100	70W	+12	5.80	LP10
SW111	25W	+15	1.67	LP7
SC103	20W	+16	1.25	LP6
SW112	25W	+16	1.56	LP7
SW103	45W	+16	2.81	LP8
PW100	75W	+16	4.70	LP10
SC104	20W	+18	1.11	LP6
PW100	81W	+18	4.50	LP10
SC105	22W	+24	0.92	LP6
SW113	25W	+24	1.05	LP7
SW105	48W	+24	2.00	LP8
PW100	84W	+24	3.50	LP10
SC106	25W	+48	0.52	LP6
PW100	91W	+48	1.90	LP10

MULTIPLE OUTPUT MODELS

MODEL	MAX POWER	OUTPUT VOLT	OUTPUT CURRENT	CASE SIZE
SW201	22W	+5 +12	4.00 1.00	LP7
SW306	17W	+5 +12 -12	2.00 .80 .40	LP7
SW301	22W	+5 +12 -12	4.00 1.00 .60	LP7
SW300	25W	+5 +12 -12	4.00 1.00 .60	LP8
PW300	50W	+5 +12 -12	4.00 2.00 .50	LP8

Input: 90-264 VAC/47 to 63 Hz
Protection: Overcurrent and short circuit protected, 5V overvoltage crowbar, automatic resetting from overcurrent.
Short Circuit Protection: Indefinite at 50°C.
Transient Response: 500 microseconds for 50% load change typical.
Hold-up Time: 20-120 MS
EMI: Meets FCC Docket 20780 Class B and VDE 0871 Class B. CE Certified.
Enclosure: High impact resistant molded lexan plastic.
Safety Agencies: UL, CSA, TUV, IEC950
Operating Temperature: 0° to +50°C.
Warranty: 3 years

LINEAR DC POWER SUPPLIES

CONSIDER THE ADVANTAGES OF EXTERNAL POWER

SINGLE OUTPUT MODELS

MODEL	OUTPUT VDC	AMPS	CASE SIZE
3305-000-400	+5	.3	3
5305-000-400	+5	.5	5
7305-000-400	+5	1.25	7
H405-000-400	+5	3.0	7
7306-000-400	+6	1.2	7
3312-000-400	+12	.12	3
5312-000-400	+12	.4	5
7312-000-400	+12	.8	7
5324-000-400	+24	.25	5
7324-000-400	+24	.5	7
5348-000-400	+48	.1	5
7000-348-400	+48	.25	7

MULTIPLE OUTPUT MODELS

MODEL	OUTPUT VDC	AMPS	CASE SIZE
5712-000-400	±12	.2 ea.	5
5000-712-400	±12	.30 ea.	5
7712-000-400	±12	.4 ea.	7
5324-110-400	24 10 VAC	.2 .1	5
5712-305-401	+5 ±12	.5 .130 ea.	5
7712-305-401	+5 ±12	.6 .2 ea.	7
7612-305-401	+5 ±12	1.0 .25 ea.	7
H712-305-401	+5 ±12	2.0 .20 ea.	7

Input: 105-129 VAC 60 Hz or 230 ±10% VAC, 50 Hz
Protection: Fuse Protected.
Regulation: ±5% Overall Regulation.
Ripple: 10mV RMS.
Operating Temp: 0°C to 40°C
Safety Agencies: UL, CSA or TUV

OPTIONS: Input cord, output cord, output connector, ground pin, hot stamping.

UNREGULATED MODELS

Unregulated-Filtered/3.2 V.P.P. RIPPLE

MODEL	OUTPUT VDC	AMPS	CASE SIZE
3312-000-000	12	.35	3
5312-000-000	12	1.2	5
5323-000-000	23	.5	5
5316-000-000	16	.8	5
7323-000-000	23	1.0	7

Many More Models Available

STANDARDS • MODIFIEDS • CUSTOMS

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External transformers, battery chargers, linear and switching power supplies provide several advantages over conventional built in power sources as listed below:

FEATURES

- Wall plug-in and desktop styles
- Single and multiple output models available
- UL, CSA or TUV safety agency approved
- Impact resistant Lexan thermoplastic enclosure
- AC blades zinc plated solid brass with tapered tip
- Available with input and/or output cord(s) and connector
- One or three year Warranty
- Sealed construction
- Private label hot stamping available
- Universal, 120 VAC/60 Hz and 230V/50 Hz input for models available

BENEFITS

- Eliminate UL considerations because hazardous voltages are kept out of your product
- Increase space for other components in your product
- Increase aesthetic appearance and portability by reducing the size and weight of your product
- Keep power source heat out of your product for increased life
- Tamperproof power source
- Reduce design time for your product
- International uniformity of your product

BATTERY CHARGERS

FAST NiCd/NiMH CHARGERS

NUMBER OF CELLS	OUTPUT CURRENT (mA)	TIMER	CASE SIZE
4, 5, 6, 7, 8, 9, 10, 11	600, 800, 1.0, 1.2, 1.5	1.5, 3.0 or 6.0 HR	7/LP7

Over 175 standard models available

CONSTANT CURRENT NiCd/NiMH CHARGERS

NUMBER OF CELLS	OUTPUT CURRENT (mA)	PROTECTION	CASE SIZE
2 to 12	11mA to 184mA	Short Circuit Thermal Overload	3

Over 95 standard models available

SEALED LEAD ACID CHARGERS

BATTERY VOLTAGE (VDC)	OUTPUT 1 AT 2V/CELL (mA)	OUTPUT VOLTAGE (VDC) FAST	OUTPUT VOLTAGE (VDC) END	CASE
6	400	7.45	6.9	3
6	400	—	6.9	3
6	600	7.45	6.9	5
6	3800 max	7.35	6.9	LP7
12	300	14.9	13.8	3
12	300	—	13.8	3
12	500	14.9	13.8	5
12	2000 max	14.7	13.8	LP7
24	200	29.8	27.6	3
24	1250 max	29.4	27.6	LP7

AC TRANSFORMERS

US, EUROPEAN, BRITISH WALL PLUG-IN OR DUAL CORD STYLES

AC TRANSFORMERS — U.S. AND EUROPEAN WALL PLUG-IN OR DUAL CORD STYLES

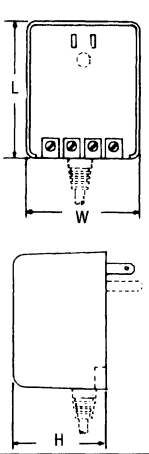
The following are all available with optional input cord, output cord, connectors, earth ground, center tap and custom hot stamped with your company logo. Standard models have output screw terminals. All versions are UL 1310 listed, some are CSA Approved.

VA	VOLTAGES	CASE SIZE
4	4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 18, 20, 22, 24	35
9	4, 5, 6, 7, 8, 9, 10, 12, 15, 16, 18, 20, 22, 24	41
10	6, 7, 9, 10, 12, 14, 16, 18, 20, 22, 24	3
16	10, 12, 14, 16, 18, 20, 22, 24	3
20	12, 14, 16, 18, 20, 22, 24	3
30	6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 18, 20, 22, 24	57
40	10, 12, 14, 16, 18, 20, 22, 24, 26	5

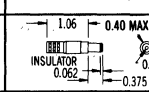
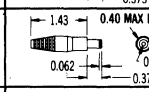
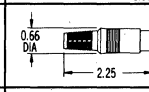
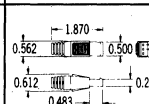
CASE SIZE (INCHES)

CASE	L	W	H
3	1.88	2.20	1.96
5	2.95	2.72	2.24
7	4.72	2.67	2.22
LP6	4.20	2.60	1.46
LP7	5.08	3.05	1.59
LP8	5.87	3.40	2.00
LP10	6.58	4.00	1.98

MANY OTHER CASES AVAILABLE



OUTPUT CONNECTORS

MODEL NUMBER	PROFILE & DIMENSIONS	PINOUT CODE	DESCRIPTION	MATING CONNECTOR
2		Center contact: positive	Switchcraft S760 plug	Switchcraft #722A or National Teltronics 6-205P-1 Right angle P.C. mount
3		Center contact: positive	Switchcraft 760 plug	Switchcrt #712A jack
12		(1) Com (2) Gnd (3) -5V (4) -12V (5) -12V	5-pin DIN 180° male connector	Various styles of straight or right angle panel or p.c. mounted DIN connectors
21		Transformer: (1) AC (2) Gnd (3) AC Power Supply: (1) DC (2) Com (3) Gnd	3-pin overmolded Molex connector (Housing 26-03-4030; Terminals 08-50-0187)	0.045 square pin on 0.156 centers. (Ref: Molex Series 2420, 2630)

MANY OTHER CONNECTORS AVAILABLE

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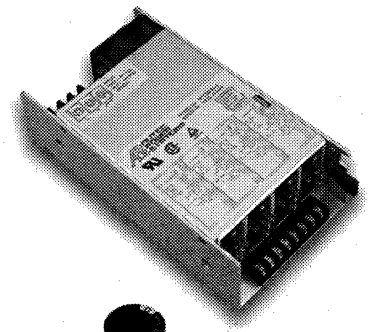

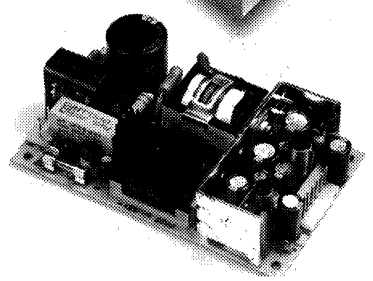

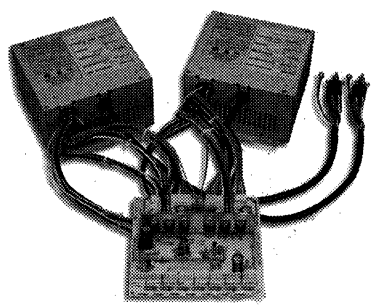

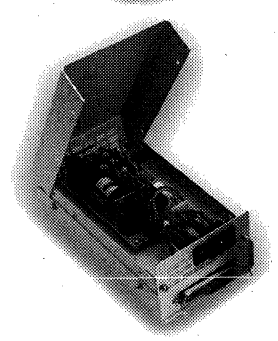

AUTEC Highlights

- Domestic and Far East Design Teams
- Domestic Sales Engineers
- Domestic and Far East R & D Teams
- National Distribution, Local Representation
- ISO 9002 Offshore Manufacturing
- Domestically Pursuing ISO 9001 Certification
- Domestic Stocking Warehouse
- Prototypes - Quick Turn-a-round
- 5 watt to 750 watt DC Power Supplies
- Complete Safety Agency Approvals

Product Options and Selections

- Open Frame
- Custom Designed Units
- Power Factor Correction Availability
- Desk Top Models
- Wall Mount Units
- Redundant Power & Load Sharing
- P.C. Series
- Telecom Series Power Supplies
- Mid-Power - 500 to 750 watts
- Hot Swap Models

CE VDE CSA TÜV Rheinland UL®

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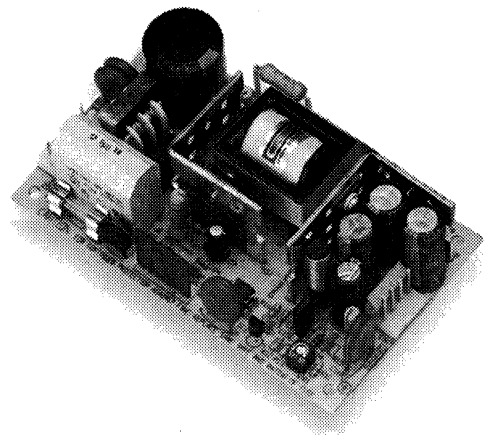
For more information on our complete product line, please visit our web site at: **www.autec.com**

AUTEC POWER SYSTEMS

Custom & Standard State-of-the-Art Switching Power Supplies Ranging from 5 Watts - 750 Watts

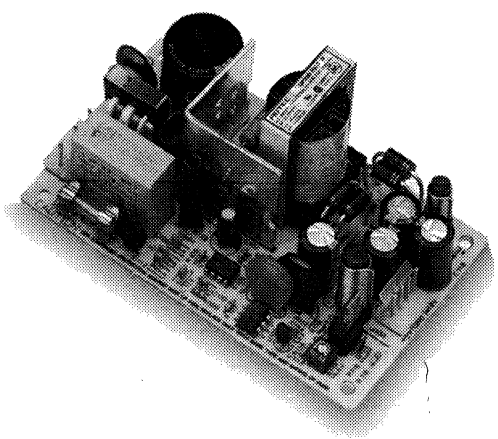
UPS Series 12W - 110W Open Frame Universal Input Models

Single Output - Model Selection Chart



Outline: .....1.57" X 4.72" X 1.14" / 40 X 120 X 29 mm Mounting: .....1.26" X 4.41" / 32 X 112 mm					
PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
12W / 17W	UPS12-1002	+5.0V	0.0A	2.0A	3.0A
12W / 15W	UPS12-1241	+24.0V	0.1A	0.5A	0.625A

Outline: ..... 3.0" X 5.0" X 1.1" / 76.2 X 127 X 28 mm Mounting: .....2.55" X 4.55" / 64.8 X 115.6 mm					
PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
40W / 60W	UPS40-2051	+5.0V	0.2A	8.0A	12.0A
40W / 60W	UPS40-2091	+9.0V	0.2A	4.5A	6.6A
40W / 60W	UPS40-2121	+12.0V	0.2A	3.5A	5.25A
40W / 60W	UPS40-2151	+15.0V	0.2A	2.7A	3.95A
40W / 60W	UPS40-2241	+24.0V	0.2A	1.7A	2.5A



Outline: ..... 3.5" X 6.0" X 1.46" / 89 X 152.4 X 37.1 mm Mounting: ..... 3.15" X 4.8" / 80 X 122 mm					
PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
65W / 85W	UPS65-1051	+5.0V	0.2A	13.0A	17.0A
65W / 85W	UPS65-1121	+12.0V	0.2A	5.5A	7.0A
65W / 85W	UPS65-1151	+15.0V	0.2A	4.5A	5.6A
65W / 85W	UPS65-1241	+24.0V	0.2A	2.75A	3.5A

Outline: ..... 4.29" X 7.0" X 1.88" / 108.5 X 178 X 47.7 mm Mounting: ..... 3.75" X 6.5" / 95.25 X 165.1 mm					
PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
85W / 110W	UPS110-1051	+5.0V	0.2A	16.7A	21.5A
85W / 110W	UPS110-1121	+12.0V	0.2A	7.0A	9.1A
85W / 110W	UPS110-1151	+15.0V	0.2A	5.6A	7.3A
85W / 110W	UPS110-1241	+24.0V	0.2A	3.5A	4.5A

NOTES:

1. Total peak power must not exceed the value indicated. with each output not exceeding its peak current rating. The supply may be capable of providing more than the specified continuous and/or peak ratings. Consult a factory Sales Engineer for application assistance.
2. Minimum load specified assures output voltage stability for all specified line voltage conditions. Full compliance to total regulation specifications may require additional loading (not to exceed 25% of rated output current for each output). Operation at no load will not damage the power supply.
3. Each output can provide its full rated output current, provided the total wattage does not exceed nominal (continuous) rating.
4. Peak power is available for 30 seconds maximum with a 10% duty cycle.

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AUTEC POWER SYSTEMS

Custom & Standard State-of-the-Art Switching Power Supplies Ranging from 5 Watts - 750 Watts

UPS Series — Open Frame Universal Input Models

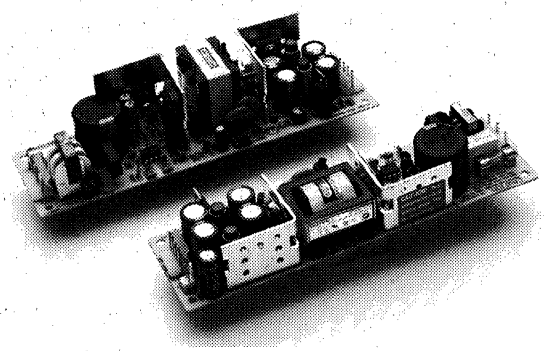
Dual Output - Model Selection Chart

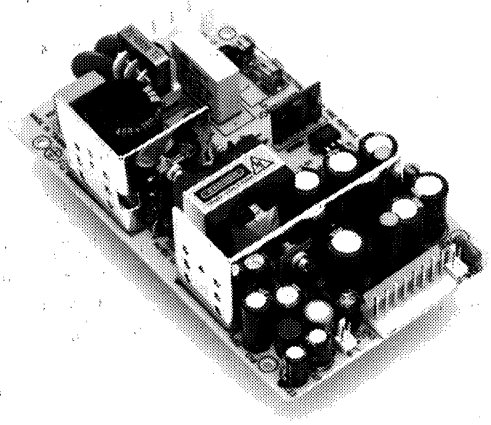
Outline: ..... 1.57" X 4.72" X 1.14" / 40 X 120 X 29 mm Mounting: .....1.26" X 4.41" / 32 X 112 mm					
PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
12W / 17W	UPS12-1002	+5.0V +12.0V	0.0A	2.0A 0.2A	3.0A
25W / 35W	UPS25-2002	+5 0V +12.0V	0.0A	1.5A 1.5A	3.0A

Outline: .....3.0" X 4.0" X 1.2" (1.5" 30W) / 76.2 X 101.6 X 30.8 mm (39 mm 30W) Mounting: .....2.59" X 3.58" / 66 X 91 mm					
PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
20W / 30W	UPS20-5002	+5.0V +12.0V	0.2A 0.2A	1.6A 1.0A	2.0A 2.0A
30W / 45W	UPS30-5002	+5.0V +12.0V	0.2A 0.2A	2.1A 1.8A	3.0A

Outline: ..... 2.0" X 7.0" X H (see below) / 51 X 178 X H (see below) Mounting: .....1.60" X 6.60" / 40.5 X 168 mm					
PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
40W / 60W	UPS40-1002 H= 1.20" / 30.8 mm	+5.0V +12.0V	0.2A 0.1A	3.0A 2.0A	4.5A
50W / 70W	UPS50-1002 H= 1.50" / 39 mm	+5.0V +12.0V	0.2A 0.1A	3.0A 3.0A	5.5A
65W / 120W	UPS65-2002 H= 1.50" / 39 mm	+5.0V +12.0V	0.2A	3.0A 4.0A	5.0A 10.0A

Outline: ..... 3.0" X 5.0" X H (see below) / 76.2 X 127 X H (see below) Mounting: .....2.55" x 4.55" / 64.8 X 115.6 mm					
PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
40W / 60W	UPS40-3002 H= 1.14" / 29 mm	+5.0V +12.0V	0.2A 0.1A	3.5A 3.0A	4.0A
40W / 60W	UPS40-2002 H= 1.10" / 28 mm	+5.0V +12.0V	0.2A 0.1A	3.0A 2.0A	4.5A
50W / 70W	UPS50-2002 H= 1.80" / 46 mm	+5.0V +12.0V	0.2A 0.1A	3.0A 3.0A	5.5A
50W / 70W	UPS51-2002 H= 1.20" / 30.5 mm	+5.0V +12.0V	0.2A 0.1A	4.0A 3.0A	5.0A 5.5A
70W / 105W	UPS70-3002 H= 1.70" / 43 mm	+5.0V +12.0V	0.5A 0.1A	6.0A 5.0A	8.0A 7.5A





NOTES:

1. Total peak power must not exceed the value indicated. with each output not exceeding its peak current rating. The supply may be capable of providing more than the specified continuous and/or peak ratings. Consult a factory Sales Engineer for application assistance.
2. Minimum load specified assures output voltage stability for all specified line voltage conditions. Full compliance to total regulation specifications may require additional loading (not to exceed 25% of rated output current for each output). Operation at no load will not damage the power supply.
3. Each output can provide its full rated output current, provided the total wattage does not exceed nominal (continuous) rating.
4. Peak power is available for 30 seconds maximum with a 10% duty cycle.

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AUTEC POWER SYSTEMS

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UPS Series — Open Frame Universal Input Models

Dual Output - Model Selection Chart

Outline: ..... 3.27" X 5.51" X 1.54" / 83 X 140 X 39 mm
Mounting: .....2.5" X 4.5" / 63.5 X 114.3 mm

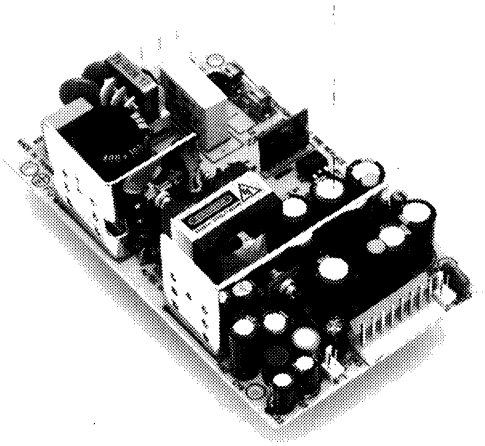
PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
65W / 90W	UPS65-1002-S	+5.0V +12.0V	0.5A 0.1A	3.5A 4.0A	10.0A 7.0A
65W / 90W	UPS65-1002-A	+5.0V +12.0V	0.5A 0.1A	6.0A 2.5A	10.0A 7.0A

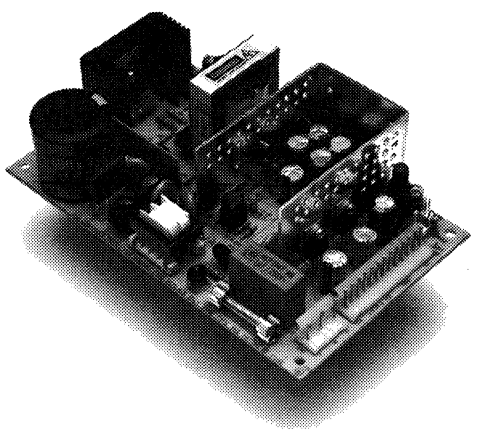
Outline: ..... 3.5" X 6.0" X H (see below) / 89 X 152.5 X H (see below)
Mounting: .....3.15" X 4.80" / 80 X 122 mm

PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
65W / 90W	UPS65-1002 H= 1.54" / 39mm	+5.0V +12.0V	0.5A 0.1A	3.5A 4.0A	10.0A 7.0A
65W / 90W Dual Output Adj.	UPS65-1002M H= 1.54" / 39 mm	+5.0V +12.0V	0.5A 0.1A	3.5A 4.0A	10.0A 7.0A
85W / 120W	UPS85-1002 H= 1.87" / 47.5 mm	+5.0V +12.0V	0.8A 0.5A	8.0A 6.7A	10.0A 9.0A

Outline: ..... 4.29" X 7.0" X 1.88" / 109 X 178 X 47.7 mm
Mounting: .....3.75" X 6.5" / 95.25 X 165 mm

PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
85W / 110W 125W PK	UPS110-1021	+5.0V +12.0V	0.0A 0.0A	7.0A 5.6A	15.0A 10.0A
85W / 110W 125W PK	UPS110-102M Dual Output Adj.	+5.0V +12.0V	0.0A 0.0A	7.0A 5.6A	15.0A 10.0A





Triple & Quad Output - Model Selection Chart

Consult factory for complete specifications and dimensions.

PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
30W / 45W	UPS30-4003 V2 V3	+5.0V +12.0V -12.0V	0.2A	3.0A 1.0A 0.2A	4.0A 3.0A 0.5A
40W / 60W	UPS40-3003 V2 V3	+5.0V +12.0V -12.0V	0.3A 0.1A	3.0A 1.8A 0.3A	5.0A 4.5A 0.5A
40W / 60W	UPS40-2003-1 V2 V3	+5.0V +12.0V -12.0V	0.2A 0.1A	5.0A 3.0A 0.5A	5.0A 4.5A 1.0A
40W / 60W	UPS40-2003-2 V2 V3	+5.0V +15.0V -15.0V	0.2A 0.1A	5.0A 2.0A 0.3A	5.0A 2.0A 1.0A
40W / 60W	UPS40-2003-4 V2 V3	+5.0V +24.0V -12.0V	0.2A 0.1A	5.0A 1.0A 0.5A	5.0A 2.0A 1.0A

PWR/PK (1)	MODEL	VOLTAGE	MIN. A (2)	FULL (3)	PEAK (4)
65W / 90W	UPS65-1004 V2 V3 V4	+5.0V +12.0V -12.0V -5.0V	0.5A 0.1A	5.5A 2.5A 0.5A 0.5A	10.0A 6.0A 1.0A 1.0A
65W / 90W	UPS65-1004-2 V2 V3 V4	+5.0V +12.0V -12.0V -5.0V	0.5A 0.1A	5.5A 2.0A 1.0A 1.0A	10.0A 4.0A N/A N/A
85W / 110W 125W PK	UPS110-1041 V2 V3 V4	+5.1V +12.0V -12.0V -5.0V	0.2A 0.2A	8.0A 4.5A 0.5A 0.5A	20.0A 9.0A 1.5A 1.5A
85W / 110W 125W PK	UPS110-1042 V2 V3 V4	+5.1V +12.0V -12.0V +24.0V	0.2A 0.2A	8.0A 4.5A 0.5A 3.5A	20.0A 9.0A 1.5A 4.5A
85W / 110W 125W PK	UPS110-1043 V2 V3 V4	+5.1V +15.0V -15.0V -5.0V	0.2A 0.2A	8.0A 4.0A 0.5A 0.5A	20.0A 7.5A 1.5A 1.5A

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AUTEC POWER SYSTEMS

Custom & Standard State-of-the-Art Switching Power Supplies Ranging from 5 Watts - 750 Watts

P.C. Series

150W - 400W - P.C. Power Supplies

Features

- **UL / CSA / TUV APPROVED**
- **3.3V OPTIONS (UP TO 5 OUTPUTS)**
- **AUTO-RANGING UNIVERSAL INPUT OPTION**
- **OPTIONAL VARIABLE SPEED FAN**
- **OPTIONAL BALL BEARING FAN**
- **LOAD SHARING OPTION AVAILABLE**

General Specifications

INPUT VOLTAGE:
90-132/180-264 VAC, 47-440 Hz.
Consult factory for 400 Hz operation.

INRUSH CURRENT:
30A peak @ 110 VAC, (40A 3.3V units)
60A peak @ 220 VAC, (80A 3.3V units)
(thermistor limited).

HOLD-UP TIME:
16 mS, min., from nominal line and full load.

DC OUTPUTS:
See chart.

SWITCHING FREQUENCY:
100 kHz nominal. (60 kHz 3.3V units).

EFFICIENCY:
75% typical, nominal line full load.

CONDUCTED EMI:
Contact Factory.

TEMPERATURE COEFFICIENT:
0.02% / degree C (after 30 min. warmup).

OVERLOAD PROTECTION:
Power limiting - within 150% of total power.

HI-POT ISOLATION:
1500 VAC input to output for 1 minute (DC equiv.).

RIPPLE & NOISE:
1% p-p of Volt, measured through a 12" twisted pair across a 47uf capacitor. (-5V output = 2% p-p).

OVERVOLTAGE PROTECTION:
+5V & 3.3V output exceeding 112% - 132% causes crowbar, automatic recovery.

OPERATING TEMPERATURE:
0° to 50° C at rated continuous load, derating linearly to 50% of rated load at 70° C.

STORAGE TEMPERATURE:
-55° C to 85° C.

HUMIDITY:
5% to 95% R.H. (N.C.).

ALTITUDE:
10,000 ft., 40,000 ft. non-operating.

SAFETY:
UL, CSA and TUV approved.

Output Rating Information

WATTAGE (1) (NOMINAL)	VOLTAGE	MINIMUM (2)	FULL (3)	PEAK (4)	REGULATION (5)
150 WATTS (168W)	+5.0V	1.5A	18.0A	N/A	±3%
	+12.0V	0.0A	5.8A	10.0A	±5%
	-12.0V	0.0A	0.5A	N/A	±5%
	-5.0V	0.0A	0.5A	N/A	±5%
200 WATTS (204W)	+5.0V	2.0A	20.0A	N/A	±3%
	+12.0V	0.0A	8.0A	12.0A	±5%
	-12.0V	0.0A	0.5A	N/A	±5%
	-5.0V	0.0A	0.5A	N/A	±5%
250 WATTS (253W)	+5.0V	3.0A	25.0A	N/A	±3%
	+12.0V	0.0A	10.0A	13.0A	±5%
	-12.0V	0.0A	0.5A	N/A	±5%
	-5.0V	0.0A	0.5A	N/A	±5%
270 WATTS (270W) [3.3V, 5 output]	+5.0V	3.0A	28.0A	N/A	±3%
	+3.3V	0.0A	11.0A	N/A	±3%
	+12.0V	0.0A	7.0A	10.0A	±5%
	-12.0V	0.0A	0.5A	N/A	±5%
	-5.0V	0.0A	0.5A	N/A	±5%
300 WATTS (326W)	+5.0V	3.0A	30.0A	N/A	±3%
	+12.0V	0.0A	14.0A	16.0A	±5%
	-12.0V	0.0A	0.5A	N/A	±5%
	-5.0V	0.0A	0.5A	N/A	±5%
330 WATTS (339W) [3.3V, 5 output]	+5.0V	3.0A	28.0A	N/A	±4%
	+3.3V	0.0A	25.0A	N/A	±3%
	+12.0V	0.5A	9.0A	12.0A	±5%
	-12.0V	0.0A	0.5A	N/A	±5%
	-5.0V	0.0A	0.5A	N/A	±5%
400 WATTS ***NEW***	CONSULT FACTORY FOR SPECIFICATIONS				

NOTES:

1. The power supply may be capable of more than the specified continuous and/or peak ratings, depending upon the nature of the application. Consult a factory Sales Engineer for feasibility.
2. Minimum load specified assures output voltage stability for all specified line voltage conditions. Full compliance to the total regulation specification may require additional loading (not to exceed 25% of rated output current for each output). Operation at no load will not damage the power supply.
3. Each output can provide its full rated output current provided the total wattage does not exceed nominal (continuous) rating.
4. Peak Power is available for 30 seconds maximum with a 10% duty cycle.
5. Total regulation includes the combined effects of:
   a) initial setpoint of main output (and/or any other adjustable output) of ±1% max.
   b) line regulation for any input voltage change between 90 & 264 VAC.
   c) load regulation for a min. - 100% of rated continuous load change.
   d) cross regulation for a min. - 100% of rated continuous load change on any other output(s) and assumes that the total continuous power rating of the supply is not exceeded.[See Note 2].

REGULATION PERFORMANCE IS PARTIALLY DEPENDENT UPON HOW THE LOAD IS DISTRIBUTED THROUGH THE OUTPUT CABLES / HARNESSES.

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AUTEC POWER SYSTEMS

Custom & Standard State-of-the-Art Switching Power Supplies Ranging from 5 Watts - 750 Watts

Mid-Power Series

500W - 750W Mid Power

Features

- **PFC OPTION (IEC 1000-3-2)**
- **UL / CSA / TUV APPROVED**
- **90-264 VAC AUTO SELECT AC INPUT**
- **9" CHASSIS WITH TERMINAL BLOCK (optional)**
- **8" CHASSIS FOR COMPACT SIZE**
- **ISOLATED OUTPUTS**
- **CLASS 'B' CONDUCTED EMI**
- **REMOTE SENSE**
- **ADJUSTABLE OUTPUT VOLTAGES**
- **OUTPUT PARALLEL CAPABILITY**

General Specifications

INPUT VOLTAGE:
90-264 VAC, 47-440 Hz.
Consult factory for 400 Hz operation.

INRUSH CURRENT:
20A@ 110 VAC. 40A @ 220 VAC.

P.F.C.:
(750W, 500W - option).

INPUT FUSING:
12A on power supply.

HOLD-UP TIME:
20 mS, min., from nominal line and full load.

DC OUTPUTS:
See chart.

SWITCHING FREQUENCY:
120 kHz nominal.

EFFICIENCY:
70% typical.

CONDUCTED EMI:
VDE and FCC Class 'B'.

TEMPERATURE COEFFICIENT:
0.02% / degree C (after 30 min. warmup).

OVERLOAD PROTECTION:
Power limiting - within 150% of total power.

HI-POT ISOLATION:
3750 VAC input to output for 1 minute (DC equiv.).

RIPPLE & NOISE:
1% p-p of output voltage measured through a 12" twisted pair across a 47uf capacitor.

OVERVOLTAGE PROTECTION:
Output voltage exceeding (110% + 0.5V) causes latched shut-down. Recovery with input recycling.

OPERATING TEMP.:
0° to 50° C at rated continuous load, derating linearly to 50% of rated load at 70° C.

STORAGE TEMP.:
-55° C to 85° C.

HUMIDITY:
5% to 95% R.H. (N.C.).

ALTITUDE:
10,000 ft. operating, 40,000 ft. non-operating.

SAFETY:
UL, CSA and TUV approved.

Using the following charts, select the modules required to meet your application requirements. Please note that there are up to a maximum of six module slots available. Contact a Factory Sales Engineer to obtain an exact model number for ordering. Note: Unless otherwise specified by the customer, installed modules will be highest current / lowest voltage - right to left, (as viewed from the output connector end of the unit). The modules will have numbered slots which make their position on the unit clear.

MODULE #	VOLTS DC	AMPS
A	2V	35A
B	2V	25A
C	2V	12A
D	3.3V	35A
E	3.3V	25A
F	3.3V	12A
G	5V	35A
H	5V	25A
J	5V	12A
K	9V	13A
L	12V	10A

MODULE #	VOLTS DC	AMPS
M	12V	5A
N	15V	8A
P	15V	4A
S	24V	5A
T	24V	2.5A
V	±5V	12 / 12A
W	±12V	5 / 5A
X	±15V	4 / 4A
Y	±24V	2.5 / 2.5A
0	BLANK (NO MODULE)	N/A

Typical model number configurations

MODEL	WATTAGE	SIZE	OUTPUTS:
MPS50-GLLV	500W	8" x 5" x 2.5"	5V @ 35A, 12V @ 10A, -12V @ 10A, +5V @ 3A, -5.25V @ 3A
MPS50-EHYO	500W	8" x 5" x 2.5"	3.3V @ 25A, 5V @ 25A, + 24V @ 2.5A, -24V @ 2.5A
MPC50-HMLV	500W	9" x 5" x 2.5"	5V @ 25A, 12V @ 5A, -12V @ 10A, +5V @ 3A, -5V @ 3A
MFC75-GLLY	750W	9" x 7.5" x 2.5"	5V @ 35A, 12V @ 10A, -12V @ 10A, + 24V @ 2A, -24V @ 2A
MFC50- DDGL	500W	9" x 5" x 2. 5"	3.3V @ 70A, 5V @ 35A, -12V @ 10A
MFC75-DDGGLM	750W	9" x 7.5" x 2.5"	+3.3V @ 35A, -3.3V @ 35A, +5V @ 35A, -5V @ 35A, +12V @ 10A, -12V @ 5A

Note:
1. Polarity reference on single output modules (-12V@10A) is an example only. All single output modules are isolated and can be referenced as either positive or negative.
2. Each output can be used up to its rated capacity as long as total unit wattage is not exceeded.
3. For 8" chassis without output terminal block specify MFS prefix. For 9" chassis with output terminal block specify MFC prefix.

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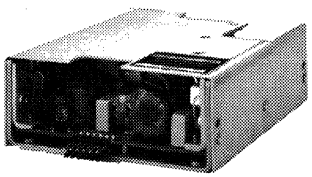
Power Supplies for Military, Commercial & Telecommunications Applications

350W "COTS" Power Supplies BCPS300 Family

Input: 85-264VAC Autoranging
47-440HZ
Optional, 24VDC Battery Back-up

Typical Output: 5VDC @ 50A
12VDC @ 8A/12A Surge
12VDC @ 4A
5VDC @ 4A

Dimensions: 6" X 5" X 2"



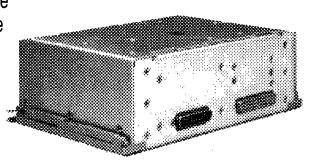
P.F. Corrected, N+1 Redundant, Meets VDE0806, UL1950

200W Military Airborne Power Supply BC200

Multi-Input: 105-132VAC Single Phase
115/208VAC Three Phase
28VDC

Outputs: 5VDC @ 30A
12VDC @ 1.5A
-12VDC @ 3A
28VDC @ 1.4A

Dimensions: 6.25" X 9.2" X 2.9"



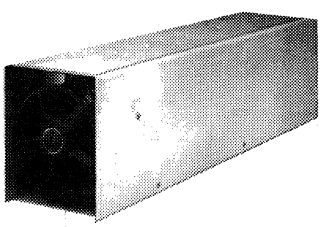
Mil-STD 461, Mil-STD 2000, Conduction Cooled

4.5KW Telecom/RF Amp Power Supply BCPS3K Family

Input: 115/208VAC 3 Phase
47-440HZ

Output: 28VDC @ 150A
or
Output: 48VDC @ 75A

Dimensions: 4" X 5.25" X 19"



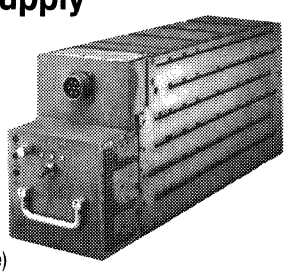
Mil-STD 461, N+1 Redundant, Full Power at 70° C

12KW Radar Power Supply BC11K

Input: 115/208VAC 3 Phase
47-440HZ

Outputs: 300VDC @ 35A Avg.,
110A Peak
5VDC @ 45A
15VDC @ 16A
-15VDC @ 35A
5VDC @ 1A (Uninterruptable)

Dimensions: 6.8" X 10.5" X 24"



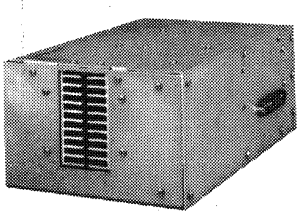
Water Cooled, 93% Eff., 1400 Joule Energy Storage

1.2KW Medical Power Supply BCPS1K Family

Input: 85-264VAC Autoranging or
115/208VAC 3 Phase
47-440HZ

Typical Output: 300VDC @ 4A, 15A Surge

Dimensions: 3.9" X 9.9" X 6"



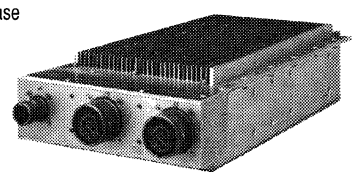
Meets IEC601

560W 9 Output Military Airborne Power Supply, BC560

Input: 115/208VAC 3 Phase
400HZ

Output: 5VDC @ 7A,
-5VDC @ .6A
12VDC @ 2.5A
-12VDC @ 2A
15VDC @ .75A
-15VDC @ .75A
35VDC @ 5A/12A Surge
-35VDC @ 5A/12A Surge
75VDC @ .2A

Dimensions: 12.2" X 6.4" X 2.7"

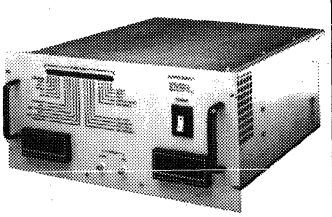


Programmable 4 Quadrant Industrial Power Supply

Input: 208VAC 60HZ

Output: 0 to +/-10VDC @ 40A
300uV Programming Resolution
1mV Accuracy

Dimensions: 19" Rack Mounted



High Speed Programing of Output Voltage and Current with Fast Settling Time

Radiation Hardened Space Rated Power Supply

Input: 26-48VDC

Outputs: 9.2VDC @ 2.8A
3.0VDC @ .1A

Dimensions: 5" X 2" X 1"

4,000,000 hr. MTBF, 100K Rad Total Dose Exposure

BC SYSTEMS, INC. 200 BELLE MEADE ROAD • SETAUKET, NEW YORK 11733 • (516) 751-9370 • FAX (516) 751-9378

For more information about our complete product line contact John Classen at (516) 751-9370, or Email # bcpowersys@nais.com or visit our website at www.bcpowersys.com

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SELECTION GUIDE

MODULES & INSTRUMENTS

MODEL SERIES

MODEL	OUTPUT VOLTAGE kV/CURRENT mA																FEATURES						
	.500	1	1.5	2	2.5	3	5	7.5	10	15	20	30	50	60	75	100	REV.	CV/CC		Imon	METER	IEEE RS232	
105	2000	1000		500		333	200		100		50	33			13		●	●	●	●	D	O	
205B						10	5				1		0.3				●			●	D	O	
210		225	130	100			40				7	4.5	2.5		2	1	●			●	A	O	
225		30				10	5		2.5		1	0.5					●			●	D	●	
230		15				5	3					0.4					●			●	D		
602C		15				5	2		1	0.6	0.5									●			
603C			20			10	5		2		1									●			
605C			6			3														●			
606C							5		2	1.5	1	0.4								●			
612C											1									●			
701												2	1							●			
720A												0.3											
730A												0.5								●			
740A												2	1							●			
815	200					33					5	3.3	2					●	●	●			
825	400					66	40		20		10		4					●	●	●			
835		300	200				60		30		15	10	6	5				●	●	●			
915	200					33			10		5	3.3	2					●	●	●	D		
935	600	300	200				60		30		15	10	6	5				●	●	●	D		
CRT30												2								●	D		
CRT50													2								D		
EB/IB-30A																			●	●	D		
EB/IB-50A													.25							●	D		
EB/IB100A																.25				●	D		
HV-SERIES		2		1																			
MPS (10W)		10	6			3	2		1	.6	.5	.2								●	D		
MPS (30W)		30	20			10	5		2	1.5	1	.4								●	D		
PMT	8	4		2		1	0.5	0.25															
SERIES AR												.4					●	●	●	●	D		
XR									30		15		6		4			●	●	●			

NIM MODULES

MODEL SERIES

MODEL	OUTPUT VOLTAGE kV						FEATURES		
	1	2	3	5	7.5	10	REV.	Vmon	Meter
301	3						●		
303			1				●		
305				0.5			●		
310									
313B			10				●		A
315B				5		2	●		A
320									
323			10				●		D
325				5			●		D
342A		1					●		A

MODEL	OUTPUT VOLTAGE kV						FEATURES		
	1	2	3	5	7.5	10	REV	Vmon	Meter
345A							●		A
353			2				●		A
355				1			●		A
362**		1					●		A
362/5**		1		0.3			●		A
365**				0.3			●		A
375**				0.5				●	A
377**					.5			●	A
380**						0.3		●	A

Refer to detailed data pages for final selection.
Chart is intended as an initial aid in the selection process.

Models 313B, 315B, 320, 323, 325, 353, 355 operate off AC line input power. All other models require NIM Bin DC power inputs.

**Dual Output Models
CV/CC-Constant Voltage Constant Current
D–Digital
A-Analog
●-Standard O–Optional

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NEW PRODUCTS FOR X RAY APPLICATIONS

REGULATED HIGH VOLTAGE X-RAY MODULES

SERIES 701

MODEL	OUTPUT	
	VOLTAGE	CURRENT
701-10N/P	0 to 10 kV	0 to 5 mA
701-20N/P	0 to 20 kV	0 to 2.5 mA
701-30N/P	0 to 30 kV	0 to 1.67 mA
701-50N/P	0 to 50 kV	0 to 1.0 mA
701-65N/P	0 to 65 kV	0 to .77 mA
701-75N/P	0 to 75 kV	0 to .57 mA

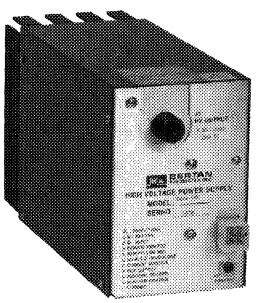
- **Models to 75 kv and up to 50 W**
- **Integrated filament supply**
- **Low ripple and noise**
- **Internal control, remote monitoring**
- **Arc and short circuit protected**
- **Compact package for OEM applications**

The BERTAN Series 701 are compact versatile high voltage modules that include a wide range of standard and optional features. These features include adaptable control circuitry, filament power supply, control grid power supply, safety circuits, and connector choices that make these units ideal for X-ray and other electron beam applications.

The power supply high voltage and current outputs are adjustable by an internal multi-turn potentiometer or programmable by a 0 to +5V source for 0 to maximum voltage output.

Positive polarity units can be provided with an optional filament power supply. If used to power a filamentary controllable electron beam device, the filament power supply can act as a constant beam current controller. The required control circuitry is included in the optional filament power supply.

Input: +23 to 29 Vdc, 6A maximum. The input will be protected against damage due to reverse polarity power connection. **Regulation:** ±0.01% line, ±0.01% load. **Ripple:** 0.1% of maximum, pk-to-pk. Temperature Coefficient: 0.01%/°C (0 to 50°C) • **Monitors:** 0 to +5V for 0 to maximum voltage and current. **Size:** 10″L x 3-15/16″ W x 6-1/4″H (254 x 100 x160 mm) • **Weight:** 10 lbs (4.5 kg)



3 kW HV GENERATOR FOR X-RAY DIFFRACTION & FLUORESCENCE

SERIES XR-3000

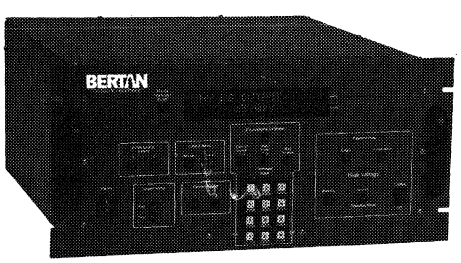
- **Vast improvement in technology and cost over competitive models**
- **Full adjustment from front panel or remote control for beam voltage and emission current**
- **Over voltage, arc and short circuit protection**
- **Provision for water flow control outlets**
- **Solid encapsulants guarantee maintenance free operation**
- **Flexibility of design to accommodate varied system requirements**
- **Appropriate for scientific or OEM applications**

The Model XR-3000 includes all necessary features for the safe and reliable operation of X-ray sources designed for fluorescence and diffraction applications.

The unit contains an integrated filament supply and the control circuitry required for filamentary emission control. Constant beam power or constant filament current modes are user selectable.

All operation and monitoring is via the front panel user control or can be accomplished via remote operation. The analog and digital interfaces allow for remote system control and monitoring.

Line Input: 220 Vac +/-10%, 50/60 Hz, single phase. • **High Voltage Output:** 0 to 60 kV dc, 0 to 60 mA dc, 0 to 3,000 Watts. • **Output Voltage Regulation:** 0.005% for full load change or +/-10% line input change. • **Voltage Ripple:** 0.05% rms. • **Output Current Regulation:** 0.01% for load and +/-10% line input change • **Temperature Coefficient:** 50 ppm/°C • **Stability:** 0.01%/hr, 0.02%/24hrs • **Filament Power Output:** 0 to 7.5 V dc, 0 to 7.5 A dc **Size:** 7″ H x 20″ D x 19″ W (standard RM) (178 x 508 x 483 mm) • **Weight:** 80lb(36kg)



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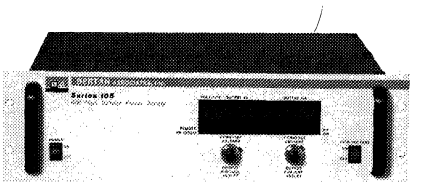
PRECISION SWITCHING LABORATORY POWER SUPPLIES

SERIES 105 1kW

MODEL		OUTPUT	
SERIES 105	SERIES 106	VOLTAGE	CURRENT
105-0.5R	106-0.5R	0 to 500V	0 to 2A
105-01R	106-01R	0 to 1kV	0 to 1A
105-02R	106-02R	0 to 2kV	0 to 500mA
105-03R	106-03R	0 to 3kV	0 to 333mA
105-05R	106-05R	0 to 5kV	0 to 200mA
105-10R	106-10R	0 to 10kV	0 to 100mA
105-20R	106-20R	0 to 20kV	0 to 50mA
105-30R	106-30R	0 to 30kV	0 to 33mA
105-50P,N	106-50P,N	0 to 50kV	0 to 20mA
105-75P,N	106-75P,N	0 to 75kV	0 to 13mA



- **Constant Voltage/Constant Current**
- **Auto Crossover**
- **Reversible Polarity**
- **IEEE-488 Interface Option**

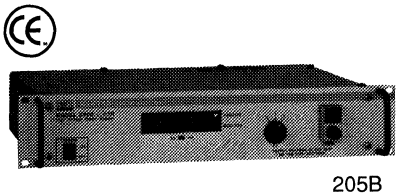
These precision switch mode power supplies have output voltages ranging from 500V to 75kV. They feature constant voltage and constant current with automatic crossover. For safety and reliability, all models include remote interlock, slow start and power interrupt as well as arc, short and open circuit protection. Remote programming of the power supply output voltage and output current can be accomplished with a remote analog voltage, remote resistance or with an optional IEEE-488 interface (Model 105-C488).
For dedicated remote applications, units are available without front panel controls, digital metering and operating mode indicator lights (Series 106).
Input: 115/230 Vac, 50-60 Hz • **Voltage Regulation:** ±0.002% for ± 10% line change, ±0.04% for NL/FL or FL/NL • **Ripple:** 0.1% of setting + 0.1% of max. peak to peak • **Current Regulation:** ±0.1% for ±10%line change, ±0.2% for NL/FL or FL/NL • **Temperature Coefficient:** ± 100 ppm for constant voltage, ±200 ppm for constant current • **Size:** 19″ x 5.2″ x 17″ (483 x133 x 432mm) • **Weight:** 45.1 lbs. (20kg)

PRECISION LINEAR LABORATORY POWER SUPPLIES

SERIES 205B/206B up to 30W

MODEL		OUTPUT				
SERIES 205B	SERIES 206B	VOLTAGE	V-DISPLAY RESOLUTION	CURRENT	I-DISPLAY RESOLUTION	RIPPLE
205B-01R	206B-01R	0 to 1kV	1V	0 to 30mA	10µA	10mV
205B-03R	206B-03R	0 to 3kV	1V	0 to 10mA	10µA	30mV
205B-05R	206B-05R	0 to 5kV	1V	0 to 5mA	1µA	50mV
205B-10R	206B-10R	0 to 10k	10V	0 to 2.5mA	1µA	100mV
205B-20R	206B-20R	0 to 20kV	10V	0 to 1mA	1µA	300mV
205B-30R	206B-30R	0 to 30kV	10V	0 to 0.5mA	1µA	400mV
205B-50R	206B-50R	0 to 50kV	10V	0 to 0.3mA	1µA	2V

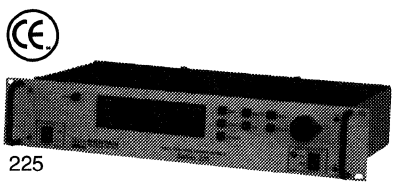
Measured peak to peak at maximum output.



205B

SERIES 225/226 up to 30W

MODEL		OUTPUT			PROGRAMMING** RESOLUTION	
SERIES 225	SERIES 226	VOLTAGE	CURRENT	RIPPLE	VOLTAGE	CURRENT
225-0.5R	226-0.5R	0 to 500V	60mA	100mV	10mV	1µA
225-01R	226-01R	0 to 1kV	0 to 30mA	10mV	100mV	1µA
225-03R	226-03R	0 to 3kV	0 to 10mA	30mV	100mV	1µA
225-05R	226-05R	0 to 5kV	0 to 5mA	50mV	100mV	0.1µA
225-10R	226-10R	0 to 10kV	0 to 2.5mA	100mV	1V	0.1µA
225-20R	226-20R	0 to 20kV	0 to 1mA	300mV	1V	0.1µA
225-30R	226-30R	0 to 30kV	0 to 0.5mA	400mV	1V	0.01µA
225-50R	226-50R	0 to 50kV	0 to 0.3mA	2V	1V	0.01µA



225

- **Reversible Polarity**
- **Voltage and Current Metering**
- **Remote Programming and Monitoring**
- **IEEE-488 Interface***

The Series 205B/225 are a family of fully enclosed, precision regulated, linear power supplies. They feature a digital LED meter for current or voltage (switch selectable), remote analog programming and monitoring, reversible polarity, and direct reading calibrated front panel voltage control. The Series 206B/226 offers identical performance specifications but omits the front panel controls and meter of the Series 205B/225. All models provide arc and short circuit protection for safe, reliable operation.
*An IEEE-488 interface is standard on the Series 225/226 models, and is available as an option on the Series 205B/206B (Model 200-C488).
Input: 115/230 Vac, 50-60 Hz • **Line Regulation:** ±0.001% for ±10% line change • **Load Regulation:** ±0.005% for NL/FL or FL/NL • **Temperature Coefficient:** 50ppm per °C • **Remote programming and Monitoring:** 0 to +5 V • **Size:** up to 20kV - 19″ x 3.5 x 9.6″ (483 x 89 x 244mm); 30 kV, 50 kV - 19″ x 5.25″ x 16″ (483 x 133 x 406mm) • **Weight:** 20.1 lbs. (9.1kg)

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PRECISION LINEAR LABORATORY POWER SUPPLIES

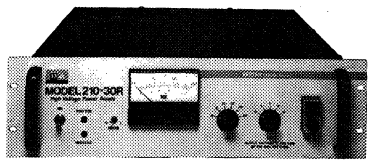
SERIES 210 up to 225W

MODEL	OUTPUT		
	VOLTAGE	CURRENT	RIPPLE*
210-01R	0 to ±1kV	0 to 225mA	50mV
210-01.5R	0 to ±1.5kV	0 to 130mA	100mV
210-02R	0 to ±2kV	0 to 100mA	100mV
210-03R	0 to ±3kV	0 to 75mA	100mV
210-05R	0 to ±5kV	0 to 40mA	200mV
210-10R	0 to ±10kV	0 to 15mA	500mV
210-20R	0 to ±20kV	0 to 7mA	1V
210-30R	0 to ±30kV	0 to 4.5mA	1.5V
210-50R	0 to 50kV	0 to 2.5mA	5V
210-75P,N	0 to 75kV	0 to 2mA	5V
210-100P,N	0 to 100kV	0 to 1mA	10V

**Measured peak to peak at maximum output.*

- **Reversible Polarity**
- **Voltage and Current Metering**
- **Remote Programming and Monitoring**
- **IEEE-488 Interface Available**

The series 210 is a family of fully enclosed, precision regulated, linear power supplies. They feature an analog meter for current or voltage (switch selectable), remote analog programming and monitoring, reversible polarity (up to 50kV), and direct reading calibrated front panel voltage control. All models provide arc and short circuit protection for safe, reliable operation. Any model may be ordered with optional 16 bit binary remote programming. An IEEE-488 interface is also available (Model 200C488).



Input: 115/230 Vac, 50-60 Hz • **Line Regulation:** ±0.001% for ±10% line change • **Load Regulation:** ±0.005 for NL/FL or FL/NL • **Temperature Coefficient:** 50ppm per °C • **Remote Programming and Monitoring:** 0 to +5V • **Size:** up to 5kV - 19″ x 5.2″ x 11″ (483 x 133 x 279mm); 10kV-100kV - 19″ x 5.2″ x 16″ (483 x 133 x 406mm)

BENCH-TOP POWER SUPPLIES

SERIES 230 12 to 15W

MODEL	OUTPUT		
	VOLTAGE	CURRENT	RIPPLE*
230-01R	0 to ±1kV	0 to 15mA	10mV
230-03R	0 to ±3kV	0 to 5mA	30mV
230-05R	0 to ±5kV	0 to 3mA	50mV
230-10R	0 to ±10kV	0 to 1.5mA	500mV
230-20R	0 to ±20kV	0 to 600µA	2V
230-30R	0 to ±30kV	0 to 400µA	5V

**Measured peak to peak at maximum output.*

- **Reversible Polarity**
- **Digital Voltage and Current Meter**
- **Compact Benchtop style**
- **Low Ripple and Noise**

The Series 230 is a family of regulated, compact, linear precision high voltage power supplies, available with outputs up to 30 kV. Output polarity of all models is reversible. A 3 1/2 digit LCD meter displays voltage or current (switch selectable). Automatic current limiting and arc protection assure safe, reliable operation.

Standard features include remote output voltage and current monitoring, remote interlock, and increased current limit sensitivity (25% of maximum rated output).

Input: 115/230 Vac, 50-60 Hz • **Line Regulation:** ±0.002% for ±10% line change • **Load Regulation:** ±0.01% for

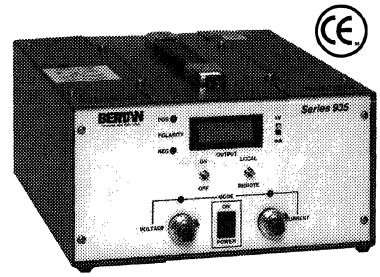
NL/FL or FL/NL • **Temperature Coefficient:** 100ppm per °C • **Size:** 7.6″ x 7.5″ x 5.2″ (194 x 191 x 128mm) • **Weight:** 10.1 lbs. (4.5kg)

SERIES 915/935 100W and 300W

MODEL SUFFIX	OUTPUT VOLTAGE	OUTPUT CURRENT	
		SERIES 915	SERIES 935
-0.5N/P	0 to 500V	0 to 200mA	0 to 600mA
-1N/P	0 to 1kV	0 to 100mA	0 to 300mA
-1.5N/P	0 to 1.5kV	0 to 66mA	0 to 200mA
-3N/P	0 to 3kV	0 to 33mA	0 to 100mA
-5N/P	0 to 5kV	0 to 20mA	0 to 60mA
-10N/P	0 to 10kV	0 to 10mA	0 to 30mA
-20N/P	0 to 20kV	0 to 5mA	0 to 15mA
-30N/P	0 to 30kV	0 to 3.3mA	0 to 10mA
-50N/P	0 to 50kV	0 to 2mA	0 to 6mA
-60N/P-FL	0 to 60kV	0 to 1.6mA	0 to 5mA

- **Up to 60 kV Output**
- **Fixed polarity**
- **Compact Bench-top size**
- **Constant Voltage/Constant Current-Auto Crossover**

The Series 915 and 935 are 100W and 300W regulated switchmode power supplies with output voltages ranging from 500V to 60 kV. They feature constant voltage/constant current operation with automatic crossover. All Models are fixed polarity, either positive or negative. Front panel controls include calibrated



potentiometers for setting current and voltage, Power and HV ON/OFF switches, and a digital meter for reading output voltage or current. These supplies may also be controlled using remote analog signals.

Input: 90-135/185-265 Vac, 50-60 Hz • **Line Regulations:** 0.02% • **Temperature Coefficient:** <100ppm/degC • **Ripple:** 0.2% pk-pk • **Size:** 915: 5.25″ x 5.75″ x 12.5″ (133 x 146 x 318mm); 935: 5.25″ x 10.25″ x 12.5″ (133 x 260 x 318mm)

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HIGH VOLTAGE LINEAR POWER SUPPLY MODULES

SERIES 612C 20W

MODEL	OUTPUT		
	VOLTAGE	CURRENT	RIPPLE*
612C-200P,N	0 to 20kV	0 to 1mA	200mV
612C-300P,N	0 to 30kV	0 to 0.5mA	300mV
612C-500P,N	0 to 50kV	0 to 0.3mA	800mV

Measured peak to peak at maximum output.

- **High Stability**
- **Low Ripple and Noise**
- **Internal and Remote Control**
- **Voltage and Current Monitoring**

The Series 612C is a family of regulated, fixed output polarity, modular high voltage power supplies. They provide exceptional performance and are ideally suited to many specialized requirements such as CRTs, imaging, ion beam and electron beam applications.

The Series 612C requires a standard line voltage of 115/230 Vac (switch selectable) 50-60 Hz. The units are fully enclosed and designed for system or bench top operation. Models are available from 20kV up to 50kV.

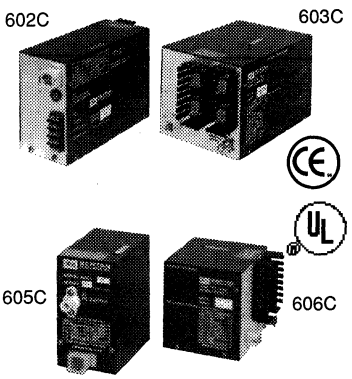
The output voltage is controlled locally by an internal multi-turn potentiometer. Provision for remote analog voltage or resistance programming is included in all models. Analog monitor outputs are also included for remote monitoring of both the high voltage and current outputs. All units are short circuit current limited and arc protected.

Input: 115 Vac ± 10% @ 1A, 50-60 Hz, 230 Vac ± 10% @ 0.5A, 50-60 Hz • **Line Regulation:** ± 0.001% of max. for ± 10% line change • **Load Regulation:** ±0.002% of max. for 0 to max. rated output current change • **Temperature Coefficient:** 50ppm of max. per °C • **Stability:** 0.01% per hour; 0.02% per 8 hours • **Local Control:** Internal multi-turn potentiometer for 0 to 102% of max. output voltage • **Remote Programming:** 0 to -5 Vdc analog input signal proportional to 0 to 102% of max. rated output. The programming input impedance is greater than 10 megohms • **Size:** 4.88″ x 8.38″ x 9.75″ (124 x 213 x 248mm) • **Weight:** 9 lbs. (4.1kg)

SERIES 600 30W

602C, 603C, 605C, 606C			MAXIMUM OUTPUT CURRENT			
			AC POWERED UNITS		DC POWERED UNITS	
MODEL SUFFIX	OUTPUT VOLTAGE	RIPPLE*	SERIES 602C	SERIES 603C	SERIES 605C	SERIES 606C
-10P,N	0 to 1kV	15mV	15mA	30mA	N.A.	N.A.
-15P,N	0 to 1.5kV	15mV	10mA	20mA	6mA	20mA
-30P,N	0 to 3kV	30mV	5mA	10mA	3mA	10mA
-50P,N	0 to 5kV	50mV	2mA	5mA	1.5mA	5mA
-100P,N	0 to 10kV	200mV	1mA	2mA	.75mA	2mA
-150P,N	0 to 15kV	450mV	0.6mA	1.5mA	.4mA	1.5mA
-200P,N	0 to 20kV	800mV	0.4mA	1mA	N.A.	1mA
-300P,N	0 to 30kV	3.0V	N.A.	.4mA	N.A.	.4mA

Measured peak to peak at maximum output.



- **Low Ripple and Noise**
- **AC or DC Powered**
- **Internal Control/Remote Programming**
- **Voltage and Current Monitoring**

The Series 602C, 603C, 605C and 606C are four families of regulated, fixed output polarity, modular high voltage power supplies.

The Series 602C and 603C require a standard line input of 115/230 Vac (switch selectable), 50-60 Hz.The series 605C and 606C require a +28Vdc input (24Vdc option available). The units are fully enclosed and designed to satisfy system or bench top operation.

The output voltage is controlled internally by a multi-turn potentiometer. Remote analog voltage or resistance programming is included in all models. Analog monitor outputs are also included for remote monitoring of both the high voltage output and the output current. Remote control capability includes a remote ON/OFF logic input.

Line Regulation: ±0.001% for ± 10% input line change. • **Load Regulation:** ±0.002% for 0 to maximum rated output current change. • **Temperature Coefficient (0 to 50°C):** 50ppm of maximum per °C. • **Stability (after 1/2 hr warm-up):** 0.01% per hour; 0.02% per 8 hours. • **Local Control:** Internal multi-turn potentiometer for 0 to maximum output voltage (±0.2%). • **Remote Programming:** 0 to +5 Volt dc analog input signal. • **Voltage Monitor:** 0 to +5 Volts proportional to 0 maximum output high voltage. • **Current Monitor:** 0 to +5 volts proportional to 0 to maximum output current. • **Current Limit:** Short circuit current limiting to less than 110% of the maximum rated output current. • **Protection:** Arc and short circuit protected, self-restoring. The input ac line is fused; dc input supplies require external fusing.

MODEL	SIZE	WEIGHTS
602C	5″ x 3.1″ x 8.7″ (127 x 79 x 221mm)	6.75 lbs (3.1kg)
603C	5″ x 5.5″ x 8.5″ (127 x 140 x 216mm)	8.0 lbs (3.64kg)
605C	5″ x 2.75″ x 4.75″ (127 x 70 x 121mm)	3.2 lbs (1.45kg)
606C	5″ x 5.2″ x 4.5″ (127 x 140 x 114mm)	3.5 lbs (1.6kg)

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REGULATED HIGH VOLTAGE POWER SUPPLY MODULES

SERIES 720A / 730A / 740A

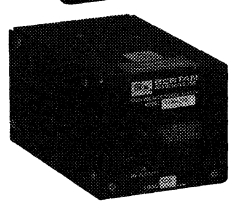
MODEL	OUTPUT		
	VOLTAGE	CURRENT	RIPPLE*
720A-10P,N	0 to 10 kV	0 to 1.2mA	5V
720A-30P,N	0 to 30 kV	0 to 0.3mA	15V
730A-30P,N	0 to 30 kV	0 to 0.5 mA	6V
740A-30P,N	0 to 30 kV	0 to 2 mA	15V
740A-50P,N	0 to 50 kV	0 to 1 mA	25V

*Ripple is measured peak to peak at maximum output.

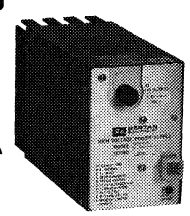
- **Internal control or remote programming**
- **Voltage and current monitoring**
- **Low ripple and noise**

The Series 720A, Series 730A and Series 740A are regulated, fixed polarity high voltage power supply modules. The units are fully enclosed and designed for reliable system or bench-top operation. All models include provision for user selection of either internal control or remote programming of the output high voltage. Input power required is +28Vdc (for +24Vdc input order Option 24V). The output high voltage is regulated to better than 0.01% independent of changes in the input voltage or output load conditions. Provision is included for monitoring of the output voltage and current. • **Input:** Series 720A: +28Vdc ±5% @ 1A. (+24Vdc ±5% @ 1.2A, Option 24V) Series 730A: +28Vdc ±5% @ 1.25A. (+24Vdc ±5% @ 1.5A, Option 24V) Series 740A: +28Vdc ±5% @ 3.5A. (+24Vdc ±5% @ 4.25A, Option 24V) • **Line Regulation:** ±0.002% of maximum for ±5% input line change. • **Load Regulation:** ±0.01% of maximum for 0 to maximum rated output current change. • **Temperature Coefficient (0 to 50°C):** 100ppm of maximum per °C. • **Stability (after 1/2 hr. warm-up):** 0.01% per hour; 0.02% per 8 hours. • **Local Control:** Internal multi-turn potentiometer for 0 to 102% of maximum output voltage. • **Remote Programming:** 0 to +5 Volt dc analog input signal proportional to 0 to 102% of maximum rated output voltage. The programming input impedance is greater than 10 megohm. • **Voltage Monitor:** 0 to +5 Volts proportional to 0 to maximum output high voltage. • **Current Monitor:** The Series 730A and 740A contain an isolated high voltage return (1 kOhm to ground) to provide 1 volt per mA output current monitoring. The Series 720A does not contain provision for current monitoring. • **Current Limit:** Short circuit current limiting to less than 120% of the maximum rated

SERIES 720A



SERIES 730A



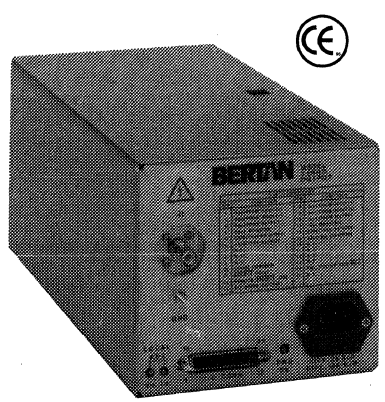
SERIES 740A

output current. • **Protection:** Arc and short circuit protected, self-restoring. • **Size:** Series 720A: 6″ W x 2-1/8″ H x 3-3/4″ D (152 x 54 x 95mm). Series 730A: 6″ W x 3-3/4″ H x 3-1/4″ D (152 x 95 x 83mm). Series 740A 4″ W x 6″ H x 9-1/2″ D (102 x 152 x 241mm). • **Weight:** Series 720A: 3lbs (1.4kg). Series 730A: 3lbs (1.4kg). Series 740A: 8lbs (3.6kg).

HIGH VOLTAGE SWITCHING MODULES

SERIES 800 100W, 200W and 300W

815, 825, 835	MAXIMUM OUTPUT CURRENT			
MODEL SUFFIX	OUTPUT VOLTAGE	100W SERIES 815	200W SERIES 825	300W SERIES 835
-0.5N,P	0 to 500V	200mA	400mA	600mA
-1N,P	0 to 1kV	100mA	200mA	300mA
-1.5N,P	0 to 1.5kV	66mA	133mA	200mA
-3N,P	0 to 3kV	33mA	66mA	100mA
-5N,P	0 to 5kV	20mA	40mA	60mA
-10N,P	0 to 10kV	10mA	20mA	30mA
-20N,P	0 to 20kV	5mA	10mA	15mA
-30N,P	0 to 30kV	3.3mA	6.6mA	10mA
-50N,P	0 to 50kV	2mA	4mA	6mA
-60N,P-FL	0 to 60kV	1.6mA	3.3mA	5mA



- **Compact high performance models up to 60kV**
- **Constant Voltage/Constant Current-auto crossover**
- **High efficiency switchmode technology**
- **Remote programming and monitoring**
- **Custom designs available**

The Series 815, Series 825 and Series 835 are three families of regulated, fixed output polarity, modular, switchmode, high voltage power supplies. Output voltages from 500V to 60 kV are available at up to 100 Watts for the Series 815, up to 200 Watts for the Series 825 and up to 300 Watts for the Series 835.

The user may configure the power supply for internal control or remote operation. Remote features include voltage and current programming, voltage and current monitoring, enable/trip control and operating mode indicator.

All models require 90-135V/185-265 Vac, 50-60 Hz line power input. Appropriate mating connectors for line power, remote control, remote monitor and the high voltage output are provided.

Line Regulation: 0.02% • **Temperature Coefficient:** less than 100ppm/degC. • **Ripple:** 0.2% pk-pk • **Size:** 5″ x 5 1/2″ x 11″ (127 x 140 x 280mm) for Series 815; 3.19″ x 10″ x 10.75″ (81 x 254 x 273mm) for Series 825; 5″ x 10″ x 11″ (127 x 254 x 279 mm) for Series 835

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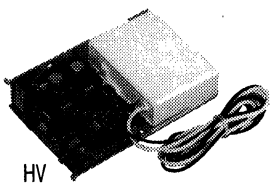
PHOTOMULTIPLIER MODULES

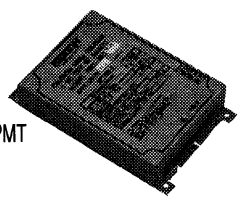
SERIES PMT and SERIES HV

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT	RIPPLE	INPUT
PMT-05C-P,N	0 to 500V	0 to 8mA	5mV	+24 to +30VDC or ±12V to ±18VDC
PMT-10C-P,N	0 to 1kV	0 to 4mA	4mV	
PMT-20C-P,N	0 to 2kV	0 to 2mA	2mV	
PMT-30C-P,N	0 to 3kV	0 to 1mA	6mV	
PMT-50C-P,N	0 to 5kV	0 to 500µA	10mV	
PMT-75C-P,N	0 to 7.5kV	0 to 250µA	100mV	
HV-1250N	0 to -1250V	0 to 2mA	0.001%	+24V ±5%
HV-1250P	0 to +1250V	0 to 2mA	0.001%	+24V ±5%
HV-1800N	0 to -1800V	0 to 1mA	0.001%	+24V ±5%
HV-1800P	0 to +1800V	0 to 1mA	0.001%	+24V ±5%

Specify output polarity (P or N) and input option.
Option #1 (+24V to +30V) or Option #3 (± 12V to ± 18V)

GENERAL SPECIFICATIONS		
	PMT-05, 10, 20, 30, 50, 75	HV-1250, 1800
Input	1: +24Vdcv to +30Vdc 3: ±12Vdcv to ±18Vdc	+24Vdc ±5%
Line Regulation	±0.001% for ±1% line change	±0.001% for ±1% line change
Load Regulation	±0.001% for NL-FL or FL-NL	±0.002% for NL-FL or FL-NL
Stability	0.005%/hr. 0.2%/8 hrs	same
Voltage Programming	0 to +9V or 5k ohm pot	0 to +5V
Voltage Monitor	1% or 0.1% of output voltage	0 to +5V
Size	3.88″ x 6.3″ x 1.25″ (99 x 160 x 32mm)	4 1/2″ x 1″ x 2 3/16″ (114 x 25 x71mm)


HV


PMT

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT
PMT-1500N	0 to -1500V	0 to 1mA
PMT-1500P	0 to +1500V	0 to 1mA
PMT-2500N	0 to -2500V	0 to 0.5mA
PMT-2500P	0 to +2500V	0 to 0.5mA

- **Internal Voltage Control**
- **Remote Voltage Programming**
- **Remote Voltage Monitoring**
- **Low Ripple and Noise**
- **Economical, Compact Size**
- **Direct PC Board Mounting**

The PMT Series is a family of high performance dc to dc modular power supplies suitable for OEM or laboratory applications. They feature exceptionally low ripple and noise, local or remote voltage control, remote voltage monitoring, arc and short circuit protection.

HIGH VOLTAGE POWER SUPPLIES FOR SPECIAL APPLICATIONS

SERIES MPS HV Multi-Output System

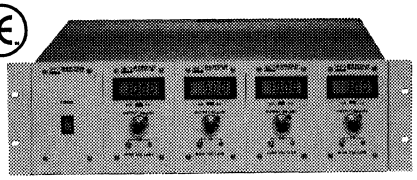
OUTPUT VOLTAGE	SINGLE MODULES			DOUBLE MODULES		
	OUTPUT CURRENT	MODULE PART NO.		OUTPUT CURRENT	MODULE PART NO.	
		POSITIVE	NEGATIVE		POSITIVE	NEGATIVE
(10W)0 to 1kV	10mA max.	MPS-HV10M-1P	MPS-HV10M-1N	(30W) 30mA max.	MPS-HV30M-1P	MPS-HV30M-1N
(9W)0 to 1.5kV	6mA max.	MPS-HV10M-1.5P	MPS-HV10M-1.5N	(30W) 20mA max.	MPS-HV30M-1.5P	MPS-HV30M-1.5N
(9W)0 to 3kV	3mA max.	MPS-HV10M-3P	MPS-HV10M-3N	(30W) 10mA max.	MPS-HV30M-3P	MPS-HV30M-3N
(10W)0 to 5kV	2mA max.	MPS-HV10M-5P	MPS-HV10M-5N	(25W) 5mA max.	MPS-HV30M-5P	MPS-HV30M-5N
(10W)0 to 10kV	1mA max.	MPS-HV10M-10P	MPS-HV10M-10N	(20W) 2mA max.	MPS-HV30M-10P	MPS-HV30M-10N
(9W)0 to 15kV	0.6mA max.	MPS-HV10M-15P	MPS-HV10M-15N	(22.5W) 1.5mA max.	MPS-HV30M-15P	MPS-HV30M-15N
(10W)0 to 20kV	0.5mA max.	MPS-HV10M-20P	MPS-HV10M-20N	(20W) 1mA max.	MPS-HV30M-20P	MPS-HV30M-20N
(6W)0 to 30kV	0.2mA max.	MPS-HV10M-30P	MPS-HV10M-30N	(12W) 0.4mA max.	MPS-HV30M-30P	MPS-HV30M-30N

- **Up to 4 Outputs per Rack**
- **Output Voltages of up to 30kV**
- **Independent Controls and Monitors**
- **Remote Analog Programming and Monitoring**

The Series MPS are modular construction, multi-output high voltage power supply systems with up to 4 outputs per rack possible. Output voltages range from 1000V to 30kV in either single width 10W modules or 30W double width modules. All modules are fixed polarity, either positive or negative. Each output can be independently controlled and monitored via front panel potentiometers and digital meters.

Remote analog control and monitoring is available as an option.

Input: 115/230 Vac, 50-60 Hz • **Line Regulation:** ±0.001% for ±10% input change • **Load Regulation:** ±0.002% for NL-FL or FL-NL • **Temperature Coefficient:** 50ppm/degC • **Remote Programming and Monitoring** (optional)**:** 0 to +5V • **Size:** 19″ x 5.25″ x 15″ (483 x 133 x 381mm)



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HIGH VOLTAGE POWER SUPPLIES FOR SPECIAL APPLICATIONS

SERIES AR Bi-Polar Supply for Electrophoresis

- Laboratory or OEM module Versions
- ±30kV, Electronically Reversible
- Constant Voltage/Constant Current-Auto Crossover
- Remote Analog Programming and Monitoring
- Computer Interface and Software Available

The Series AR power supplies are designed for any application requiring automatic polarity reversal such as electrophoresis or mass spectrometry. Compact bench-top supplies, with front panel controls and meters, are ideal for laboratory use. Low cost, dc input modular supplies can be integrated into clinical or research instrumentation. Remote analog programming is featured on all supplies. Computer interface and software are also available. Custom units can be quickly and economically provided for special requirements. **Output:** 0 to ±30kV at 400µA

• **Ripple:** 0.05% pk-pk at max output • **Energy Storage:** 0.35 Joule • **Remote Programming and Monitoring:** 0 to +10V.

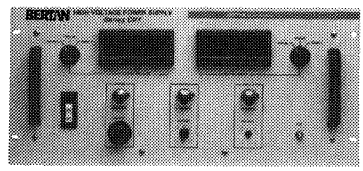
SERIES CRT 30/50 for CRT Testing and System Applications

MODEL	OUTPUT		
	VOLTAGE	CURRENT	RIPPLE* PK-PK
Anode			
CRT-30	0 to +30kV	0 to 2mA	3V
CRT-50	0 to +50kV	0 to 1.5mA	5V
Focus	0 to +10kV	0 to 1mA	1V
Grid 2	0 to +1kV	0 to 1mA	100mV

Measured peak to peak at maximum output.

- Bias and Filament Options
- CRT Test System
- IEEE-488 Interface Available

The BERTAN CRT-30 and CRT-50 are three output high voltage power supply systems configured for versatile laboratory, CRT test, or systems applications. Calibrated controls and digital displays provide independent control and monitoring of the Anode, Focus, and Grid 2 voltages and currents. A wide range of options are available, including auxiliary outputs, dynamic focus, digital programming, and a comprehensive IEEE-488 Talker/Listener interface (Model 300-C488). Custom units can be provided to meet individualized system applications.



GENERAL SPECIFICATIONS	
Input	115/230V ± 10% 50-60Hz
Regulation	.01% line, .01% load
Temp. Coeff.	100ppm/°C, 0 to +50°C
Accuracy	.25% +.2% of maximum
Size	19″ x 8.75″ x 15″ (483 x 222 x 381mm)

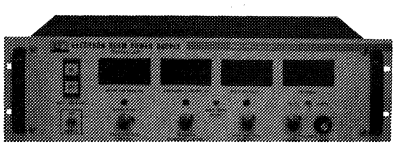
SERIES EB/IB for Electron and Ion Beam Application

	BEAM POWER SUPPLY		*BIAS POWER SUPPLY	
MODEL	VOLTAGE	CURRENT	VOLTAGE	CURRENT
EB-30A	0 to -30kV	0 to 500µA	0 to -1000V	0 to 50µA
EB-50A	0 to -50kV	0 to 250µA	0 to -2000V	0 to 50µA
EB-100A	0 to -100kV	0 to 250µA	0 to -2000V	0 to 50µA
IB-30	0 to +30kV	0 to 500µA	0 to +2000V	0 to 50µA
IB-50	0 to +50kV	0 to 250µA	0 to +2000V	0 to 50µA
IB-100	0 to +100kV	0 to 250µA	0 to +2000V	0 to 50µA

Series EB and IB are triple output high voltage power supply systems specifically developed for precision electron beam and ion beam applications. Each model contains three independently adjustable power supplies for beam acceleration, bias, and filament. The isolated bias and filament power outputs "float" on the high voltage acceleration output.

In addition to the standard models, custom designed units are available to meet specific requirements.

An IEEE-488 interface is available to provide full control and monitoring capability (Model 300-C488).



GENERAL SPECIFICATIONS	
*Filament	Voltage: 0 to 5Vdc Current: 0 to 5Adc
Input	115/230V ± 10%, 2A, 50-60Hz
Size	19″ x 5.25″ x 17″ (483 x 133 x 432mm)
Weight	55 lbs. (25kg)

Bias and Filament "float" on Beam high voltage.

SERIES XR for X-ray Applications

MODEL	TARGET	
	VOLTAGE	CURRENT
XR-10B	0 to 10kV	0 to 30mA
XR-20B	0 to 20kV	0 to 15mA
XR-30B	0 to 30kV	0 to 10mA
XR-50B	0 to 50kV	0 to 6mA
XR-75B	0 to 75kV	0 to 4mA

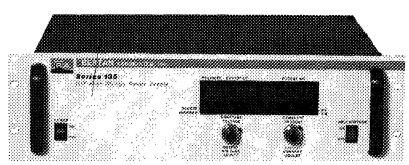
Specify target output voltage polarity when ordering.

- Target Voltage/Current Control
- Front Panel/Remote Control
- IEEE-488 Interface Available

The BERTAN Series XR is designed for the operation and control of filamentary X-RAY sources. All units include a regulated high voltage target power supply, an appropriately isolated filament power supply and the intelligent control circuitry to provide adjustable constant target current operation.

Custom designed units can be provided to meet specialized system, test or laboratory applications.

An IEEE-488 interface is available to provide full control and monitoring capability (Model XR-C488)



Input: 115/230V ±10%, 8/4A, 50-60 Hz • **Filament:** 0 to 4V @ 0 to 4A • **Size:** 19″ x 5.25″ x 18″ (483 x 133 x 457mm) • **Weight:** 48lbs (22kg)

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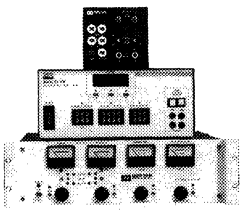
CUSTOM OEM SYSTEMS

- **Outputs up to 200kV, 2kW**
- **AC to DC, DC to AC**
- **Single or Multiple Output**
- **Microprocessor Control**
- **Analog and Digital Programming including IEEE-488 and RS232/485**
- **Custom Interfacing**
- **CE/UL/CSA/VDE Approvals**

BERTAN specializes in designing and producing custom OEM systems with unique electrical and mechanical features. Our experienced engineering staff, equipped with the most advanced design and analytical tools, including CAD/CAM, enables us to provide cost effective, timely solutions to your particular power supply problems. Our modern 40,000 sq. ft. manufacturing facility is staffed and organized to satisfy both large and small quantity production requirements.

Complete in-house quality control accompanies each custom product. From the determination of specifications and configurations through full production and delivery, the utmost attention is given to optimizing quality and reliability while minimizing cost. Each power supply is fully burned in and tested to ensure that it meets or exceeds all performance requirements.



NUCLEAR INSTRUMENTATION MODULES

SERIES NIM

MODEL	VOLTAGE	CURRENT	RIPPLE	SIZE	NOTES	REV	CV/CL	V_{PROG}	V_{MON}	METER	INPUT AC	INPUT DC	DUAL OUTPUT
301	0 to ± 1,000V	0 to 3mA	1mV	D	—	•	•	•	—	—	—	•	—
342A	0 to ± 2,000V	0 to 1mA	2mV	S	3	•	•	•	—	A	—	•	—
362	0 to ± 2,000V	0 to 1mA	2mV	S	—	•	•	•	—	A	—	•	•
303	0 to ± 3,000V	0 to 1mA	3mV	D	—	•	•	•	—	—	—	•	—
353	0 to ± 3,000V	0 to 2mA	5mV	S	—	•	•	•	—	—	•	—	—
313B	0 to ± 3,000V	0 to 10mA	10mV	D	—	•	•	•	—	A	•	—	—
323B	0 to ± 3,000V	0 to 10mA	10mV	D	—	•	•	•	—	D	•	—	—
345A	0 to ± 5,000V	0 to 300µA	5mV	S	3	•	•	•	—	A	—	•	—
305	0 to ± 5,000V	0 to 500µA	5mV	D	—	•	•	•	—	—	—	•	—
355	0 to ± 5,000V	0 to 1mA	10mV	S	—	•	•	•	—	—	•	—	—
365	0 to ± 5,000V	0 to 1mA	5mV	S	—	•	•	•	—	A	—	•	•
362/5	0 to ± 5,000V	0 to 1mA	2/5mV	S	1	•	•	•	—	A	—	•	•
315B	0 to ± 5,000V	0 to 5mA	25mV	D	—	•	•	•	—	A	•	—	—
325B	0 to ± 5,000V	0 to 5mA	25mV	D	—	•	•	•	—	D	•	—	—
375P,N,X	0 to 5,000V	0 to 500µA	50mV	D	2	—	•	•	•	A	—	•	•
377P,N,X	0 to 7,500V	0 to 500µA	50mV	D	2	—	•	•	•	A	—	•	•
380P,N,X	0 to 10,000V	0 to 300µA	50mV	D	2	—	•	•	•	A	—	•	•
310P,N	0 to 10,000V	0 to 250µA	20mV	D	—	—	•	•	—	—	—	•	—
320P,N	0 to 10,000V	0 to 2mA	100mv	D	—	—	•	•	—	—	•	—	—

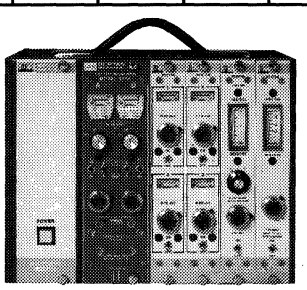
NOTES:
1. Model 362/5 is a dual output unit having one 0 to ±2,000V output and one 0 to ±5,000V output.
2. Output polarity: P=both positive, N=both negative, X=one positive, one negative.
3. 342A, 345A: Double output current is available with increased input.

Size: D: Double width:
2.7″W x 8.7″H x 9.7″D
(69 x 221 x 246mm)
S: Single width:
1.35″W x 8.7″H x 9.7″D
(34 x 221 x 246mm)

CV/CL: Constant Voltage/Current Limit

• Standard
A - Analog
D - Digital

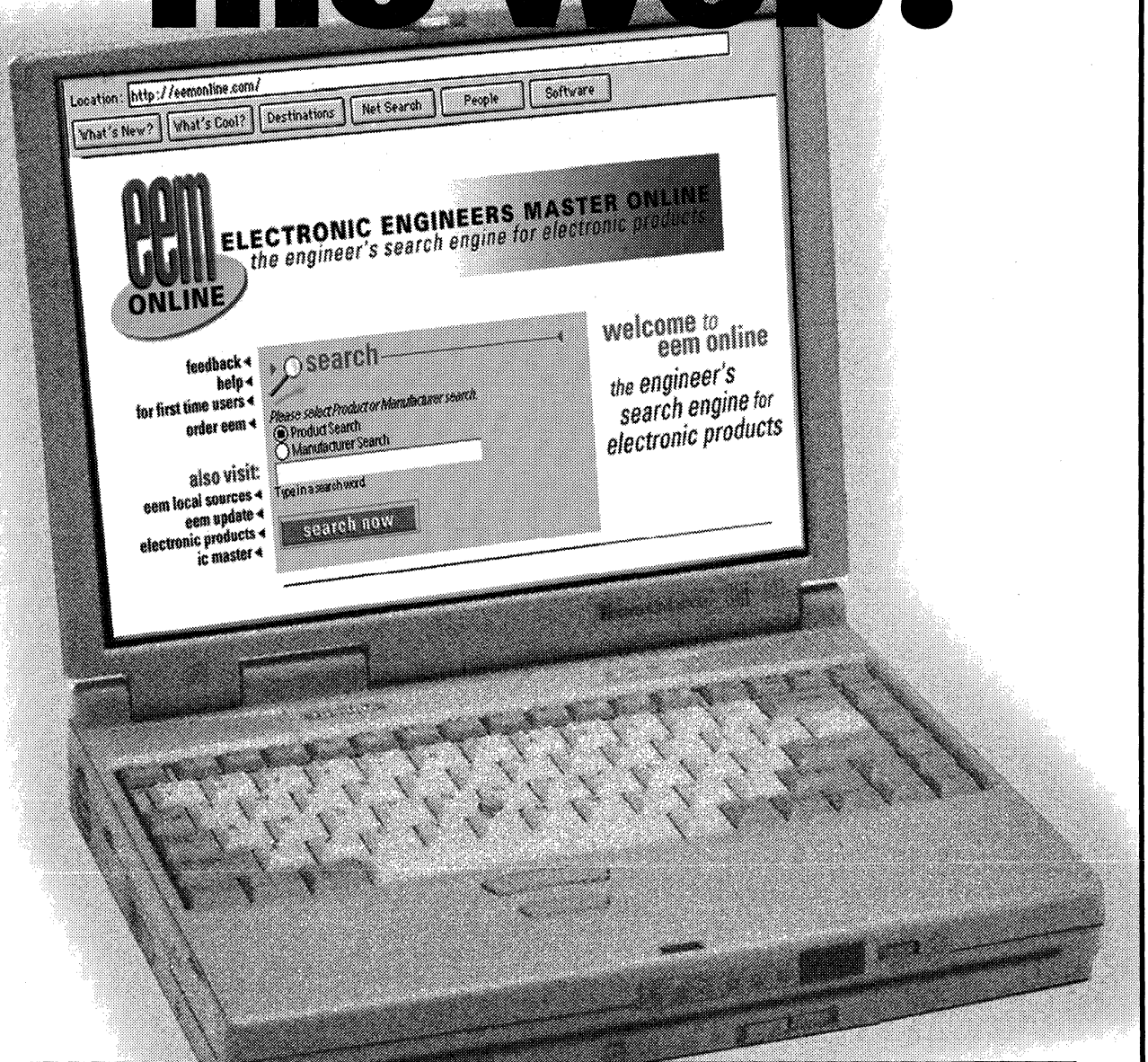
SPECIFICATIONS ALL MODELS	
Regulation	0.001% line, 0.002% load
Stability	0.01%/hr., 0.02%/8 hrs.
Temp. Coeff	50ppm/°C, 0 to +50°C



- **Models for all Detector Types**
- **Single and Dual Output Units**
- **Reversible Polarity**
- **High Stability**
- **AC Line Powered & DC Bin Powered**

Bertan offers a complete line of high voltage power supplies in NIM configuration. Modules are available in single or dual width, single or dual output, and with ac or dc input. All models have reversible polarity (except 10kV units), remote programming, arc and short circuit protection. The Series MWPC supplies (Models 375, 377, 380) are designed specifically for multiwire proportional chamber applications and include sensitive monitors, precision voltage control, fast and slow over-current detection. Bertan also provides NIM mini-bin enclosures for convenient benchtop mounting of single or dual width NIM modules requiring ac or dc power.

EEM is on the Web!



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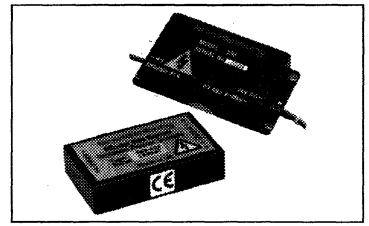
General Purpose Modules

Features

- 12V or 24V dc input versions
- Excellent line and load regulation
- Low output ripple, noise and temp-co
- Remote voltage programming option
- Current / Voltage monitor
- Positive and negative versions



Description/summary

Brandenburg offer a wide range of general purpose high voltage DC to DC convertor modules ideal for OEM applications, offering a wide range of output voltages up to 50kV and up to 25W in output power.
Many units are available in both positive, negative and electrically switchable output polarity with options such as remote analog voltage programming and analog voltage and current monitoring facilities. Input voltages are typically 12V or 24V dc with proportional supplies operating over a 4V to 15V range. All of the modules in the range are either fully or partially encapsulated with many modules being housed with a metal case offering excellent screening properties.

Input Voltage Options	Current Voltage Options	Output Current	Ripple pk-pk	Power Rating	Polarity	Series
12V & 24V dc	1.5 to 10kV	3mA to 0.5mA	0.35V	5W	+ve & -ve	590
2V to 12V	250V to 2.4kV	250µA to 50µ	0.5%	100mW	Floating	566
2V to 12V	300V to 2kV	5mA to 750µ	0.025%	1.5W	Floating	567
4V to 12V	300V to 6kV	10mA to 500µA	0.5%	3W	Floating	568
4V to 12V	300V to 6kV	10mA to 500µA	0.2%	3W	Floating	569
24V	500V to 8kV	500µA	100ppm	4W	Selectable	540
24V	5kV, 10kV & 20kV	2mA to 500µA	7.5V	10W	+ve & -ve	797
24V	5kV to 25kV	5mA to 1mA	0.1%	25W	+ve & -ve	732

Photomultiplier Power Supply Modules

Features

- DC to DC and 115/230V ac versions
- Excellent line and load regulation
- Low output ripple, noise and temp-co
- Remote voltage programming
- Voltage & current monitor outputs
- Positive and negative versions

Description/summary

Brandenburg's extensive range of photomultiplier power supplies now caters for more applications than ever before with a wide range of OEM modules. Output voltages range from 300V up to 3.5kV with output power ranging from 2W to 54W with input voltages covering 12V to 370V dc plus line powered units at 115/230V ac 50/60Hz. In particular the miniature modules in the Brandenburg standard 4479 series are designed to provide a closely controlled high voltage output. The use of high stability components in the feedback system, ensures a low temp-co and good long & short term drift.

Rating	Output	Input	Remote Control	V+I Monitor	Ripple PK-PK	Approval	Other Features	Series
4W	500V, 1kV, 2kV, 3kV 8, 4, 1.3mA	±12 or 24VDC	✔	✔	<5mV	EN60 - 950	• Low noise, drift & tempco.v • Excellent line and load regulation • Short circuit protected	2482
3W	300V, 10mA 6kV, 500µA	2V-12VDC			<0.2%	CE	• PCB mountable • 0/p V proportional to i/p • i/p-0/p isolation>3kV • Very low drift	569
54W	<20V to 1.8kV, 30mA	115/230VAC or 24VDC	✔	✔	7mV	CE	• Pos & neg versions • 0/load & short protected	2481
4W	500V, 1kV, 2kV, 3kV 8,4,2, 1.3mA	115/230VAC	✔	✔	<5mV	CE	See precision photomultiplier PSUs on following page.	477
2W	300V, 3mA 2kV, 1mA	12 or 24VDC	✔	✔	1mV	EN60 - 950	• Excellent line & load regulation • Low tempco • PCB/chassis mount	4479

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brandenburg

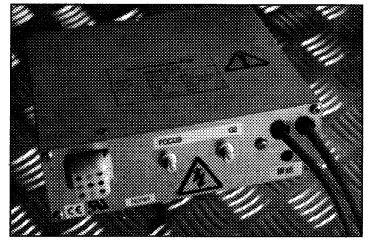
HIGH VOLTAGE PSUs

HIGH VOLTAGE PSUs

CRT Power Supplies

Features

- Designed for use with precision colour CRTs
- Supply voltages 24V or 36V dc nominal
- Positive anode output up to 29kV
- Excellent pulse load regulation
- Adjustable G2 and focus outputs
- Input for dynamic focus control
- Protected against flashovers and short circuits
- Metal case for good screening
- UL, CSA & VDE approved



Description/summary

The high voltage power supply modules in the Brandenburg 2836 & 78 series provide outputs for all the electrodes in a high resolution shadow mask colour and mono CRTs.
The input voltage is either 24V or 36V (nominal) and all have adjustable voltage over a wide range.
The output regulator circuits are designed to provide a power supply which has good static and dynamic regulation, combined with low ripple, ensuring a display which remains stable and sharp over a very wide range of brightness modulation.
As well as the anode supply, these modules generate adjustable focus and G2 outputs plus some versions with additional G1 and dynamic focus output.

Input Voltage (nominal)	Anode Output Voltage Range	Anode Output Current	Focus Output Voltage Range	G1 Output Voltage	G2 Output Voltage	Series
24V	2kV to 5kV	2mA	600V to 1kV	-100V	40V to 400V	789-10
24V	5kV to 10kV	1mA	600V to 1kV	-100V	40V to 400V	788-10
24V	10kV to 20kV	500µA	600 V to 1kV	-100V	40V to 400V	787-10
36V dc	+23kV to +27.5kV	1.2mA at 25kV	+5.1kV to +8.1kV		+200V to +850V	2836-101
24V dc	+25, +27.5, +29kV remote selectable	1.2, 1.1, 1.0mA	20% to 32.5% of anode voltage		+400V to +900V	2836-102
24V dc	+23kV to 27.5kV	1.2mA at 25kV	+4.75kV to +8.25kV	-200V	+200V to +950V	2836-103

Note: For volume manufacture, variants of these models can be produced by Brandenburg to give a precise match to the CRT specification. Please contact our sales office with details of your requirements.

High Voltage Meters

Features

- Up to 60kV dc
- $3^1/_2$ & $4^1/_2$ digit LCD displays
- High input impedance (30GΩ)
- Positive and negative reading without switching
- Voltage coefficient compensated
- Accuracy better than ±0.05%
- Precision output for recorder or oscilloscope
- 40kV high voltage probe available
- Rugged construction

Description/summary

There are two series of meters in the range, the first of which is the model 139 which offers voltage measurement up to 40kV over two selectable ranges with a very high impedance input, (30GΩ) and incorporates a $3^1/_2$digit LCD display.
The second in the range, the model 149 offers measurement up to 60 KV dc over three selectable ranges with an input impedance of 10GΩ. The 149 incorporates a $4^1/_2$ digit LCD display and active voltage coefficient compensation.
Both the 139 and 149 HV meters are battery operated having integral batteries accessible from the rear, with the display incorporating a low-battery indicator.
A precision recorder output is also provided for use with an oscilloscope or chart recorder.

Rangers	Input Resistance	Accuracy	Description	Series
20kV & 40kV	30GΩ	±1.5%	Direct reading dual range HV meter	139
2kV, 20kV & 40kV	10GΩ	±0.1%	Precision 3 range high voltage meter	149-01
2kV, 20kV & 60kV	10GΩ	±0.05%	Precision 3 range high voltage meter	149-02

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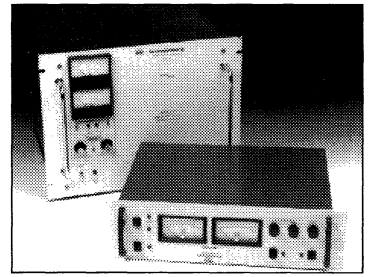
brandenburg

Bench Power Supplies

Features

- Input: 115/230V ac 50/60Hz
- Output Power up to 100W
- Output voltage up to 100kV
- Excellent line and load regulation
- Low output ripple, noise and temp-co
- Digital and analog remote control
- Voltage & Current read-back
- Positive, negative & switchable versions



Description/summary

Brandenburg's range of high voltage bench/19" rack equipment cover voltages up to 100kV and 100W with a variety of control options available, including RS232 serial interface which makes these supplies ideal for both industrial and research applications.

All of the supplies in the range are available in 115V and 230 voltage input and are supplies complete with associated high voltage connector and lead. Application where front panel controls are not required or amy be a hazard, versions with remote control only are also available.

Input Voltage Options	Output Voltage Options	Output Current	Ripple pk-pk	Power Rating	Polarity	Series
115/230V	10V to 2.1kV	5mA	5mV	10W	Reversible	2475
115/230V	410 to 2.4kV	4mA	5mV	10W	Reversible	2476
115/230V	0 to 5kV	10mA	1.5V	45W	Reversible	3507
115/230V	0 to 15kV	3mA	1.5V	45W	Reversible	3707
115/230V	0 to 30kV	1.5mA	3V	45W	Reversible	3807
115/230V	6kV to 60kV	0.4mA	100ppm	24W	+ve & -ve	2907
115/230V	1Kv to 10kV	10mA	5V	100W	+ve & -ve	628
115/230V	2kV to 20kV	5mA	10V	100W	+ve & -ve	728
115/230V	3kV to 30kV	3mA	15V	100W	+ve & -ve	828
115/230V	5kV to 50kV	2mA	25V	100W	+ve & -ve	2878
115/230V	10kV to 100kV	1mA	50V	100W	+ve & -ve	2928

Precision Photomultiplier Power Supplies

Features

- Input 115/230V 50/60Hz
- Excellent line & load regulation
- Low output ripple & noise
- Fixed or selectable polarity
- Voltage & current monitor
- Auxiliary low voltage supply

Description/summary

This range of photomultiplier power supplies are ideal for use in research and educational environments. These supplies are suited to both single and multiple tube applications, with the 477 series including a low voltage auxiliary supply ideal for use with the associated discriminator/amplifier circuitry.

The use of high stability components in the feedback systems ensures a low temperature coefficient and good long & short term drift.

Rating	Output	Input	Remote Control	V+I Monitor	Ripple PK-PK	Approval	Other Features	Series
4W	500V, 1kV, 2kV, 3kV 8, 4, 2, 1.3mA	115/230V AC 50/60Hz	✔	✔	<5mV pk-pk	CE	Direct reading 4½ digit DPM for HV voltage/current, split rail 15V & 5V auxiliary supply. Single, switchable and dual polarity versions available.	477
10W	2.1kV	115/230V AC 50/60Hz		KV Meter	<5mV pk-pk	CE	Switchable polarity, push button voltage selection.	2475
10W	2.1kV	115/230V AC 50/60Hz		KV Meter	<5mV pk-pk	CE	Switchable polarity, push button voltage selection.	2476

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Power Supplies for Military and Commercial OEMs

Brandt Electronics, Inc.

Located in Mountain View, CA, **Brandt Electronics** has been producing innovative power supply designs for the military, industrial, and commercial OEM markets for over eighteen years. These designs include AC/DC Low Voltage Power Supplies, DC/DC Converters, High Voltage Power Supplies, Battery Chargers, Custom EMI Filters, and high quality MIL-T-27 Magnetics. Brandt has designed and delivered over 300 different models to our military, industrial, and commercial OEM customers. These products have been designed to meet the critical performance specifications of airborne, shipboard, ground-based, ground mobile, man portable, and underwater applications. Brandt's design team has over fifty (50) years of power product development experience, thus assuring your requirements will be met in a technical, cost-effective and timely manner.

Contract Manufacturing

Brandt Electronics now offers "build to print" services for our customers with in-house power supply designs. Our experience in the design, testing, and manufacturing of power supplies, provides our customers a cost-effective, low risk solution to satisfying their outsourcing needs.

Quality Assurance

Brandt Electronics' Quality Assurance Standards are in accordance with the most rigorous military specification requirements such as MIL-I-45208. Brandt's facilities and procedures are regularly certified through DOD and prime contractor audits. SPC defects analysis with requisite corrective action follow-up, and environmental stress screenings are all components of the Quality Assurance System. As a result of Brandt Electronics' stringent quality control requirements, we have been approved by all of our major contractors as a source of high reliability power supplies.

Warranty

Brandt Electronics, Inc. warrants each production model power supply of its manufacture to be free from defects in material and workmanship for a period of one year from the original shipment date, unless otherwise stipulated by the purchase agreement. This warranty is transferable to the end user.

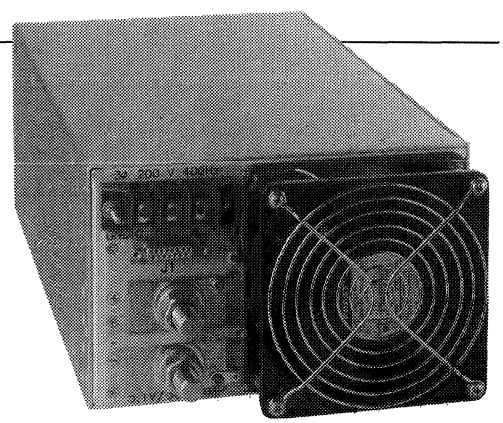
For more information about how **BRANDT ELECTRONICS, INC.** can assist you with your power product needs, please do not hesitate to contact us.

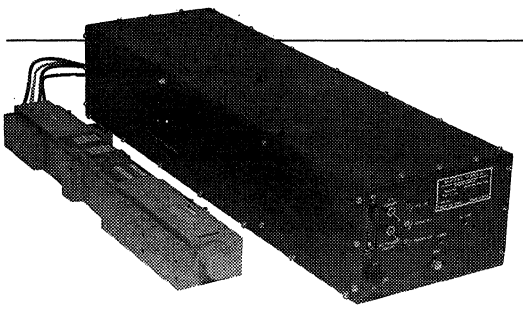
AC/DC Power Supplies

Brandt's AC/DC power supplies have been designed and qualified to meet the most stringent performance and environmental requirements. Brandt's experienced design team uses only highly reliable field proven topologies, thus assuring your requirement will be met at a minimum technical risk. Our design engineers are dedicated to ensuring such parameters as efficiency, input transients, wide input ranges, extreme environments, EMI, and multi-output configurations are met without exception.

General specifications for Brandt's AC/DC Power Supplies are as follows:

Input: 115/220 VAC single or three phase, 47-440 Hz
Output Voltages: Single and multiple from 2 to 48 VDC
Output Power: 10 to 7000 watts
Output Regulation: Typically 1%
Output Ripple: Typically 50-100 millivolts
Efficiency: >85% for single output, 70-85% for multiple outputs
Protection: Short circuit, overcurrent, overtemperature, overvoltage
Environments: MIL-E-5400, MIL-STD-810, MIL-STD-2036
EMI: CE01, CE03, CE07, RE01, RE02 and all conducted and radiated susceptibility levels





High Voltage Power Supplies

For CRT, TWT's and MPM Applications

Brandt's design diversity includes high voltage power supplies for the operation of Microwave Power Modules (MPM) CRT Displays, Traveling-Wave-Tubes (TWT), Klystrons, and Magnetrons. These supplies typically employ either linear or switching regulators on the primary side of the high voltage transformer and potted high voltage sections. They can vary from CRT supplies of a few watts of output power to TWT's of several kilowatts of output power.

General specifications for Brandt's HV power supplies are as follows:

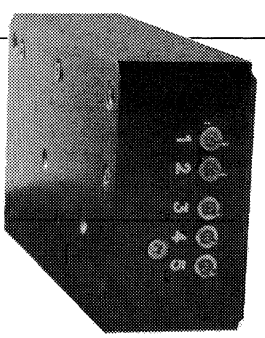
Input: 115/220 VAC single or three phase, 47-440 Hz or 18-70 VDC
Output Voltages: Up to 36 KV
Output Power: 1 to 7000 watts
Efficiency: Greater than 80%
Protection: Short circuit and over current
Environments: MIL-E-5400, MIL-STD-810, MIL-STD-2036

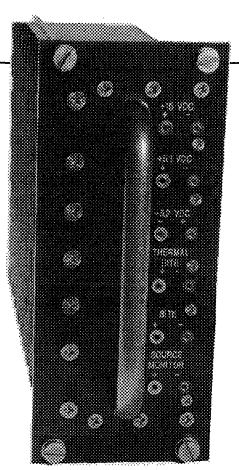
DC/DC Converters

If you use DC/DC converters with requirements such as high power density, high efficiency, and a wide input range combined with a high environmental stress application, the solutions are best provided by a converter from Brandt Electronics.

General specifications for Brandt's DC/DC converters are as follows:

Input: 28 VDC (9-36 VDC), 48 VDC (37-70 VDC), 270 VDC (216-324 VDC), MIL-STD-704
Output Voltage: Single and multiple from 2 to 48 VDC
Output Power: 10 to 7000 watts
Output Regulation: Typically 1%
Output Ripple: Typically 50-100 millivolts
Efficiency: >80% for single output, 70-85% for multiple outputs
Protection: Short circuit, overcurrent, overtemperature, overvoltage
Environments: MIL-E-5400, MIL-STD-810, MIL-STD-2036





VME Power Supplies

Brandt's VME power supplies have been designed and qualified to meet the stringent requirements of MIL-STD-704A input power. These power supplies are available in multiple 6U and chassis mount formats per IEEE1014.

General specifications of Brandt's VME power supplies are as follows:

Input: 115/220 VAC single or three phase, 47-440 Hz, DC; 28 VDC or 270 VDC per MIL-STD-704A
Output Voltages: Standard VME, +5, -5.2, ±15, ±12 VDC
Output Power: 50 to 1000 watts
Output Regulation: Typically 1%
Output Ripple: Typically 50-100 millivolts
Efficiency: Typically 70-85%
VME Control Signals: SYSRESET, ACFAIL, PWRON, OUTPUT BITE
Protection: Short circuit, overcurrent, overtemperature, overvoltage
Environments: MIL-E-5400, MIL-STD-810, MIL-STD-2036
EMI: CE01, CE03, CE07, RE01, RE02 and all conducted and radiated susceptibility levels per MIL-STD-461

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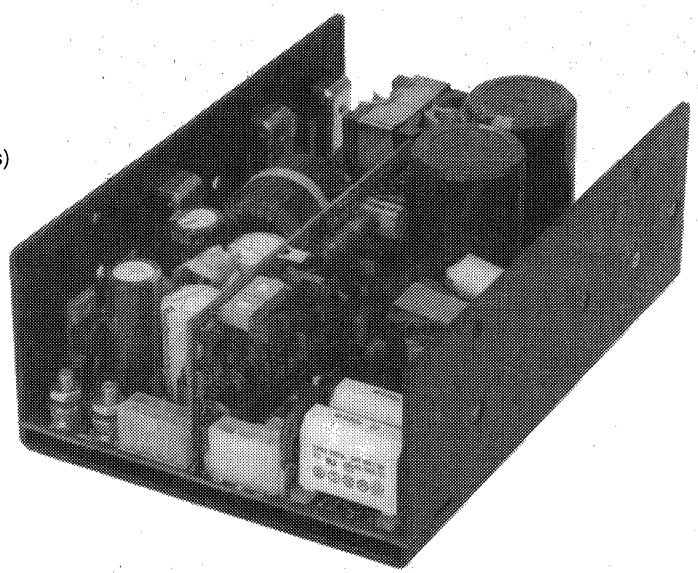

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in selecting an appropriate standard,
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CALEX Encapsulated AC/DC Linear Power Supplies

All CALEX linear power supplies are built for excellent performance in even the most rugged environments. Their industry standard pin configurations make them ideal for use with most operational amplifiers, function modules and data conversion circuits. All models are covered under our 5 Year Warranty.

Common Specifications

Input Voltage	100 ±10 VAC (add "-100" to model number) 115 ±10 VAC (add "-115" to model number) 220 ±20 VAC (add "-220" to model number) 230 ±20 VAC (add "-230" to model number) 240 ±20 VAC (add "-240" to model number)
Input Frequency Range	50 to 60 Hz
Input to Output Isolation	1000 - 2500 VRMS, depending on model
Input to Output Resistance	50 Megohms minimum
Capacitance	50 - 250 pF, depending on model
Overvoltage Protection	Standard on all 5 Volt singles except models 21-30 and 7009
Temperature Coefficient	+0.01%/°C typical
Storage Temperature	-25°C to +85°C
Case Operating Temperature with No Derating	-25°C to +50°C
Short Circuit Protection	Foldback current limiting on all except models 21-12, 21-30 and 22-40, which have constant current limiting
Mounting Kits	Available for the PC board mountable cases

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Mounting Kits

Case	Kit
PC Board Power Supplies	
B1, B2, B3	MK215-022, MK215-08B
A	MK015, MK08B
C	MK22-015, MK22-08B
Chassis Mountable Power Supplies	
CM	MP 90 Interface Plate Adaptor

Case Size

Case	Case Dimensions
A	3.0" x 2.0" x 1.0"
B1	3.5" x 2.5" x 0.875"
B2	3.5" x 2.5" x 1.25"
B3	3.5" x 2.5" x 1.56"
C	2.26" x 1.75" x 1.00"
CM	4.0" x 2.7" x 1.4"

Printed Circuit Board Mounting Cases

Output Voltage VDC	Output Current mA	Line & Load Regulation	Noise & Ripple mV RMS	Case Size	Model Number	*FaxFACTS #*
Single Output						
5	300	±0.20%	2	★C	21-30	205
5	500	±0.10%	1	B1	1.5.500	204
5	1000	±0.10%	1	B2	1.5.1000	204
**5	1000	±0.10%	1	B2	1.5.1000-DV	204
♦5	1000	±0.10%	1	B2	7009	204
5	2000	±0.20%	2	B3	1.5.2000	204
**5	2000	±0.20%	2	B3	1.5.2000-DV	204
9	1000	±0.10%	2	B3	1.9.1000	204
10	750	±0.10%	1	B3	1.10.750	204
12	120	±0.20%	2	★C	21-12	205
12	480	±0.04%	2	B2	1.12.480	204
**12	480	±0.04%	2	B2	1.12.480-DV	204
12	750	±0.04%	2	B3	1.12.750	204
15	400	±0.04%	2	B2	1.15.400	204
15	600	±0.04%	2	B3	1.15.600	204
18	500	±0.04%	2	B3	1.18.500	204
24	375	±0.04%	2	B3	1.24.375	204
Dual Output						
±5	±750	±0.10%	1	B3	2.5.750	204
±12	±120	±0.04%	1	B1	2.12.120	204
±12	±120	±0.04%	2	A	22-120	205
±12	±240	±0.04%	1	B2	2.12.240	204
**±12	±240	±0.04%	1	B2	2.12.240-DV	204
±12	±360	±0.04%	2	B3	2.12.360	204
±15	±50	±0.04%	1	B1	2.15.50	204
±15	±50	±0.20%	2	★C	22-40	205
±15	±100	±0.04%	1	B1	2.15.100	204
±15	±100	±0.04%	2	A	22-100	205
±15	±200	±0.04%	1	B2	2.15.200	204
**±15	±200	±0.04%	1	B2	2.15.200-DV	204
♦±15	±200	±0.04%	1	B2	7010	204
±15	±350	±0.04%	2	B3	2.15.350	204
Triple Output						
±12 & 5	±100 & 600	*±0.10%	2	B2	3.12.5	204
±15 & 5	±100 & 500	±0.10%	2	B2	3.15.5	204
±12 & 5	±125 & 1000	±0.20%	2	B3	3.12.1000	204
±15 & 5	±100 & 1000	±0.20%	2	B3	3.15.1000	204

* The +5V output load regulation in the 3.12.5-100 and 3.12.5-115 models is ±0.2%
**Dual AC Input 115/230VAC ♦Recognized to UL 544 available in 115 VAC only
★ C case size units output current is ½ @ 50Hz

Chassis Mounting Cases

Output Voltage VDC	Output Current mA	Line & Load Regulation	Noise & Ripple mV RMS	Case Size	Model Number	*FaxFACTS #*
Single Output						
5	500	±0.10%	1	CM	CM1.5.500	203
5	1000	±0.10%	1	CM	CM1.5.1000	203
10	400	±0.10%	1	CM	CM1.10.400	203
12	500	±0.10%	1	CM	CM1.12.500	203
15	400	±0.10%	1	CM	CM1.15.400	203
250	30	±2.0%	5	CM	CM1.250.30	203
Dual Output						
±12	±120	±0.04%	1	CM	CM2.12.120	203
±12	±240	±0.04%	1	CM	CM2.12.240	203
±15	±50	±0.04%	1	CM	CM2.15.50	203
±15	±100	±0.04%	1	CM	CM2.15.100	203
±15	±200	±0.04%	1	CM	CM2.15.200	203
Triple Output						
±12 & 5	±100 & 600	±0.10%	2	CM	CM3.12.5	203
±15 & 5	±100 & 500	±0.10%	2	CM	CM3.15.5	203

CALEX Mfg. Co., Inc. ■ 2401 Stanwell Drive ■ Concord, CA 94520-4841 ■ (925)687-4411 ■ FAX: (925)687-3333 ■ http://www.calex.com

C&C JETRONIC

SWITCHING POWER SUPPLY

MAIN PRODUCTS:

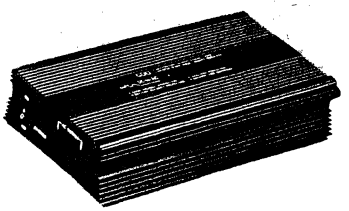
SWITCHING POWER SUPPLY (5W~90W)

OPEN FRAME (General purpose. Medical. Telecommunications. Subsystems. Fax machine. Network...etc)

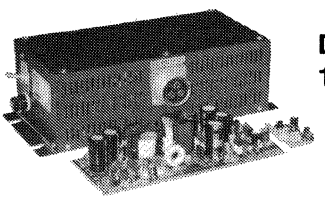
AC ADAPTORS. GENERAL ADAPTORS. DC/DC CONVERTER. DC/AC INVERTER.

*Universal AC input and multi-outputs
*Low ripple, low noise, low leakage current
*Short circuit, overvoltage, overcurrent protection
*High efficiency (above 70%)
*Input transient and thermal protection
*Soft start circuit and auto ranging input
*Power factor correction and remote error sensing

Our 40W~60W double and triple outputs switching power supplies have the best quality, performance and reliability. They are second to none in the market place. Our models can be delivered as a standard unit or can be modified to meet your special requirement. They are UL.CUL.TUV.CE.CB T-mark and SAA approved. Our hottest item for 40W triple output item is 5V/5A, 12V/1A,-12V/0.3A. Our new 15W series is the smallest in the market today. We guarantee every unit we ship with best delivery time. Contact us for how we can solve your switching power supply requirements.

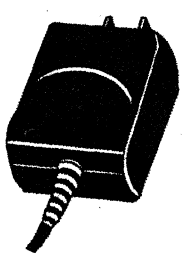


DC-AC INVERTERS 150W-600W

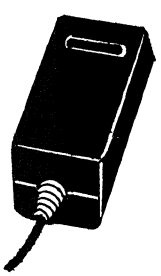


DC-DC CONVERTER 1W ~ 300W

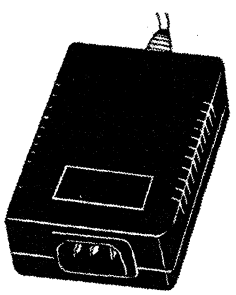
5W-10W



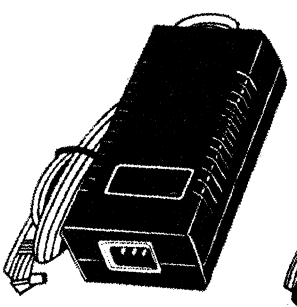
15W



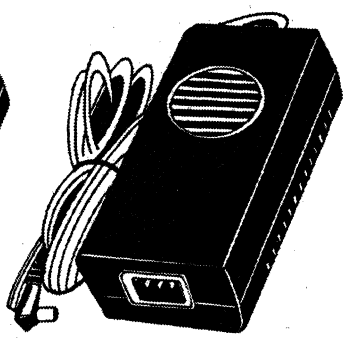
24W-30W



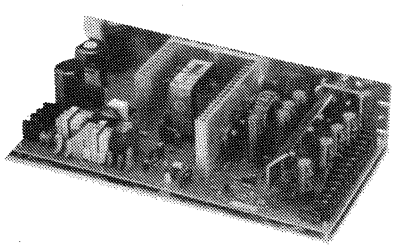
40W-60W

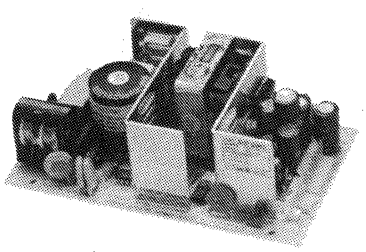


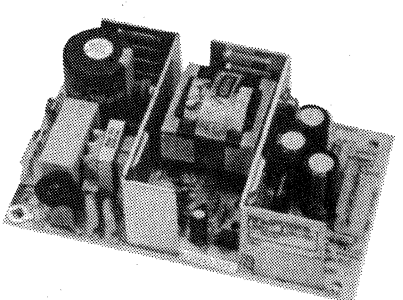
70W-90W



OPEN FRAME







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Factory: No.3-45, 6 lin, She Kou Chun, Wan Tan Hsiang, Ping Tong, Taiwan, ROC.
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CELL-CON INCORPORATED

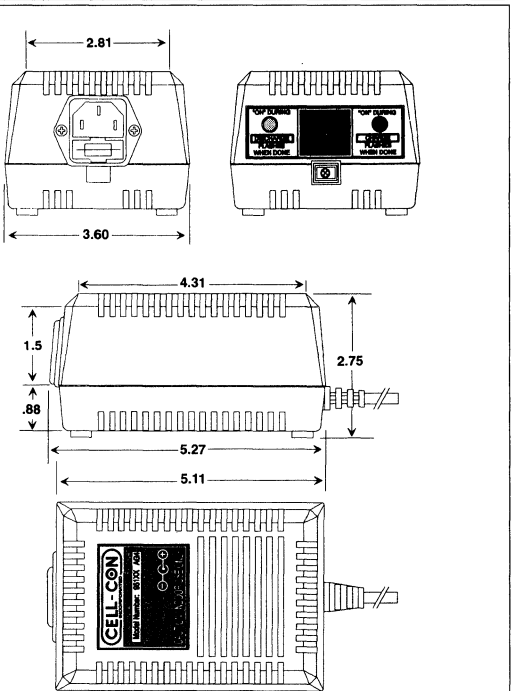
DC & AC POWER SUPPLIES

ISO 9002 QMI REGISTERED QUALITY SYSTEM

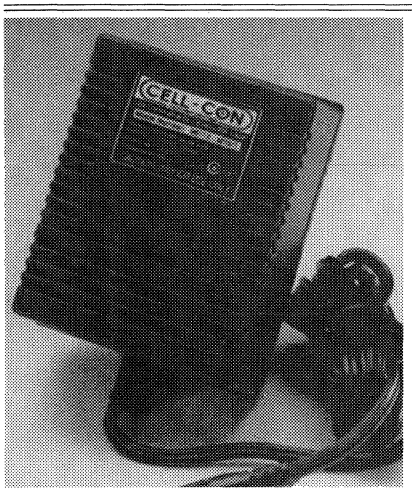
SEE CELL-CON COMPLETE PRODUCT LISTING OF BATTERIES, CHARGERS AND POWER SUPPLIES ON PAGES D•1329 THROUGH D•1333

DT-25 DESK CASE

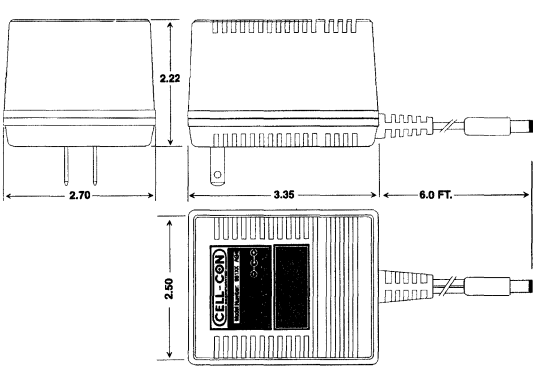
- Samples 1-2 weeks
- Micro Processor controlled
- Custom Nameplate
- Thermistor control option
- IEC Connector Optional
- Fused I/O as Required
- 120/240VAC input switch
- Custom Output cable
- Fast/Smart Charge Rates
- Molded Strain Relief
- Discharge Option
- Output plugs as required
- LED Function Indicators
- UL/CSA Available



P-20 WALL CASE



- Samples 1-2 weeks
- Custom Nameplate
- DC Charger
- AC or DC Power Supply
- Up to 15W / 40V A
- Vented Case
- Molded Strain Relief
- Output plugs as required
- UL/CSA Listed
- Smaller case sizes available



See our pages in Batteries, Section 3900, Pages **D•1329** - **D•1333**

CELL-CON INCORPORATED 735 Fox Chase • Coatesville, PA 19320
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CET TECHNOLOGY **CET Technology** 27 Roulston Rd. Windham,NH 03087 TEL 603-894-6100
FAX 603-894-6161

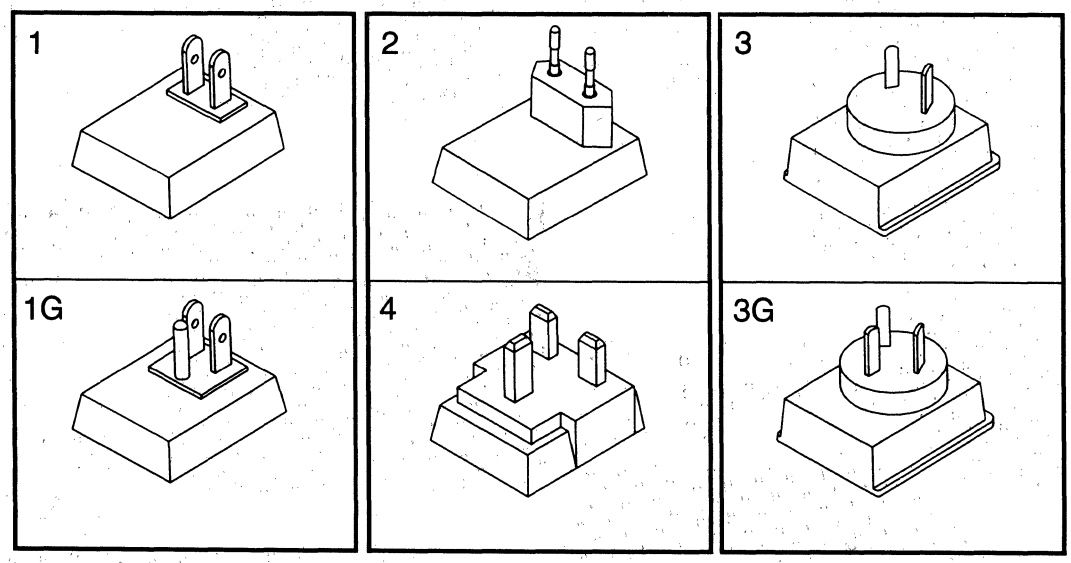
Mfgr of Standard & Custom AC/DC & AC/AC Adapters

UL/CUL/CSA approved adapters for North America
TUV/VDE approvals for Europe
T-Mark for JIS approvals for Japan
Linear Regulated power supplies (with up to 3 outputs)
Switching power supplies
Custom adapters available

General Specifications:
Input Voltages available; 100VAC, 120VAC, 220VAC, 230 vac & 240VAC
Dielectric withstanding 4000VAC (for TUV/VDE Requirements)
Humidity: up to 95%
Storage temperature: -40°C to +70°C
Operating Range: -10°C to + 40°C
Output cords: 6 ft. standard other lengths available on request
Custom units per customer design are available
Choice of many standard molded output connectors available including MiniDins and right angle plugs.

Linear switchable desktop case available for dual or triple input voltages

Many case types and connectors available including an integrated IEC 320 socket offering the option to avoid stocking the various international case types required to supply your world wide market needs.



Visit us on the WEB WWW.CETTECH.COM also see our listing in transformers VOL Sec 5600.

CET TECHNOLOGY **CET Technology** 27 Roulston Rd. Windham,NH 03087 TEL 603-894-6100
FAX 603-894-6161

UL/CUL/CSA/TUV/VDE Approved Adapters

DC Models

Model	DC Voltage	Current Range(ma.)
35	3.0	50-800
	3.6	50-650
	4.5	50-600
	5.0	50-500
	6.0	50-500
	7.5	50-500
	9.0	50-350
	12.0	50-250
	15.0	50-200
	16.0	50-150
	18.0	50-150
	21.0	50-150
	24.0	50-150

Model	DC Voltage	Current Range (ma.)
41	3.0	100
	4.0	1000
	4.5	500-1000
	6.0	350-900
	7.0	350-850
	7.5	350-800
	9.0	200-900
	10.0	250-550
	12.0	200-700
	14.0	150-450
	15.0	150-400
	18.0	150-350
	21.0	100-300
	24.0	100-300

Model	DC Voltage	Current Range(ma.)
48	4.0	900-1500
	6.0	850-1400
	7.0	800-1300
	7.5	700-1300
	9.0	500-1200
	10.0	450-1100
	12.0	400-1000
	13.5	650-850
	14.0	300-800
	15.0	300-800
	18.0	250-700
	21.0	200-600
	24.0	200-550

Model	DC Voltage	Current Range(ma.)
57	6.0	1400-4500
	7.0	1300-4000
	7.5	1300-3800
	9.0	1200-3000
	10.0	1100-2500
	12.0	1000-2300
	14.0	800-2000
	15.0	800-1800
	18.0	700-1500
	21.0	600-1300
	24.0	550-1100

AC Models

Model	AC Voltage	Current Range (ma.)
35A	3.0	50-900
	3.6	50-900
	4.5	50-800
	5.0	50-700
	6.0	50-700
	7.5	50-650
	8.0	50-600
	9.0	50-600
	12.0	50-500
	15.0	50-400
	18.0	50-350
	21.0	50-300
	24.0	50-200
	28.0	50-200

Model	AC Voltage	Current Range (ma.)
41A	4.5	500-1600
	6.0	350-1500
	7.0	350-1400
	9.0	250-1200
	10.0	250-1100
	12.0	200-1000
	14.0	150-750
	15.0	150-750
	18.0	150-550
	21.0	100-500
	24.0	100-450
	28.0	100-400

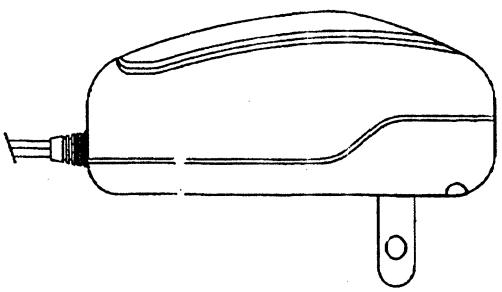
Model	AC Voltage	Current Range(ma.)
48A	4.0	900-1000
	6.0	800-2000
	9.0	500-2000
	10.0	450-1700
	12.0	400-1500
	14.0	300-1200
	15.0	300-1200
	16.0	300-1100
	18.0	250-1000
	21.0	200-850
	24.0	200-750
	28.0	200-600

Model	AC Voltage	Current Range(ma.)
57A	9.0	1800-4300
	12.0	1500-3000
	15.0	1200-2600
	18.0	1000-2100
	24.0	750-1600
	28.0	700-1300
66A	9.0	4300-5900
	12.0	3000-4500
	15.0	2700-3700
	18.0	2000-3000
	24.0	1600-2300
	28.0	1300-2000

CET TECHNOLOGY **CET Technology** 27 Roulston Rd., Windham,NH 03087 TEL 603-894-6100
FAX 603-894-6161

5 Watt to 30 Watt Switching PowerSupplies Wall mount and Desktop Versions

General Specification
AC input: 90---265 VAC
Input Freq.: 47---63Hz
Input Current: 1A RMS max @ 120VAC.
Operating Temp. 0°C to 40°C (derated > 40°C)
Storage Temp. -20°C---85°C
Storage Humidity 10%---90%.
Natural Convection cooling
Dielectric withstand 1.5KVAC @ 1 Min.
Insulation resistance: 50MΩ
Reliability spec 50,000Hrs MTBF @ 25° C
Ripple 1%, **Load regulation** 5%



Features:
UL/CSA/TUV approved
Meets FCC/VDC Class B Requirements
Units are available in wall mount and desktop with your choice of domestic or international input blade options.
Units come in standard or our new compact cases to fit your needs.

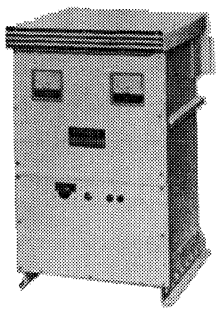
Call or fax us with your power supply requirements now.

	5V	6V	7V	9V	10V	12V	15V	16V	18V	20V	24V
5W	1A	.83A	-	0.55A	-	0.41A	0.33A	-	0.27A	-	0.2A
10W	2A	1.66A	1.4A	1.1A	1.0A	0.83A	0.66A	0.625A	0.55A	0.5A	0.42A
15W	3A	2.5A	2.1A	1.65A	1.5A	1.25A	1A	0.9A	0.85A	0.75A	0.625A
20W	4A	3.3A	2.85A	2.2A	2A	1.6A	1.33A	1.25A	1.1A	1A	0.85A
30W	5A	4A	3.5A	3.3A	3A	2.5A	2A	1.875A	1.66A	1.5A	1.25A

DC to DC converters

We also offer a line of low cost DC to DC converters from .25 Watt to 10 Watts in SIPP and DIP packages,call us for details.

Visit us on the WEB WWW.CETTECH.COM also see our listing in transformers VOL Sec 5600.



Magamp Regulated Power Supplies

- EXTREME RELIABLITY AND LONG LIFE
- UP TO 500% INTERMITTENT LOAD CURRENT CAPABILITY

K SERIES

STANDARD FEATURES

DC VOLTAGE RANGE: Continuous adjustment over the entire range by means of one knob.

SERIES OR PARALLEL OPERATION: Units may be operated in series. They may also be operated in parallel, if the Current Limiting option under Optional Extras is included.

REMOTE SENSING: Provision for selecting "local" sensing at the power supply terminals, or "remote" sensing at the load terminals. Three terminals for remote on-off station and two terminals for remote voltage adjustment potentiometer.

REGULATION & RECTIFICATION: All solid state design including magnetic amplifier and hermetically sealed silicon diodes. Peak voltages and currents during operation and switching held well within rated values.

INTERMITTENT RATINGS (% of Rated Current): 125% for 5 minutes every 20 minutes; 250% for 5 seconds every 20 seconds; 350% for 1 second; 500% peak.

ON-OFF CONTROLS: By AC magnetic contactor; 3-wire start-stop pushbutton switch on front panel.

CIRCUIT ISOLATION: Output circuit completely isolated from input; either positive or negative DC bus can be grounded.

AMBIENT TEMPERATURE: Continuous operation from 0 to +55°C. (also –55°C. to 0°C. with decreased performance); storage at –62°C. to +70°C.

COOLING: Fan cooling by means of induction motor with sealed ball bearings; silicone lubricated for low and high temperatures.

STABILITY: Negligible temperature influence. Adjustable time constant.

PILOT LIGHT: Indicates when unit is energized.

METERS: 3 1/2" voltmeter and ammeter, 2% accuracy.

MULTIPLE INPUT: Can be set for various AC supply voltages by a simple reconnection.

CABINET: Inside readily accessible from front for inspection and routine maintenance.

OPTIONAL FEATURES

PARALLEL OPERATION: Specify Current Limiting (Suffix "B").

MILITARIZING: To MIL-STD-810 for humidity, salt fog, sand, dust and fungus. Also vibration per Curve AB up to 33 Hz., Figure 514-6 of MIL-STD-810, only on MH stationary and 2-wheel styles. Radio interference limits per MIL-I-26600 and MIL-I-6181D. Specify suffix "P".

ALTERNATE CABINET STYLES: See table of dimensions. Specify final alternate suffix.

DC OUTPUT CABLES: Standard lengths available are 12 ft. and 25 ft.

AC INPUT CABLES: Standard lengths 50, 100 and 150 ft. Specify length.

ENGINEERING DATA

Line	Model No.	Nominal	DC Volts Output Continuous Range	DC Amps Continuous	DC Voltage Regulation			Voltage Ripple rms	Response Time (3) Millisec.	Input AC Volts 3-Phase	Input Freq.	Approx. Max. AC Amps Per Phase		Net Weight Lbs. (Stationary)
					Static (1)	Dynamic (2)								
						1/2 Load	Full Load					at 220v	at 440v	
1	MH32-100KVZ234S	28	22-32	100	0.25%	4v	6v	1%	50	230/380/460	50/60 Hz	22	11	245
2	MH32-200KVZ234S	28	22-32	200	0.25%	4v	6.5v	1%	50 (4)	230/380/460	50/60 Hz	38	19	310
3	MH32-250KVZ234M	28	22-32	250	0.25%	4v	6.5v	1%	50 (4)	230/380/460	50/60 Hz	46	23	370
4	MH32-300KV24S	28	22-32	300	0.25%	4v	6.5v	1%	50 (4)	230/460	60 Hz	55	27.5	370
5	1C36-400KVZ234S	28	26-36	400	0.25%	5v	8v	1%	100	230/380/460	50/60 Hz	84	42	650
6	1C36-500KVZ234S	28	26-36	500	0.25%	5v	8v	1%	100	230/380/460	50/60 Hz	104	52	720
7	1C36-600KVZ4S	28	26-36	600	0.25%	5v	8v	1%	100	460	50/60 Hz	126	63	780
8	2C36-1000K2S	28	26-36	1000	0.25%	6v	9v	1%	100	220	60 Hz	200	—	1220
9	2C36-1200K4S	28	26-36	1200	0.25%	7v	10v	1%	100	460	60 Hz	—	125	1235

NOTE: Output amps stated are continuous. All units have 500% intermittent peak output current. All values based on balanced supply line. Dynamic Regulation and Response Time based on nominal input and output.

(1) Deviation of the DC voltage from its average value for any combination of rated load and line variations.

(2) Maximum over or undershoot for a step change from no load to full (half) load or full (half) load to no load.

(3) For 63% reduction of transient.

(4) 75 milliseconds, full load to no load.

(5) Add 14" for handle.

(6) Add 2" for lifting eyes.

DIMENSIONS All dimensions given are in inches.

Cabinet Style	Std or Extra	Final Suffix	MH			1C			2C		
			W	D	H	W	D	H	W	D	H
STATIONARY	Std.	S	18 7/8	19 1/4	30 7/8	23 1/2	25	38 1/2	26 1/4	38	54 1/2 (6)
CASTER	Extra	C	18 7/8	19 1/4	35 3/8	23 1/2	25	43	26 1/4	38	60 1/2 (6)
2-WHEEL	Extra	M	22	20 1/4	31 1/2 (5)	—	—	—	—	—	—

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http://www.christiecorp.com

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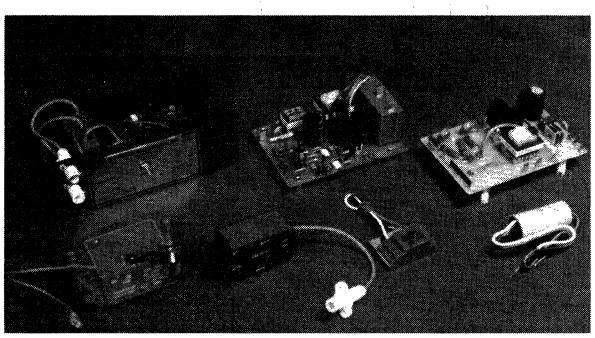
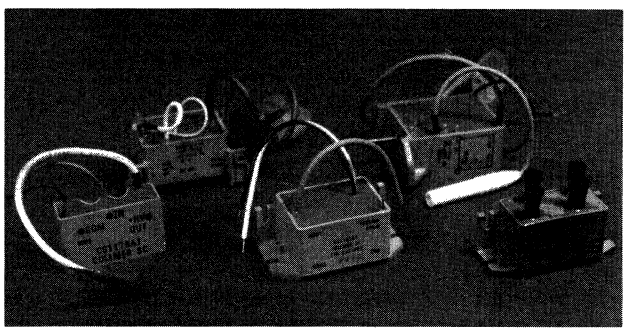
High Voltage Power Supplies, Multipliers, Diode-Rectifier Assy. and Low Voltage Modules

Collmer Semiconductor's high-volume production capacity assures high quality on-time delivery for both standard products or those customized to meet your special requirements.





ELECTRONIC HIGH VOLTAGE POWER SUPPLIES

Model	Input Voltage	Output Voltage Range	Current Range	Typical Power	Applications
Unregulated					
CS2132	120/240 VAC	6-18 kV	1-5μA	60mW	• Laser Triggers • Ionizers • EOS/ESD • Ozonators • Electrostatic Speakers • Copiers • Duplicators • Home & Office Air Cleaners
CS2112	9-24VDC	3-20 kV	5-100μA	.5-1W	
CS2120	120/240 VAC	3kV-10kV*	1-10μA	100mW	
CS2091	120/240 VAC	6-30 kV	25-600μA	1-5W	
CS2095	120/240 VAC	5-15 kV	.8-1.5mA	5-10W	
Regulated					
CS2096	120/240 VAC	5-15 kV	1.0-2.5mA	10-20W	• Industrial Air Cleaners Light to Heavy Duty • Arc & Plasma Cutters/Welders • Laser Power Supplies
CS2094	120/240 VAC	5-15 kV	2.0-5.0mA	15-70W	
CS2097	120/240 VAC	1-5 kV	5.0-15.0mA	5-120W	
CS2100	120/240 VAC	5-15 kV	3.0-10.0mA	50-120W	
CS2098	120/240 VAC	10-20 kV	30-40mA	200-600W	

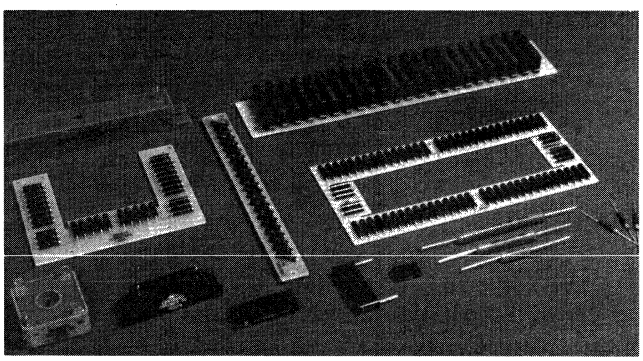
* Dual Output (Both Positive and Negative); grounded or ungrounded

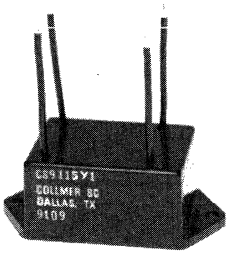
Custom variations are available on request. LED displays, bleeders, voltage clamps and output voltage adjustable controls can be included.

HIGH VOLTAGE MULTIPLIERS

Custom designed to meet your requirements 5kV to 120kV DC output.

Circuits	Applications
• Multi-stage Series or Parallel W or W/O Bleeder Resistors • Sensing Resistor Networks • Custom Designs From Multiple Wave Forms	• CRT • Copiers • X-Ray Equipment • Ionizers • Electrostatic Sprayers • HV Power Supplies





CUSTOM ENCAPSULATED MODULES (VersaMod)

Circuits	Applications
• MOV Assemblies 1Ø, 3Ø • Snubbers (C, RC, RCD, ZC) • Capacitors (EMI) Filters • Resistor(s) and/or Networks • Customer Designed Circuits	• UPS Systems • Welding Equipment • Motor Drives • Severe Vibration • Harsh Environments

HIGH VOLTAGE DIODE/RECTIFIER ASSEMBLIES

Series Type	Repetitive Peak Reverse Voltage V_{RRM} (kV)	Average Forward Current I_O	Reverse Recovery Time t_{rr}	Applications
CS4500	4-16	15mA	<100 nsec	• High Voltage Power Supplies X-Ray (Medical & Industrial) Welding (Arc & Plasma) Laser • CRT Display • Electrostatic Equipment • Electron Beam Equipment
CS451	7-50	15mA	<100 nsec	
CS458	8-15	275-650mA	75nsec-2.5μs	
XRay	to 350	to 380mA	Std.	
High Power	to 200	to 1.5A	75nsec-2.5μs	
Bridges	All	to 3.0A	Any	

Also from Collmer: *Power Semiconductors (See Sec. 4800)*
Hall Current Sensors (See Vol. B, Sec. 5500)

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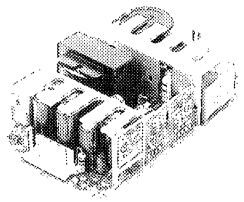
Fax 972/233-0481 • http://www.collmer.com • e-mail: info@collmer.com

CONDOR Global Low-Cost Switching Power Supplies



NEW! 50 WATTS FULL POWER WITHOUT AIR FLOW!

- Ultra-small 2.50"x 4.25"x 1.25" footprint
- 50 watts with no air flow
- 90-264 VAC input
- Overvoltage protection standard
- CE marked to LVD
- Outputs over current protected
- Peak power of 55 watts for 60 seconds
- Meets CISPR 22 and FCC Class B
- Approved to UL1950, IEC950, CSA22.2 No. 234

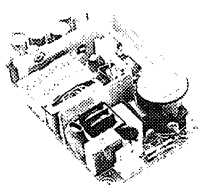
CE LVD

RATINGS

MODEL NO.*	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	TOTAL POWER, WATTS	SIZE, INCHES
GLC50A	+5.05V @ 4A	+12V @ 2.5A	-12V @ 0.2A	N/A	50	2.50 x 4.25 x 1.25
GLC50B	+5.05V @ 4A	+15V @ 2.5A	-15V @ 0.2A	N/A	50	2.50 x 4.25 x 1.25
GLC50D	+5.05V @ 4A	+24V @ 1.5A	-12V @ 0.2A	N/A	50	2.50 x 4.25 x 1.25
GLx50-5	+5.1V @ 8A	N/A	N/A	N/A	41	2.50 x 4.25 x 1.25
GLx50-12	+12V @ 4.2A	N/A	N/A	N/A	50	2.50 x 4.25 x 1.25
GLx50-15	+15V @ 3.3A	N/A	N/A	N/A	50	2.50 x 4.25 x 1.25
GLx50-24	+24V @ 2.1A	N/A	N/A	N/A	50	2.50 x 4.25 x 1.25
GLx50-28	+28V @ 1.8A	N/A	N/A	N/A	50	2.50 x 4.25 x 1.25
GLC50-48	+48V @ 1.04A	N/A	N/A	N/A	50	2.50 x 4.25 x 1.25

*NOTE: Replace "x" in Model No. with "M" (medical version) or "C" (commercial version)

CONDOR Global Compact Switching Power Supplies



NEW! WORLD'S SMALLEST 25-WATT SWITCHER!

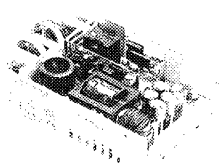
- Ultra-small footprint: 2.50"x 4.00"x 0.86"
- 90-264 VAC input range
- EMI to CISPR 22 and FCC Class B
- Overvoltage protection standard
- Outputs protected against overload
- Enclosures available
- Approved to UL 1950, IEC950, CSA 22.2 No. 234

CE LVD

RATINGS

MODEL NO.*	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	TOTAL POWER, WATTS	SIZE, INCHES
GSC25A	+5.1V @ 2.5A	+12V @ 1.5A	-12V @ 0.2A	N/A	25	2.50 x 4.00 x 0.86
GSC25B	+5.1V @ 2.5A	+15V @ 1.5A	-15V @ 0.2A	N/A	25	2.50 x 4.00 x 0.86
GSC25D	+5.1V @ 2.5A	+24V @ 1.0A	-12V @ 0.2A	N/A	25	2.50 x 4.00 x 0.86

CONDOR Global Switching Power Supplies with PFC



NEW! INDUSTRY'S SMALLEST 160-WATT SWITCHER!

- 160 watts; 4.50"x 7.00"x 1.69" footprint
- PFC to IEC 1000-3-2
- Single-output versions from 5 to 28 VDC
- 85-264 VAC input range
- Outputs overload protected
- Exceeds CISPR 22 and FCC Class B
- Power fail signal standard
- Outputs adjustable ±5% minimum
- Approved to UL 1950, IEC950, CSA 22.2 No. 234

CE LVD

RATINGS

MODEL NO.	VOLTS	AMPS	TOTAL POWER, WATTS	SIZE, INCHES
GPFC160-5	5	26/31.3*	160	4.50 x 7.00 x 1.69
GPFC160-12	12	11.7/13.3*	160	4.50 x 7.00 x 1.69
GPFC160-15	15	9.3/10.7*	160	4.50 x 7.00 x 1.69
GPFC160-24	24	5.8/6.7*	160	4.50 x 7.00 x 1.69
GPFC160-28	28	5/5.7*	160	4.50 x 7.00 x 1.69

*Convection/air flow.

ADDITIONAL MODELS AVAILABLE—CONTACT FACTORY FOR DETAILS

Condor D.C. Power Supplies, Inc., A subsidiary of SL Industries, Inc.
2311 Statham Parkway, Oxnard, CA 93033 ◆ (805) 486-4565 ◆ (800) 235-5929
FAX (805) 487-8911 ◆ www.condorpower.com/

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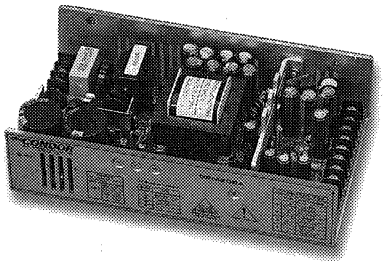
CONDOR Global Performance Switching Power Supplies

FOR COMMERCIAL AND MEDICAL APPLICATIONS



- 71 models (single and multi-output)
- Approved to UL 1950 without D3 deviation, CSA 22.2 No. 234 Level 3, IEC 950, EN60950.
- Medical models approved to UL544, UL2601, IEC601-1, CSA234 Level 3, VDE0750
- Industry-standard packages
- Custom designs available
- FCC/CISPR 11 and 22 level B
- Continuous-input voltage (85-264VAC)
- OVP on 5V outputs & single-output units
- MTBF 100,000+ hours per Mil Hndbk 217E
- 8-hour burn-in with cycling (24 hours on medical versions)
- All models less than 60µA leakage current.
- Computerized testing with data sheets
- 2-year warranty; free evaluation samples

CE LVD

SPECIFICATIONS

AC Input
85-264 VAC, 47-63 Hz single phase.

DC Output
See output rating chart.

Holdup Time
20 mS minimum at full load and nominal line (115 VAC).

Minimum Load
Normal Operation: Output #1 and/or #2 combined load current must exceed 20% of total output power being drawn. Also, Output #1 must meet the minimum listed below for proper regulation of other outputs. See Ratings for additional notes or conditions.

GPx40	0.4A
GPx50	0.4A
GPx55	0.7A
GPx80	1.0A
GPx130	3.0A
GPx200	4.0A
All single output models	Not required

Overload Protection
Fully protected against short circuit and output overload on all outputs. Short circuit protection cyclic type on most outputs; foldback on outputs with 3-terminal regulator post regulation. Overload protection recovery automatic after removal of fault.

Output Noise and Ripple
0.5% RMS, 1.5% PK-PK maximum on all outputs.

Transient Response
+5V main output; 500 µS typical response time for a 50 to 100% or 100 to 50% load change. Maximum voltage deviation: 3.5%.

Overvoltage
Built-in on +5V output with a firing point set at 6.2V ±0.6V. Also standard on single-output versions.

Input Protection
ESD protected to 15kV per IEC 801-2, IEC 801-4 level 2 and IEC 801-5 level 1. Internal A.C. fuse provided on all units. This fuse only blows if a catastrophic failure occurs in the unit; it does not blow on overload or short circuit. A.C. input protected from line transients by metal oxide varistors on all units.

Reverse Voltage Protection
All outputs protected against inadvertent application of reverse voltage up to 1 times the rated current of the reversed output.

Voltage Adjustment
Built-in potentiometer adjusts voltage from 4.5V to OVP trip point (6.2V nominal) on main +5V output. A separate potentiometer adjusts Output #2 ±5% minimum except GPx40.

Temperature Coefficient
0.03% per ° C typical for all outputs.

Temperature Rating
0 to 50 ° C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space, moving air may be required. For operation above 50 ° C, it is important that cooling vs. load profile is such that the heatsinks do not operate above 90 ° C for extended periods.

EMI SPECIFICATIONS
All models include built-in EMI filters to meet or exceed the conducted emissions requirements of FCC 20870 Class B and VDE 0871 Class B, EN55022B.

SAFETY SPECIFICATIONS
All commercial models are designed to meet UL 1950 without D3 deviations CSA 22.2 Level 3, IEC 950 and VDE EN60950. All medical models are approved to UL 2601, IEC 601.1, VDE 0750 and CSA 22.2 No. 601.1. CE compliant.

RATINGS

MODEL NO.*	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	TOTAL POWER, WATTS	SIZE, INCHES
GPx41-5 **NEW!**	+5.1V @ 6A	N/A	N/A	N/A	30	4.00 x 2.00 x 1.50
GPx41-12 **NEW!**	+12V @ 3.3A	N/A	N/A	N/A	40	4.00 x 2.00 x 1.50
GPx41-15 **NEW!**	+15V @ 2.7A	N/A	N/A	N/A	40	4.00 x 2.00 x 1.50
GPx41-24 **NEW!**	+24V @ 1.7A	N/A	N/A	N/A	40	4.00 x 2.00 x 1.50
GPx41-28 **NEW!**	+28V @ 1.4A	N/A	N/A	N/A	40	4.00 x 2.00 x 1.50
GPx40A	+5.1V @ 4A (5 PK)	+12V @ 2A (3 PK)	-12V @ 1A (1.2 PK)	N/A	40	3.00 x 5.00 x 1.28
GPx40B	+5.1V @ 4A (5 PK)	+15V @ 2A (3 PK)	-15V @ 0.4A	N/A	40	3.00 x 5.00 x 1.28
GPx40D	+5.1V @ 4A (5 PK)	+24V @ 1A (1.5 PK)	-12V @ 0.4A	N/A	40	3.00 x 5.00 x 1.28
GPx40-3.3	+3.3V @ 8A (10 PK)	N/A	N/A	N/A	40	3.00 x 5.00 x 1.28
GPx40-5	+5V @ 8A (10 PK)	N/A	N/A	N/A	40	3.00 x 5.00 x 1.28
GPx40-9	+9V @ 4.5A (6 PK)	N/A	N/A	N/A	40	3.00 x 5.00 x 1.28
GPx40-12	+12V @ 3.3A (4.2 PK)	N/A	N/A	N/A	40	3.00 x 5.00 x 1.28
GPx40-15	+15V @ 2.7A (3.3 PK)	N/A	N/A	N/A	40	3.00 x 5.00 x 1.28
GPx40-24	+24V @ 1.7A (2.1 PK)	N/A	N/A	N/A	40	3.00 x 5.00 x 1.28
GPx40-28	+28V @ 1.4A (1.8 PK)	N/A	N/A	N/A	40	3.00 x 5.00 x 1.28
GPC50A	+5V @ 5A (7 PK)	+12V @ 2A (3 PK)	-12V @ 0.5A (1 PK)	N/A	50	6.30 x 3.92 x 1.57
GPC50F	+5V @ 5A (7 PK)	+12V @ 1.2A (1.5 PK)	-12V @ 0.5A	N/A	50	6.30 x 3.92 x 1.57

*NOTE: Replace "x" in Model No. with "M" (medical version) or "C" (commercial version)

ADDITIONAL MODELS AVAILABLE—CONTACT FACTORY FOR DETAILS

Condor D.C. Power Supplies, Inc., A subsidiary of SL Industries, Inc.
2311 Statham Parkway, Oxnard, CA 93033 ◆ (805) 486-4565 ◆ (800) 235-5929
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CONDOR Global Performance Switching Power Supplies

MODEL NO.*	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	TOTAL POWER, WATTS	SIZE, INCHES
GPx55A	+5V @ 6A (8 PK)	+12V @ 3A (5 PK)	+12V @ 1A (1.2 PK)	-12V @ 1A	55	6.30 x 3.94 x 1.68
GPx55B	+5V @ 6A (8 PK)	+12V @ 3A (5 PK)	-5V @ 1A (1.2 PK)	-12V @ 1A	55	6.30 x 3.94 x 1.68
GPx55C	+5V @ 6A (8 PK)	+15V @ 3A (5 PK)	-15V @ 1A (1.2 PK)	-5V @ 1A	55	6.30 x 3.94 x 1.68
GPx55D	+5V @ 6A (8 PK)	+24V @ 1.5A (2 PK)	+12V @ 1A	-12V @ 1A	55	6.30 x 3.94 x 1.68
GPx55E	+5V @ 6A (8 PK)	+24V @ 1.5A (2 PK)	+15V @ 1A	-15V @ 1A	55	6.30 x 3.94 x 1.68
GPx55F	+5V @ 6A (8 PK)	+12V @ 3A (5 PK)	+15V @ 1A	-15V @ 1A	55	6.30 x 3.94 x 1.68
GPx55-5	5V @ 11A (14 PK)	N/A	N/A	N/A	55	6.30 x 3.94 x 1.68
GPx55-12	12V @ 4.7A (5.8 PK)	N/A	N/A	N/A	55	6.30 x 3.94 x 1.68
GPx55-15	15V @ 3.7A (4.7 PK)	N/A	N/A	N/A	55	6.30 x 3.94 x 1.68
GPx55-24	24V @ 2.3A (2.9 PK)	N/A	N/A	N/A	55	6.30 x 3.94 x 1.68
GPx55-28	28V @ 2.0A (2.4 PK)	N/A	N/A	N/A	55	6.30 x 3.94 x 1.68
GPx55-48	48V @ 1.5A (1.5 PK)	N/A	N/A	N/A	72	6.30 x 3.94 x 1.68
GPx80A	+5V @ 12A (16 PK)	+12V @ 3A (5 PK)	-12V @ 1A	+12V @ 1A	80/110**	7.00 x 4.25 x 1.86
GPx80B	+5V @ 12A (16 PK)	+12V @ 3A (5 PK)	-12V @ 1A	-5V @ 1A	80/110**	7.00 x 4.25 x 1.86
GPx80C	+5V @ 12A (16 PK)	+12V @ 3A (5 PK)	-15V @ 1A	+15V @ 1A	80/110**	7.00 x 4.25 x 1.86
GPx80D	+5V @ 12A (16 PK)	+24V @ 2A (4 PK)	-12V @ 1A	+12V @ 1A	80/110**	7.00 x 4.25 x 1.86
GPx80E	+5V @ 12A (16 PK)	+24V @ 2A (4 PK)	-15V @ 1A	+15V @ 1A	80/110**	7.00 x 4.25 x 1.86
GPx80P	+5V @ 12A (16 PK)	+24V @ 3.5A (4.5 PK)	-12V @ 1A	+12V @ 2A	80/110**	7.00 x 4.25 x 1.86
GPx80-5	5V @ 16A (22 PK)	N/A	N/A	N/A	80/100**	7.00 x 4.25 x 1.86
GPx80-12	12V @ 6.7A (9.2 PK)	N/A	N/A	N/A	80/110**	7.00 x 4.25 x 1.86
GPx80-15	15V @ 5.3A (7.3 PK)	N/A	N/A	N/A	80/110**	7.00 x 4.25 x 1.86
GPx80-24	24V @ 3.4A (4.6 PK)	N/A	N/A	N/A	80/110**	7.00 x 4.25 x 1.86
GPx80-28	28V @ 2.9A (3.9 PK)	N/A	N/A	N/A	80/110**	7.00 x 4.25 x 1.86
GPC80-48	48V @ 1.7A (2.3 PK)	N/A	N/A	N/A	80/110**	7.00 x 4.25 x 1.86
GPx130A	+5V @ 20A (25 PK)	+12V @ 5A (8 PK)	-12V @ 1.2A	+12V @ 1.2A	110/130**	8.50 x 4.50 x 2.00
GPx130B	+5V @ 20A (25 PK)	+12V @ 5A (8 PK)	-5V @ 1.2A	-12V @ 1.2A	110/130**	8.50 x 4.50 x 2.00
GPx130C	+5V @ 20A (25 PK)	+12V @ 5A (8 PK)	-15V @ 1.2A	+15V @ 1.2A	110/130**	8.50 x 4.50 x 2.00
GPx130D	+5V @ 20A (25 PK)	+24V @ 3.5A (5 PK)	-12V @ 1.2A	+12V @ 1.2A	110/130**	8.50 x 4.50 x 2.00
GPx130E	+5V @ 20A (25 PK)	+24V @ 3.5A (5 PK)	-15V @ 1.2A	+15V @ 1.2A	110/130**	8.50 x 4.50 x 2.00
GPx140-5	5V @ 26A (32 PK)	N/A	N/A	N/A	120/160**	8.50 x 4.50 x 2.12
GPx140-12	12V @ 11.7A (14.6 PK)	N/A	N/A	N/A	120/160**	8.50 x 4.50 x 2.12
GPx140-15	15V @ 9.3A (11.7 PK)	N/A	N/A	N/A	120/160**	8.50 x 4.50 x 2.12
GPx140-24	24V @ 5.8A (7.3 PK)	N/A	N/A	N/A	140/160**	8.50 x 4.50 x 2.12
GPx140-28	28V @ 5A (6.3 PK)	N/A	N/A	N/A	140/160**	8.50 x 4.50 x 2.12
GPx200A	+5V @ 26A (32 PK)	+12V @ 8A (12 PK)	-12V @ 1.2A	12V @ 4A	150/200**	9.00 x 5.00 x 2.50
GPx200B	+5V @ 26A (32 PK)	+12V @ 8A (12 PK)	-5V @ 1.2A	12V @ 4A	150/200**	9.00 x 5.00 x 2.50
GPx200D	+5V @ 26A (32 PK)	+24V @ 5A (6.5 PK)	-12V @ 1.2A	12V @ 4A	150/200**	9.00 x 5.00 x 2.50
GPx200E	+5V @ 18A (32 PK)	+24V @ 3A (6.5 PK)	-15V @ 1A	15V @ 4A	150/200**	9.00 x 5.00 x 2.50
GPx200F	+5V @ 18A (32 PK)	+12V @ 5A (12 PK)	-12V @ 1.5A	5V @ 4A	150/200**	9.00 x 5.00 x 2.50
GPx225-5	+5V @ 40A (45 PK)	N/A	N/A	N/A	170/225**	9.00 x 5.00 x 2.50
GPx225-12	+12V @ 19A (20 PK)	N/A	N/A	N/A	190/225**	9.00 x 5.00 x 2.50
GPx225-15	+15V @ 15A (16 PK)	N/A	N/A	N/A	190/225**	9.00 x 5.00 x 2.50
GPx225-24	+24V @ 9.4A (10 PK)	N/A	N/A	N/A	200/225**	9.00 x 5.00 x 2.50
GPx225-28	+28V @ 8A (8.5 PK)	N/A	N/A	N/A	200/225**	9.00 x 5.00 x 2.50

*NOTE: Replace "x" in Model No. with "M" (medical version) or "C" (commercial version) **Higher power rating with fan cooling.

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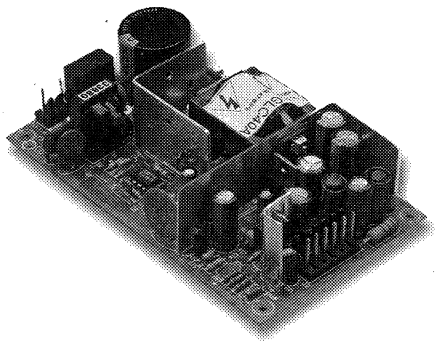
CONDOR Global Low-Cost Switching Power Supplies



LOW-COST, LOW-PROFILE SWITCHERS

- 110 watts with air
- Cost-effective power source
- Universal input 90-264 VAC
- 2-year warranty
- Single and multiple outputs
- Overload protection
- Overvoltage protection
- Built-in EMI filter
- UL, CSA and IEC approvals
- Operation at no-load
- Power fail detect on GLx75
- GLx75 models have both commercial and medical versions

CE LVD

SPECIFICATIONS

AC Input
90-264 VAC, 47-63 Hz single phase.

DC Output
See output rating chart.

Holdup Time
15 mS minimum at full load and nominal line (115 VAC).

Overload Protection
Fully protected against short circuit and output overload on all outputs. Short circuit protection is cycling type power limit.

Output Noise and Ripple
0.5% RMS, 1% PK-PK, 20MHz bandwidth, differential mode.

Transient Response
Main output: 500µSec typical response time for return to within 0.5% of final value for a 50% load step within the regulation limits of minimum and maximum load, dI/dt<0.2A/µSec. Maximum voltage deviation is 3.5%.

Overvoltage
Built in with firing point set per ratings. OVP firing reduces voltage to less than 50% of nominal voltage.

Input Protection
Internal AC fuse provided on all units. Designed to blow only if a catastrophic failure occurs in the unit.

Voltage Adjustment
Factory set with fixed resistors to maximize reliability. Single-output versions adjustable ±5%.

Reverse Voltage Protection
All outputs protected against inadvertent application of reverse voltage up to 1 times the rated current of the reversed output.

Overshoot
Less than 2% overshoot at turn-on under nominal conditions, inversely proportional to input voltage and temperature.

Temperature Coefficient
0.03% per ° C typical for all outputs.

Temperature Rating
0 to 50 ° C at full rated output power. For operation in a confined space, moving air may be required. Under all conditions, the cooling vs. load profile should be such that the heatsink temperatures do not exceed 90° for extended periods.

EMI SPECIFICATIONS
All models include built-in EMI filtering to meet FCC Class B, CISPR 22 Class B.

SAFETY SPECIFICATIONS
All GLC models are approved to UL1950, CSA22.2 No. 234 Level 3, IEC950, EN60950 and VDE 0805.

Medical GLM75 series: approved to IEC601-1, UL 2601, CSA 601.1, CISPR 11 and FCC Class B.

RATINGS

MODEL NO.*	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	TOTAL POWER, WATTS	SIZE, INCHES
GLC40A	+5V @ 3A	+12V @ 2A	-12V @ 0.35A	N/A	40	3.00 x 5.00 x 1.20
GLC40B	+5V @ 3A	+15V @ 1.5A	-15V @ 0.35A	N/A	40	3.00 x 5.00 x 1.20
GLC40D	+5V @ 3A	+24V @ 1A	-12V @ 0.4A	N/A	40	3.00 x 5.00 x 1.20
GLC40-5	5.1V @ 7.8A	N/A	N/A	N/A	40	4.96 x 2.96 x 1.20
GLC40-12	12V @ 3.3A	N/A	N/A	N/A	40	4.96 x 2.96 x 1.20
GLC40-15	15V @ 2.7A	N/A	N/A	N/A	40	4.96 x 2.96 x 1.20
GLC40-24	24V @ 1.7A	N/A	N/A	N/A	40	4.96 x 2.96 x 1.20
GLC40-28	28V @ 1.4A	N/A	N/A	N/A	40	4.96 x 2.96 x 1.20
GLx75A	+5.1V @ 8A	+12V @ 2.5A	-12V @ 1A	12V @ 2.5A	75/110	7.00 x 4.25 x 1.30
GLx75C	+5.1V @ 8A	+12V @ 2.5A	-15V @ 1A	15V @ 2.5A	75/110	7.00 x 4.25 x 1.30
GLx75D	+5.1V @ 8A	+24V @ 2.5A	-12V @ 1A	12V @ 2.5A	75/110	7.00 x 4.25 x 1.30
GLx75E	+5.1V @ 8A	+24V @ 2.5A	-15V @ 1A	15V @ 2.5A	75/110	7.00 x 4.25 x 1.30
GLx75-5	5.1V @ 14.7A	N/A	N/A	N/A	70/110	3.40 x 5.75 x 1.56
GLx75-12	12V @ 6.3A	N/A	N/A	N/A	75/110	3.40 x 5.75 x 1.56
GLx75-15	15V @ 5A	N/A	N/A	N/A	75/110	3.40 x 5.75 x 1.56
GLx75-24	24V @ 3.1A	N/A	N/A	N/A	75/110	3.40 x 5.75 x 1.56
GLx75-28	28V @ 2.7A	N/A	N/A	N/A	75/110	3.40 x 5.75 x 1.56

*NOTE: For GLx75 series, replace "x" in Model No. with "M" (medical version) or "C" (commercial version)

ADDITIONAL MODELS AVAILABLE—CONTACT FACTORY FOR DETAILS

Condor D.C. Power Supplies, Inc., A subsidiary of SL Industries, Inc.
2311 Statham Parkway, Oxnard, CA 93033 ◆ (805) 486-4565 ◆ (800) 235-5929
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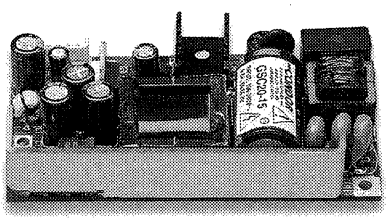
CONDOR Global Compact Switching Power Supplies



WORLD'S SMALLEST 20-WATT SWITCHERS

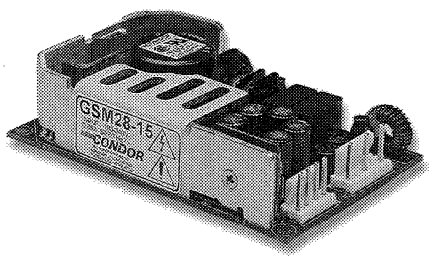
- No bigger than a business card!
- 90-264VAC input
- EMI FCC Class B, CISPR22B
- Standard overvoltage protection
- Fixed-frequency operation
- Full burn-in
- Approved to UL1950, IEC950, CSA22.2 No. 234 Level 3 and EN60950
- 2-year warranty

CE LVD

RATINGS

MODEL NO.	VOLTS	AMPS	TOTAL POWER, WATTS	SIZE, INCHES
GSC20-5	5.1	3.8	20	3.50 x 2.00 x 0.71
GSC20-12	12	1.7	20	3.50 x 2.00 x 0.71
GSC20-15	15	1.4	20	3.50 x 2.00 x 0.71
GSC20-24	24	0.85	20	3.50 x 2.00 x 0.71
GSC20-28	28	0.7	20	3.50 x 2.00 x 0.71

CONDOR Global Compact Medical Switching Power Supplies



WORLD'S SMALLEST 28-WATT MEDICAL SWITCHERS

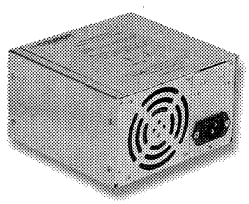
- Extremely small footprint
- Wide range AC input 85-264VAC
- Approved to IEC601-1 and UL2601
- EMI approved to FCC and CISPR 11 Class B
- Less than 25µA leakage current
- Overvoltage protection standard
- Full burn-in
- 2-year warranty

CE LVD

RATINGS

MODEL NO.	VOLTS	AMPS	TOTAL POWER, WATTS	SIZE, INCHES
GSM28-5	5.1	5.5	28	4.00 x 2.59 x 0.92
GSM28-12	12	2.3	28	4.00 x 2.59 x 0.92
GSM28-15	15	1.9	28	4.00 x 2.59 x 0.92
GSM28-24	24	1.2	28	4.00 x 2.59 x 0.92
GSM28-28	28	1.0	28	4.00 x 2.59 x 0.92

CONDOR Medical PC Power Supply



MODEL NO. XMAT 200

- 204-watt, medically approved switcher
- FCC Class B and VDE Class B
- Power good signal
- 115/230 switch-selectable AC input
- Fully enclosed with fan
- Industry-standard size
- UL544 and IEC601 approved
- AC inlet
- Flying lead AC on/off switch
- Suitable for PC/AT, tower or file server

ADDITIONAL MODELS AVAILABLE—CONTACT FACTORY FOR DETAILS

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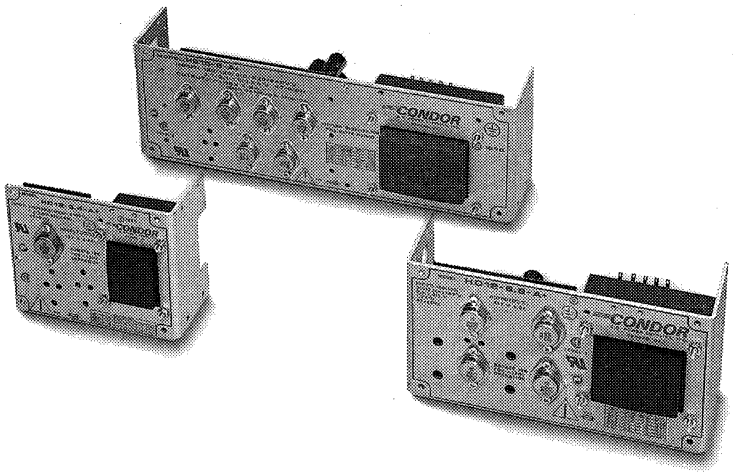
CONDOR International Plus Linear Power Supplies



- 115 models (single- and multi-output)
- 7 power levels (3 to 288W)
- Worldwide AC input ranges
- Worldwide safety standards
- Approved to UL 1950 without D3 deviation, IEC950, CSA C22.2 No. 234, VDE0871 Level B EMI, BABT
- Industry-standard packages
- OVP on all 5V outputs
- Hermetically sealed power transistors
- 105°C electrolytic capacitors
- MTBF 200,000+ hours per Mil Hndbk 217E
- 2-hour burn-in with cycling (8 hours on medical versions)
- Computerized testing with data sheets
- 3-year warranty
- Free evaluation samples available

CE LVD

SPECIFICATIONS

AC Input
100/120/220/240 VAC +10%, -13%; 47-63 Hz. Tolerance for 230 VAC operation is +15%, -10%. Derate output current 10% for 50 Hz operation.

DC Output
See voltage current rating chart. Adjustment range ±5% minimum.

Line Regulation
±0.05% for a 10% change.

Load Regulation
±0.05% for a 50% load change.

Transient Response
>50 microseconds for 50% load change.

Short Circuit Protection
Automatic current limit/foldback.

Overvoltage Protection
Built in on all 5V models, set at 6.2V ±0.4V. Other models use optional overvoltage protection.

Remote Sensing
Provided on all models 3 amps and above; open sense lead protection built in.

Stability
±0.05% for 24 hours after warmup.

Temperature Rating
0 to 50 °C fully rated; derated linearly to 40% at 70 ° C.

Temperature Coefficient
±0.01%/° C maximum.

Efficiency
5V units: 45%; 12 and 15V units: 55%; 20 and 24V units: 60%.

Output Ripple
3mV +0.05% of output voltage, peak to peak maximum. All "3-terminal regulator" outputs: 3mV +0.2% peak-to-peak maximum.

Vibration
Per Mil-Std-810B, Method 514, Procedure 1, curve AB (to 50 Hz).

Shock
Per Mil-Std-810B, Method 516, Procedure V.

Logic Inhibit
F & G units.

SINGLE-OUTPUT RATINGS

MODEL NO.	VOLTS	AMPS	CASE	SIZE
HA2-1.5-A+	2	1.5	B	4.88 x 4.00 x 2.25
HB2-3-A+	2	3.0	B	4.88 x 4.00 x 2.25
HC2-6-A+	2	6.0	C	5.63 x 4.88 x 2.95
HN2-9-A+	2	9.0	N	7.00 x 4.88 x 3.30
ND2-12-A+	2	12.0	D	9.00 x 4.88 x 3.30
HE2-18-A+	2	18.0	E	14.00 x 4.88 x 3.55
HA5-1.5/OVP-A+	5	1.2	B	4.88 x 4.00 x 2.25
HB5-3/OVP-A+	5	3.0	B	4.88 x 4.00 x 2.25
HC5-6/OVP-A+	5	6.0	C	5.63 x 4.88 x 2.95
HN5-9/OVP-A+	5	9.0	N	7.00 x 4.88 x 3.30
HD5-12/OVP-A+	5	12.0	D	9.00 x 4.88 x 3.30
HE5-18/OVP-A+	5	18.0	E	14.00 x 4.88 x 3.55
F5-25/OVP-A+	5	25.0	F	16.75 x 4.88 x 5.00

SINGLE-OUTPUT RATINGS (CONT.)

MODEL NO.	VOLTS	AMPS	CASE	SIZE
G5-35/OVP-A+	5	35.0	G	16.75 x 4.88 x 5.30
CP197-A+	5	50.0	G	16.75 x 4.88 x 5.30
HA15-0.9-A (12)+	12	0.9	B	4.88 x 4.00 x 2.25
HB12-1.7-A+	12	1.7	B	4.88 x 4.00 x 2.25
HC12-3.4-A+	12	3.4	C	5.63 x 4.88 x 2.95
HN12-5.1-A+	12	5.1	N	7.00 x 4.88 x 3.30
HD12-6.8-A+	12	6.8	D	9.00 x 4.88 x 3.30
HE12-10.2-A+	12	10.2	E	14.00 x 4.88 x 3.55
F15-15-A+ (12V)	12	16.0	F	16.75 x 4.88 x 5.00
HA15-0.9-A+	15	0.9	B	4.88 x 4.00 x 2.25
HB15-1.5-A+	15	1.5	B	4.88 x 4.00 x 2.25
HC15-3-A+	15	3.0	C	5.63 x 4.88 x 2.95
HN15-4.5-A+	15	4.5	N	7.00 x 4.88 x 3.30

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CONDOR International Plus Linear Power Supplies

SINGLE-OUTPUT RATINGS (CONT.)

MODEL NO.	VOLTS	AMPS	CASE	SIZE
HD15-6-A+	15	6.0	D	9.00 x 4.88 x 3.30
HE15-9-A+	15	9.0	E	14.00 x 4.88 x 3.55
F15-15-A+	15	15.0	F	16.75 x 4.88 x 5.00
HA24-0.5-A+	24	0.5	B	4.88 x 4.00 x 2.25
HB24-1.2-A+	24	1.2	B	4.88 x 4.00 x 2.25
HC24-2.4-A+	24	2.4	C	5.63 x 4.88 x 2.95
HN24-3.6-A+	24	3.6	N	7.00 x 4.88 x 3.30
HD24-4.8-A+	24	4.8	D	9.00 x 4.88 x 3.30
HE24-7.2-A+	24	7.2	E	14.00 x 4.88 x 3.55
F24-12-A+ (28V)	24	12.0	F	16.75 x 4.88 x 5.00
HA24-0.5-A (28)+	28	0.5	B	4.88 x 4.00 x 2.25

SINGLE-OUTPUT RATINGS (CONT.)

MODEL NO.	VOLTS	AMPS	CASE	SIZE
HB28-1.0-A+	28	1.0	B	4.88 x 4.00 x 2.25
HC28-2-A+	28	2.0	C	5.63 x 4.88 x 2.95
HN28-3-A+	28	3.0	N	7.00 x 4.88 x 3.30
HD28-4-A+	28	4.0	D	9.00 x 4.88 x 3.30
HE28-6-A+	28	6.0	E	14.00 x 4.88 x 3.55
F24-12-A+	28	10.0	F	16.75 x 4.88 x 5.00
HB48-0.5-A+	48	0.5	B	4.88 x 4.00 x 2.25
HC48-1-A+	48	1.0	C	5.63 x 4.88 x 2.95
HD48-3-A+	48	3.0	D	9.00 x 4.88 x 3.30
HE48-4-A+	48	4.0	E	14.00 x 4.88 x 3.55
F48-6-A+	48	6.0	F	16.75 x 4.88 x 5.00

MULTI-OUTPUT RATINGS

MODEL NO.	OUTPUT 1	OUTPUT 2	OUTPUT 3	CASE	SIZE, INCHES
HAA5-1.5/OVP-A+	5V @ 1.5A	5V @ 1.5A	N/A	AA	6.50 x 4.00 x 2.25
HBB5-3/OVP-A+	5V @ 3A	5V @ 3A	N/A	BB	7.00 x 4.88 x 2.95
HCC5-6/OVP-A+	5V @ 6A	5V @ 6A	N/A	CC	9.38 x 4.88 x 3.30
HAA512-A+	5V @ 2A	9 to 15V @ 0.5A	N/A	AA	6.50 x 4.00 x 2.25
HBB512-A+	5V @ 3A	9 to 15V @ 1.25A	N/A	AA	6.50 x 4.00 x 2.25
HCC512-A+	5V @ 6A	9 to 15V @ 2.5A	N/A	CC	9.38 x 4.88 x 3.30
HAA524-A+	5V @ 2A	18 to 24V @ 0.3A	N/A	AA	6.50 x 4.00 x 2.25
HBB524-A+	5V @ 3A	18 to 24V @ 0.8A	N/A	BB	7.00 x 4.88 x 2.95
HCC524-A+	5V @ 6A	18 to 24V @ 2A	N/A	CC	9.38 x 4.88 x 3.30
HAD12-0.4-A+	+12V @ 0.4A**	-12V @ 0.4A**	N/A	B	4.88 x 4.00 x 2.25
HAD15-0.4-A+	+15V @ 0.4A**	-15V @ 0.4A**	N/A	B	4.88 x 4.00 x 2.25
HAA15-0.8-A+	+12 to 15V @ 1A/0.8A	-12 to 15V @ 1A/0.8A	N/A	AA	6.50 x 4.00 x 2.25
HBB15-1.5-A+	+12 to 15V @ 1.7A/1.5A	-12 to 15V @ 1.7A/1.5A	N/A	BB	7.00 x 4.88 x 2.95
HCC15-3-A+	+12 to 15V @ 3.4A/3A	-12 to 15V @ 3.4A/3A	N/A	CC	9.38 x 4.88 x 3.30
HDD15-5-A+	+12 to 15V @ 5A	-12 to 15V @ 5A	N/A	E	14.00 x 4.88 x 3.55
HAA24-0.6-A+	+18 to 24V @ 0.4A/0.6A	-18 to 24V @ 0.4A/0.6A	N/A	AA	6.50 x 4.00 x 2.25
HTAA-16W-A+	5V @ 2A	+12 to 15V @ 0.4A/0.4A	-12 TO 15V @ 0.4A/0.4A*	AA	6.50 x 4.00 x 2.25
HBAA-40W-A+	5V @ 3A	+12 to 15V @ 1A/0.8A	-12 TO 15V @ 1A/0.8A*	BAA	10.25 x 4.00 x 2.95
HCBB-105W-A+	5V @ 3A	+12 to 15V @ 3.4A/3A	-12 TO 15V @ 3.4A/3.0A*	CBB	11.00 x 4.88 x 3.30
HCAA-60W-A+	5V @ 6A	+12 to 15V @ 1A/0.8A	-12 TO 15V @ 1A/0.8A*	D	9.00 x 4.88 x 3.30
HCBB-75W-A+	5V @ 6A	+12 to 15V @ 1.7A/1.5A	-12 TO 15V @ 1.7A/1.5A*	CBB	11.00 x 4.88 x 3.30
CP131-A+	5V @ 9A	+12 to 15V @ 1.7A/1.5A	-12 TO 15V @ 1.7A/1.5A*	NBB	11.00 x 4.88 x 3.30
HDBB-105W-A+	5V @ 12A	+12 to 15V @ 1.7A/1.5A	-12 TO 15V @ 1.7A/1.5A*	DBB	14.25 x 4.88 x 3.55
HDCC-150W-A+	5V @ 12A	+12 to 15V @ 3.4A/3A	-12 TO 15V @ 034A/3A*	DCC	15.00 x 4.88 x 4.55

*No. 3 output usable at -5V; rate at one-half of 15V current rating. **Non-adjustable output.

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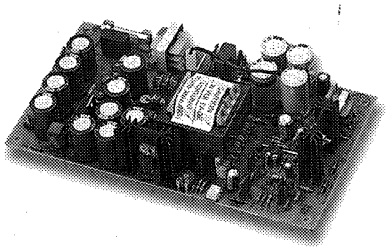
CONDOR "V" Series Switching Power Supplies



- 26 low-cost models—2 to 5 outputs
- 6 power levels—30 to 125 watts
- Clean, open frame design
- Fully protected; adjustable current limit, built-in OVP and reverse voltage protection
- Full load burn-in and 2-year warranty
- High peak current disk drive outputs and closely regulated 3-terminal-type outputs
- Versatile output configurations for tough applications
- Isolated outputs can be used for positive or negative sources or in series with other outputs
- Units pass vibration and shock per MIL-STD 810D

SPECIFICATIONS

AC Input
90-132/180-264 VAC user selectable, 47-63Hz single phase.
DC Outputs
See output rating chart.
Hold Up Time
20mS minimum @ full load and nominal input voltage.
Output Regulation
See output rating chart for individual output regulation ratings. Regulation ratings shown are for combined line and load variations with the line varied from either 90-132 or 180-264 VAC and the load on the output under test varied from 50% to either 20% or 100% with tha other loads held constant at 50%.
Minimum Load
A minimum load is required on the +5V output to maintain proper operation of the other outputs. VCA series: 0.8A; VFA series: 2A; VHA series: 2.5A; VKA series: 3A. Operation down to no load will not cause damage and the +5V output will generally remain within regulation (except on VCA and VEA models).
Output Noise and Ripple
05% RMS, 15% P-P maximum on all outputs.
Transient Response
+5V output only. 1.0 milliseconds typical response time for a 50% to 100% or 100% to 50% load change. Maximum voltage deviation: 6.0%.
Temperature Coefficient
0.03% typical for all outputs.
Efficiency
70% ±5% depending on model and load distribution. Measured at 100% of rated power.
Overvoltage Protection
Built in on +5V with firing point set at 6.2V ±0.6V.
Overload Protection
Fully protected against output overload and short circuit. Automatic recovery after removal of fault.
Voltage Adjustment
Built-in potentiometer adjusts voltage from 4.5V to overvoltage firing point (6.2V nominal).
Current Limlt AdJustment
Built-in potentiometer set to begin current limiting at the following peak power outputs minimum under nominal line conditions. VCA series: 58W; VFA series: 130 watts; VHA series: 140 watts; VKA series: 155 watts.
Overshoot
No output overshoot on turn on or turn off.
Reverse Voltage Protection
All outputs protected against inadvertent application of reverse voltage.
Input Protection
Internal AC fuse provided on all units.
Inrush Current
Inrush current is limited by an internal thermistor for maximum protection of input rectifiers. Peak inrush current averaged over first half cycle = 12A (115 VAC input), 24A (230 VAC input).
Temperature Rating
0 to 50 °C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space, moving air is recommended. For operation above 50 °C, it is important that the cooling vs. load profile is such that the heat sinks do not operate above 100 °C for extended periods.

RATINGS

MODEL NO.	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5	POWER, WATTS	SIZE, INCHES
VBA 326	+5V @ 3A	+12V @ 0.5A	-12V @ 0.5A	N/A	N/A	30	5.00 x 3.00 x 1.35
VBA 323	+5V @ 3A	+15V @ 0.5A	-15V @ 0.5A	N/A	N/A	30	5.00 x 3.00 x 1.35
VCA 326	+5V @ 4A	+12V @ 3A (3.5 PK)	-12V @ 0.8A	N/A	N/A	45	6.30 x 3.90 x 1.65
VCA 420	+5V @ 4A	+12V @ 3A (3.5 PK)	-12V @ 1.8A	-5V @ 0.25A	N/A	45	6.30 x 3.90 x 1.65
VCA 423	+5V @ 4A	+15V @ 2A (2.5 PK)	-15V @ 0.7A	-5V @ 0.15A	N/A	45	6.30 x 3.90 x 1.65
VCA 426	+5V @ 4A	+12V @ 3A (3.5 PK)	-12V @ 0.8A	-5V @ 0.2A	N/A	45	6.30 x 3.90 x 1.65
VEA 405	+5V @ 6A	+15V @ 2A (3.5 PK)	-15V @ 0.7A	-5V @ 0.5A	N/A	65	7.75 x 4.25 x 1.90
VEA 424	+5V @ 6A	+15V @ 2A (3.5 PK)	-15V @ 0.7A	+24V @ 1.2A (2 PK)	N/A	65	7.75 x 4.25 x 1.90
VEA 417	+5V @ 6A	+12V @ 2.5A (4 PK)	-12V @ 1A	-5V @ 0.5A	N/A	65	7.75 x 4.25 x 1.90
VEA 412	+5V @ 6A	+12V @ 2.5A (4 PK)	-12V @ 1A	+12V @ 0.7A	N/A	65	7.75 x 4.25 x 1.90
VEA 436	+5V @ 6A	+12V @ 2A (3.5 PK)	-12V @ 0.7A	+24V @ 1.2A (2 PK)	N/A	65	7.75 x 4.25 x 1.90
VFA 420	+5V @ 8A	+12V @ 2.5A (4.5 PK)	+12V @ 2.5A (4.5 PK)*	-12V @ 2.5A	N/A	85	7.75 x 4.25 x 1.90
VFA 421	+5V @ 8A	+12V @ 2.5A (4.5 PK)	+12V @ 2.5A (4.5 PK)*	-5V @ 2.5A	N/A	85	7.75 x 4.25 x 1.90
VFA 423	+5V @ 6A	+15V @ 2.5A (3.5 PK)	+15V @ 2.5A (3.5 PK)*	-5V @ 2.5A	N/A	85	7.75 x 4.25 x 1.90
VFA 430	+5V @ 8A	+12V @ 2.5A (4.5 PK)	+24V @ 2A (4 PK)*	-12V @ 2.5A	N/A	85	7.75 x 4.25 x 1.90
VHA 420	+5V @ 10A	+12V @ 3A (4.5 PK)	12V @ 3A (4.5 PK)*	-12V @ 2A	-5V @ 0.5A	100	8.40 x 4.60 x 2.20
VHA 423	+5V @ 7A	+15V @ 2.5A (4 PK)	N/A	-15V @ 2.5A (4 PK)	-5V @ 0.2A	100	8.40 x 4.60 x 2.20

*Isolated outputs.

ADDITIONAL MODELS AVAILABLE—CONTACT FACTORY FOR DETAILS

Condor D.C. Power Supplies, Inc., A subsidiary of SL Industries, Inc.
2311 Statham Parkway, Oxnard, CA 93033 ◆ (805) 486-4565 ◆ (800) 235-5929
FAX (805) 487-8911 ◆ www.condorpower.com/

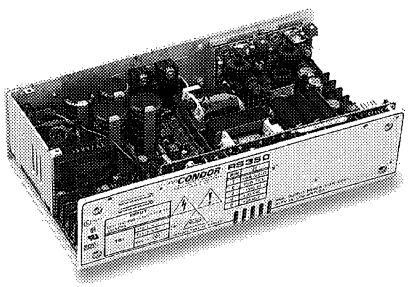
CONDOR

CONDOR "V" Series Switching Power Supplies

MODEL NO.	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5	POWER, WATTS	SIZE, INCHES
VHA 426	+5V @ 10A	+12V @ 3A (4.5 PK)	12V @ 1A*	-12V @ 1A	-5V @ 0.2A	100	8.40 x 4.60 x 2.20
VHA 427	+5V @ 10A	+12V @ 3A (4.5 PK)	15V @ 1A*	-15V @ 1A	-5V @ 0.2A	100	8.40 x 4.60 x 2.20
VHA 428	+5V @ 13A	N/A	12V @ 3A (4.5 PK)*	-12V @ 3A (4.5 PK)	-5V @ 0.5A	100	8.40 x 4.60 x 2.20
VHA 430	+5V @ 10A	+12V @ 3A (4.5 PK)	24V @ 2.5A (4 PK)*	-12V @ 2A	-5V @ 0.5A	100	8.40 x 4.60 x 2.20
VKA 420	+5V @ 15A	+12V @ 4A (6 PK)	12V @ 3A*	-12V @ 3A	-5V @ 0.5A	125	10.40 x 4.60 x 2.20
VKA 423	+5V @ 10A	+15V @ 3A (4 PK)	N/A	-15V @ 3A (4 PK)	-5V @ 0.4A	125	10.40 x 4.60 x 2.20
VKA 426	+5V @ 15A	+12V @ 4A (6 PK)	12V @ 1A*	-12V @ 1A	-5V @ 0.2A	125	10.40 x 4.60 x 2.20
VKA 427	+5V @ 15A	+12V @ 4A (6 PK)	15V @ 1A*	-15V @ 1A	-5V @ 0.2A	125	10.40 x 4.60 x 2.20
VKA 430	+5V @ 15A	+12V @ 4A (6 PK)	24V @ 3A (4.5 PK)*	-12V @ 3A	-5V @ 0.5A	125	10.40 x 4.60 x 2.20

*Isolated outputs.

CONDOR Rainbow Series Switching Power Supplies



- Automatic line range selection
- Fully regulated and floating outputs
- Modular auxiliaries for flexible product selection
- 2-year warranty
- FCC/VDE level B
- Commercial and medical approvals
- AC power fail signal
- Remote inhibit
- Optional fan cover package
- "Smart Load" feature eliminates minimum load requirements

CE LVD

SPECIFICATIONS

Input
RSx = 90–135 and 180–264 VAC, autoranging
AC Frequency Range
47–63 Hz
Conducted Emissions
FCC/VDE Class B
Input Current
9/4.5A
Inrush Current
40A maximum
Adjustment Range
±5%
Power
350W with 12 CFM (390 peak)
Output Noise
0.5% RMS, 1% peak to peak
Line Regulation
±2% all outputs
Total Regulation
Main ±1%; auxiliary ±2%
Remote Sense
Standard on main output.
Holdup Time
20 mS
Overcurrent Protection
Automatic recovery set at 415W.
Efficiency
74% minimum at full load.
Overvoltage Protection
Included on all outputs.
Operating Temperature
0 to 50° C.
Minimum Load
"Smart Load" feature eliminates minimum load requirement
Storage Temperature
-40 to 85° C.
Thermal Shutdown
Automatic

SAFETY SPECIFICATIONS
Commercial units are approved to UL 1950 (no D3 deviations), IEC 950, CSA 22.2 No. 234, EN 60950. Medical units are approved to UL 544, UL2601, IEC 601-1 and CSA 22.2 No. 601.1 for patient vicinity (non-invasive) applications. CE Compliant. Consult Condor for approval status.

RATINGS (Note: many configurations available; contact factory for model selection)

MODEL NO.	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5	POWER, WATTS	SIZE, INCHES
RSx350BBB*	5V @ 40A	12V @ 12A	12V @ 4A	12V @ 4A	N/A	350	5.00 x 9.50 x 2.50
RSx350DBB	5V @ 40A	24V @ 6A	12V @ 4A	12V @ 4A	N/A	350	5.00 x 9.50 x 2.50
RSx350DAC	5V @ 40A	24V @ 6A	5V @ 4A	15V @ 4A	N/A	350	5.00 x 9.50 x 2.50
RSx350BAB	5V @ 40A	12V @ 12A	5V @ 4A	12V @ 4A	N/A	350	5.00 x 9.50 x 2.50

*NOTE: Replace "x" in Model No. with "M" (medical version) or "C" (commercial version).
Output configurations: "A" auxiliary output adjusts from 4.7 to 5.3 VDC; "B" auxiliary output adjusts from 11.5 to 15.5 VDC; "C" same as "B" (factory set at 15 VDC; "D" auxiliary output adjusts from 23 to 29 VDC. Specifications subject to change.

ADDITIONAL MODELS AVAILABLE—CONTACT FACTORY FOR DETAILS

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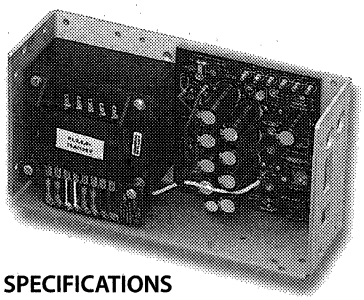
CONDOR

CONDOR International Medical Linear Power Supplies



- 36 models (single, dual & triple output)
- 3 power levels (5 to 92 watts)
- Approved to UL 544, IEC 601 and CSA 601.1B
- AC input: 110/120/220/240 VAC, 47-63 Hz
- Leakage current <10µA
- OVP on all 5V outputs
- Meets EMI per FCC/VDE B
- Hermetically sealed power transistors and IC's
- MTBF 200,000+ hours per Mil Handbook 217D
- 8-hour burn-in with cycling
- 3-year warranty
- Try before you buy—free evaluation samples available

SPECIFICATIONS

AC Input
100/120/220/240VAC +10%, -13%, 47-63Hz. Tolerance for 230 VAC operation is +15%, -10%. Derate output current 10% for 50Hz operation. The L and LL case units have AC input of 95-132/190-264VAC, 47-63Hz. This range can be extended to 90-132/180-264VAC by derating ouput current 20%.

DC Output
See voltage current rating chart. Adjustment range ± 5% minimum.

Line Regulation
± 0.05% for a 10% change.

Load Regulation
± 0.05% for a 50% load change.

Output Ripple
3mV +0.05% of output voltage, peak to peak maximum.

Transient Response
50 micr oseconds for 50% load change.

Short Circuit Protection
Automatic current limit/foldback.

Overvoltage Protection
Built in on all 5V models, set at 6.2V ± 0.4V. Other models use optional overvoltage protection. OVP is not optional on L and LL case units; however, it is built in on 5V output models.

Remote Sensing
Provided on all models of 3A and above; open-sense lead protection built in.

Stability
± 0.05% for 24 hours after warmup.

Temperature Rating
0 to 50°C full rated, derated linearly to 40% at 70°C.

Temperature Coefficient
± 0.01%/° C maximum.

Efficiency
5V units: 45%; 12 and 15V units: 55%; 20 and 24V units: 60%.

Vibration
Per Mil-Std-810D, Method 514.3, Category 1, Procedure 1.

Shock
Per Mil-Std-810D, Method 5163, Procedure III

Remote Programming
Capability included on remote sense models.

Safety Leakage Current
Less than 8µA maximum on all units. See rating chart for typical values.

SAFETY SPECIFICATIONS
All models are approved to: IEC 601, VDE 0750, UL 544, CSA 1402-3 and CSA 22.2 No. 125.

EMI SPECIFICATIONS
All models are tested to meet or exceed the conducted emissions requirements of FCC 20870, Class B and VDE 0871, Class B without the addition of external filters.

SINGLE-OUTPUT RATINGS

MODEL NO.	OUTPUT	CASE	SIZE, INCHES
ML5-1/OVP-A	5V @ 1.0A	L	4.25 x 3.25 x 1.80
MB5-3/OVP-A	5V @ 3.0A	B	4.88 x 4.00 x 2.25
MC5-6-OV-A	5V @ 6.0A	C	5.63 x 4.88 x 2.95
MD5-12-OV-A	5V @ 12.0A	D	9.00 x 4.88 x 3.30
ML12-0.5-A	12V @ 0.5A	L	4.25 x 3.25 x 1.80
MB12-1.7-A	12V @ 1.7A	B	4.88 x 4.00 x 2.25
MC12-3.4-A	12V @ 3.4A	C	5.63 x 4.88 x 2.95
MD12-6.8-A	12V @ 6.8A	D	9.00 x 4.88 x 3.30
ML15-0.4-A	15V @ 0.4A	L	4.25 x 3.25 x 1.80
MB15-1.5-A	15V @ 1.5A	B	4.88 x 4.00 x 2.25
MC15-3-A	15V @ 3.0A	C	5.63 x 4.88 x 2.95
MD15-6-A	15V @ 6.0A	D	9.00 x 4.88 x 3.30
ML24-0.28-A	24V @ 0.28A	L	4.25 x 3.25 x 1.80
MB24-1.2-A	24V @ 1.2A	B	4.88 x 4.00 x 2.25
MC24-2.4-A	24V @ 2.4A	C	5.63 x 4.88 x 2.95
MD24-4.8-A	24V @ 4.8A	D	9.00 x 4.88 x 3.30
MB28-1-A	28V @ 1.0A	B	4.88 x 4.00 x 2.25
MC28-2-A	28V @ 2.0A	C	5.63 x 4.88 x 2.95
MD28-4-A	28V @ 4.0A	D	9.00 x 4.88 x 3.30

MULTI-OUTPUT RATINGS

MODEL NO.	OUTPUT 1	OUTPUT 2	OUTPUT 3	CASE	SIZE, INCHES
MLL12-0.25A	+12V @ 0.25A	-12V @ 0.25A	N/A	L	4.25 x 3.25 x 1.80
MLL15-0.2A	+15V @ 0.20A	-12V @ 0.25A	N/A	L	4.25 x 3.25 x 1.80
MAA15-0.8A	+12/15V @ 1.0/0.8A	-15V @ 0.20A	N/A	AA	6.50 x 4.00 x 2.25
MBB15-1.5A	+12/15V @ 1.7/1.5A	-12/15V @ 1.0/0.8A	N/A	BB	7.00 x 4.88 x 3.30
MCC15-3-A	+12/15V @ 3.4/3.0A	-12/15V @ 1.7/1.5A	N/A	CC	9.38 x 4.88 x 3.30
MAA512-A	5V @ 2.0A	-12/15V @ 3.4/3.0A	N/A	AA	6.50 x 4.00 x 2.25
MBB512-A	5V @ 3.0A	9/15V @ 0.5A	N/A	BB	7.00 x 4.88 x 3.30
MCC512-A	5V @ 6.0A	9/15V @ 1.25A	N/A	CC	9.38 x 4.88 x 3.30
MAA524-A	5V @ 2.0A	9/15V @ 2.5A	N/A	AA	6.50 x 4.00 x 2.25
MBB524-A	5V @ 3.0A	18/24V @ 0.3A	N/A	BB	7.00 x 4.88 x 3.30
MCC524-A	5V @ 6.0A	18/24V @ 2.0A	-N/A	CC	9.38 x 4.88 x 3.30
MTLL-5W-A	+5V @ 0.5A	+12/15V @ 0.1A	-12/15V @ 0.1A	L	4.25 x 3.25 x 1.80
MTAA-16W-A	5V @ 2.0A	+12/15V @ 0.4A	-12/15V @ 0.4A	AA	6.50 x 4.00 x 2.25
MBAA-40W-A	5V @ 3.0A	+12/15V @ 1.0/0.8A	-12/15V @ 1.0/0.8A	BAA	10.25 x 4.00 x 2.95
MCAA-60W-A	5V @ 6.0A	+12/15V @ 1.0/0.8A	-12/15V @ 1.0/0.8A	D	9.00 x 4.88 x 3.30
MCBB-75W-A	5V @ 6.0A	+12/15V @ 1.7/1.5A	-12/15V @ 1.7/1.5A	CBB	11.00 x 4.88 x 3.30

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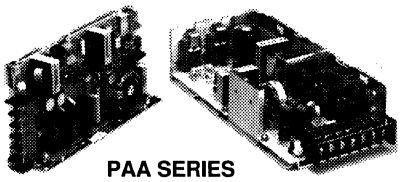
COSEL U.S.A.inc. WORLD-WIDE POWER SUPPLIES

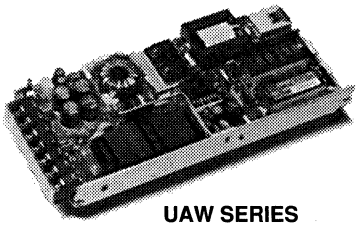
ISO 9001 Certified

NEW PRODUCT RELEASE

ZU SERIES



PAA SERIES



UAW SERIES

DC TO DC CONVERTERS

(SINGLE OUTPUT)

SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A) 5V	12V	15V	SIZE (W x H x D) (mm)	(inch)	WEIGHT (g)	(oz.)	SAFETY
ZS	1R5	DC 4.5 ~ 6V (5) DC 10 ~ 15V (12) DC 20 ~ 30V (24) DC 35 ~ 63V (48)	0.25	0.12	0.1	33 X 10 X 21	1.30 X 0.39 X 0.83	25	0.88	
	3		0.5	0.25	0.2	47 X 10 X 30	1.85 X 0.39 X 1.18	35	1.23	
	6		1.0	0.50	0.4	47 X 14 X 42	1.85 X 0.55 X 1.65	70	2.47	
	10	DC 4.5 ~ 6V (5)	1.6	0.70	0.6	47 X 14 X 42	1.85 X 0.55 X 1.65	75	2.65	
		DC 10 ~ 15V (12) DC 20 ~ 30V (24) DC 35 ~ 63V (48)	2.0	0.9	0.7					
ZUS	1R5	DC 4.5 ~ 9V (5) DC 9 ~ 18V (12) DC 18 ~ 36V (24) DC 36 ~ 72V (48)	0.3	0.13	0.1	27.5 X 7.0 X 18.0	1.08 X 0.27 X 0.70	10	0.35	
	3		0.6	0.25	0.2	35 X 7.0 X 23.0	1.37 X 0.27 X 0.90	16	0.56	
	6	DC 4.5 ~ 9V (5)	1.0	0.5	0.4	44.5 X 7.0 X 28.0	1.75 X 0.27 X 1.10	25	0.88	
		DC 9 ~ 18V (12) DC 18 ~ 36V (24) DC 36 ~ 72V (48)	1.2							
	10	DC 4.5 ~ 9V (5)	1.6	0.7	0.6	45.0 X 7.0 X 35.0	1.77 X 0.27 X 1.37	40	1.41	
		DC 9 ~ 18V (12) DC 18 ~ 36V (24) DC 36 ~ 72V (48)	2.0	0.9	0.7					
	15	DC 4.5 ~ 9V (5)	2.0	1.0	—	45.0 X 8.5 X 50.0	1.77 X 0.33 X 1.97	55	1.94	
		DC 9 ~ 18V (12) DC 18 ~ 36V (24) DC 36 ~ 72V (48)	2.4	1.3	—					
	25	DC 4.5 ~ 9V (5)	3.2	1.7	—	65.0 X 8.5 X 50.0	2.56 X 0.33 X 1.97	65	2.29	
		DC 9 ~ 18V (12) DC 18 ~ 36V (24) DC 36 ~ 72V (48)	4.0	2.1	—					

(MULTIPLE OUTPUT)

SERIES	MODEL NAME	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A) ±12V (24V)	±15V (30V)	SIZE (W x H x D) (mm)	(inch)	WEIGHT (g)	(oz.)	SAFETY
ZW	1R5	DC 4.5 ~ 6V (5) DC 10 ~ 15V (12) DC 20 ~ 30V (24) DC 35 ~ 63V (48)	0.06	0.05	33 X 10 X 21	1.30 X 0.39 X 0.83	25	0.88	
	3		0.12	0.1	47 X 10 X 30	1.85 X 0.39 X 1.18	35	1.23	
	6		0.25	0.2	47 X 14 X 42	1.85 X 0.55 X 1.65	70	2.47	
	10	DC 4.5 ~ 6V (5)	0.35	0.3	47 X 14 X 42	1.85 X 0.55 X 1.65	75	2.65	
		DC 10 ~ 15V (12) DC 20 ~ 30V (24) DC 35 ~ 63V (48)	0.45	0.35					
ZUW	1R5	DC 4.5 ~ 9V (5) DC 9 ~ 18V (12) DC 18 ~ 36V (24) DC 36 ~ 72V (48)	0.065	0.05	27.5 X 7.0 X 18.0	1.08 X 0.27 X 0.70	10	0.35	
	3		0.13	0.10	35 X 7.0 X 23.0	1.37 X 0.27 X 0.90	16	0.56	
	6		0.25	0.20	44.5 X 7.0 X 28.0	1.75 X 0.27 X 1.10	25	0.88	
	10	DC 4.5 ~ 9V (5)	0.35	0.30	45.0 X 7.0 X 35.0	1.77 X 0.27 X 1.37	40	1.41	
		DC 9 ~ 18V (12) DC 18 ~ 36V (24) DC 36 ~ 72V (48)	0.45	0.35					
	15	DC 4.5 ~ 9V (5)	0.60	0.50	45.0 X 8.5 X 50.0	1.77 X 0.33 X 1.97	55	1.94	
		DC 9 ~ 18V (12) DC 18 ~ 36V (24) DC 36 ~ 72V (48)	0.65	0.50					
	25	DC 4.5 ~ 9V (5)	0.84	0.67	65.0 X 8.5 X 50.0	2.56 X 0.33 X 1.97	65	2.29	
		DC 9 ~ 18V (12) DC 18 ~ 36V (24) DC 36 ~ 72V (48)	1.05	0.85					

DAS and DPA Series also available. Please call for further information.

COSEL U.S.A.inc.

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SWITCHING POWER SUPPLIES (DUAL OUTPUT)

SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A)			SIZE (W x H x D)		WEIGHT		SAFETY
			V1	V2	V3	(mm)	(inch)	(kg)	(lb.)	
MMB	MMB50U-1	AC85 ~ 132V DC 110 ~ 170V	5V3A	12V3A (3.6)*	—	93 x 36 x 155	3.66 x 1.41 x 6.10	0.4	0.88	
	MMB50U-2		5V5A	12V2.1A	—					
	MMB50U-3		5V3A	24V1.5A (1.8)	—					
	MMB50U-4		12V2.1A	12V2.1A	—					
	MMB50U-5		12V3A	12V1.5A	—					
	MMB50U-6		15V1.7A	15V1.7A	—					
	MMB75U-1		5V5A	12V4A	—	93 x 42 x 175	3.66 x 1.65 x 6.88	0.5	1.10	
	MMB75U-2		5V6A	24V2A	—					
RMB	RMB15U-1	AC85 ~ 132V DC 110 ~ 170V	5V0.8A	12V1A (1.3)*	—	80 x 32 x 100	3.15 x 1.26 x 3.94	0.25	0.55	
	RMB15U-2		5V0.8A	24V0.5A (0.65)	—	80 x 32 x 100	3.15 x 1.26 x 3.94	0.25	0.55	
	RMB30U-1		5V1.5A	12V2A (2.8)	—	80 x 35 x 135	3.15 x 1.38 x 5.31	0.35	0.77	
	RMB30U-2		5V1.5A	24V1A (1.4)	—	80 x 35 x 135	3.15 x 1.38 x 5.31	0.35	0.77	
	RMB50U-1		5V1.5A	12V3.6A (4.0)	—	93 x 35 x 155	3.66 x 1.38 x 6.10	0.35	0.77	
	RMB50U-2		5V1.5A	24V1.8A (2.0)	—	93 x 35 x 155	3.66 x 1.38 x 6.10	0.35	0.77	

* ( ) indicates peak current

SWITCHING POWER SUPPLIES (TRIPLE OUTPUT)

SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A)			SIZE (W x H x D)		WEIGHT		SAFETY
			V1	V2	V3	(mm)	(inch)	(kg)	(lb.)	
MMC	MMC8U-1	AC85 ~ 132V DC 110 ~ 170V	5V1.2A	12V0.1A	–12V0.1A	74 x 27 x 68	2.91 x 1.06 x 2.67	0.15	0.33	
	MMC8U-2		5V1.1A	15V0.1A	–15V0.1A					
	MMC8U-3		5V1.2A	12V0.1A	–5V0.1A					
	MMC50U-1		5V5A	12V1.5A (2)	–12V0.5A	93 x 36 x 155	3.66 x 1.41 x 6.10	0.4	0.88	
	MMC50U-2		5V5A	15V1.2A	–15V0.5A					
	MMC50U-3		5V5A	12V1.5A (2)	–5V0.5A					
	MMC50U-4		5V7A	12V1A (1.5)	–12V0.3A					
	MMC75U-1		5V8A	12V2.5A	–12V0.5A	93 x 42 x 175	3.66 x 1.65 x 6.88	0.6	1.32	
	MMC75U-2		5V8A	15V1.8A	–15V0.5A					
	MMC75U-3		5V8A	12V2.5A	–5V0.5A					
	MMC75U-4		5V6A	12V3.2A	–12V0.5A					
	MMC100U-1		5V13A	12V2A	–12V1A	93 x 50 x 190	3.66 x 1.96 x 7.48	0.7	1.54	
	MMC100U-2		5V13A	15V1.5A	–15V1A					
	MMC100U-3		5V13A	12V2A	–5V1A					
	MMC100U-4		5V8A	12V4A	–12V1A					
PMC	PMC15E-1	AC85 ~ 264V DC 110 ~ 340V	5V2A	12V0.3A	–12V0.2A	60 x 37 x 110	2.36 x 1.45 x 4.33	0.25	0.55	
	PMC15E-2		5V2A	15V0.3A	–15V0.2A					
	PMC15E-3		5V2A	12V0.3A	–5V0.2A					
	PMC30E-1		5V3A	12V1.2A	–12V0.3A	60 x 38.5 x 145	2.36 x 1.51 x 5.70	0.3	0.66	
	PMC30E-2		5V3A	15V0.7A	–15V0.5A					
	PMC50E-1	AC85 ~ 132V AC 170 ~ 264V	5V5A	12V1.5A (2)	–12V0.5A	93 x 30 x 185	3.66 x 1.18 x 7.28	0.4	0.88	
	PMC50E-2		5V5A	15V1.2A	–15V0.5A					
	PMC50E-3		5V7A	12V1A (1.5)	–12V0.3A					
	PMC75E-1		5V8A	12V2.5A	–12V0.5A	93 x 38 x 205	3.66 x 1.50 x 8.07	0.6	1.32	
	PMC75E-2		5V8A	15V1.8A	–15V0.5A					
	PMC75E-4		5V6A	12V3.2A	–12V0.5A					
	PMC100E-1		5V13A	12V2A	–12V1A	93 x 48 x 220	3.66 x 1.89 x 8.66	0.75	1.65	
	PMC100E-2		5V13A	15V1.5A	–15V1A					
	PMC100E-4		5V8A	12V4A	–12V1A					
RMC	RMC15U-1	AC85 ~ 132V DC 110 ~ 170V	5V2A	12V0.3A	–12V0.2A	80 x 28 x 100	3.14 x 1.10 x 3.93	0.25	0.55	
	RMC15U-2		5V2A	15V0.2A	–15V0.2A					
	RMC30U-1		5V3A	12V1.2A	–12V0.3A	80 x 31 x 135	3.14 x 1.22 x 5.31	0.35	0.77	
	RMC30U-2		5V3A	15V0.5A	–15V0.5A					
	RMC50U-1		5V5A	12V1.5A (2.0)	(–12V) 0.5A	93 x 35 x 155	3.66 x 1.37 x 6.10	0.35	0.77	
	RMC50U-2		5V5A	15V1.2A	(–15V) 0.5A	93 x 35 x 155	3.66 x 1.37 x 6.10	0.35	0.77	

SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A)					SIZE (W x H x D)		WEIGHT		SAFETY
			5V	12V	–12V	15	–15	(mm)	(inch)	(kg)	(lb.)	
LDC	LDC15F-1	AC85 ~ 264V DC 110 ~ 340V	2.0	0.3	0.2	–	–	50 X 26 X 127	1.96 X 1.00 X 4.95	0.15	0.33	
	LDC15F-2		2.0	–	–	0.3	0.2	50 X 26 X 127	1.96 X 1.00 X 4.95	0.22	0.48	
	LDC30F-1		3.0	1.2	0.3	–	–	65 X 26 X 140	2.53 X 1.01 X 5.46	0.22	0.48	
	LDC30F-2		3.0	–	–	1.0	0.3	65 X 26 X 140	2.53 X 1.01 X 5.46	0.22	0.48	
	LDC60F-1		5.0	2.5	0.5	–	–	83 X 26 X 185	3.27 X 1.01 X 7.28	0.30	0.66	
	LDC60F-2		5.0	–	–	2.0	0.5	83 X 26 X 185	3.27 X 1.01 X 7.28	0.30	0.66	

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*SWITCHING POWER SUPPLIES (SINGLE OUTPUT)

SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A) 5V	12V	15V	24V	SIZE (W x H x D) (mm)	(inch)	WEIGHT (kg)	(lb.)	SAFETY
K	K10AU	AC85 ~ 132V DC 110 ~ 170V	2.0	0.9	0.7	0.5	74 x 27 x 68.0	2.91 x 1.06 x 2.67	0.15	0.33	
	K15AU		3.0	1.3	1.0	0.7	97 x 35 x 99.5	3.81 x 1.37 x 3.91	0.30	0.66	
	K25AU		5.0	2.1	1.7	1.1	97 x 35 x 124.5	3.81 x 1.37 x 4.90	0.40	0.88	
	K50AU		10.0	4.2	3.4	2.1	97 x 37 x 161.0	3.81 x 1.45 x 6.33	0.45	0.99	
	K100AU		20.0	8.5	7.0	4.5	93 x 50 x 168.5	3.66 x 1.96 x 6.63	0.60	1.32	
	K150AU		30.0	13.0	10.0	6.5	93 x 65 x 179.0	3.66 x 2.55 x 7.04	0.95	2.09	
R	R15U	AC85 ~ 132V DC 110 ~ 170V	3.0	1.3	1.0	0.7	69 x 30 x 84.0	2.71 x 1.18 x 3.30	0.20	0.44	
	R25U		5.0	2.1	1.7	1.1	69 x 31 x 104.0	2.71 x 1.22 x 4.09	0.25	0.55	
	R50U		10.0	4.2	3.4	2.2	85 x 33 x 119.0	3.34 x 1.30 x 4.68	0.30	0.66	
	R100U		20.0	8.5	7.0	4.5	93 x 34.5 x 160.0	3.66 x 1.36 x 6.30	0.60	1.32	
	R150U		30.0	13.0	10.0	6.5	93 x 44.5 x 175.0	3.66 x 1.74 x 6.80	0.90	1.98	
P	P15E	AC85 ~ 264V DC 110 ~ 340V	3.0	1.3	1.0	0.7	97 x 35 x 99.5	3.81 x 1.37 x 3.91	0.30	0.66	TÜV
	P30E		6.0	2.5	2.0	1.3	97 x 35 x 124.5	3.81 x 1.37 x 4.90	0.40	0.88	
	P50E		10.0	4.2	3.4	2.1	97 x 37 x 160.0	3.81 x 1.45 x 6.29	0.40	0.88	
	P100E	AC85 ~ 132V AC 170 ~ 264V	20.0	8.5	7.0	4.5	50 x 93 x 189.0	1.97 x 3.66 x 7.44	0.70	1.54	
	P150E		30.0	13.0	10.0	6.5	65 x 93 x 199.0	2.55 x 3.66 x 7.83	0.90	1.98	
	P300E		60.0	27.0	22.0	14.0	120 x 93 x 190.0	4.72 x 3.66 x 7.48	2.50	5.51	
	P600E		120.0	53.0	43.0	27.0	190 x 93 x 200.0	7.48 x 3.66 x 7.87	4.00	8.81	
	P1500E		300.0	125.0	100.0	65.0	200 x 97 x 300.0	7.87 x 3.81 x 11.81	7.00	15.43	
LCA	LCA10S	AC85 ~ 132V DC 110 ~ 170V	2.0	0.9	0.7	0.5	49 x 17 x 94.0	1.90 x 0.66 x 3.70	0.065	0.14	
	LCA15S		3.0	1.3	1.0	0.7	50 x 17 x 115.0	1.96 x 0.66 x 4.53	0.08	0.18	
	LCA30S		6.0	2.5	2.0	1.3	50 x 25 x 132.5	1.96 x 0.99 x 5.21	0.15	0.33	
	LCA50S		10.0	4.3	3.5	2.5	50 x 25 x 195.0	1.96 x 0.99 x 7.67	0.20	0.44	
	LCA100S		20.0	8.5	7.0	4.3	62 x 32 x 222.0	2.44 x 1.26 x 8.74	0.37	0.81	
	LCA150S		30.0	12.5	10.0	6.3	75 x 36 x 222.0	2.95 x 1.42 x 8.74	0.55	1.21	
LDA	LDA10F	AC85 ~ 264V DC110 ~ 340V	2.0	0.9	0.7	0.5	50 x 21 x 125	1.96 x 0.82 x 4.90	0.08	0.17	
	LDA15F		3.0	1.3	1.0	0.7	50 x 21 x 125	1.96 x 0.82 x 4.90	0.10	0.21	
	LDA30F		6.0	2.5	2.0	1.3	55 x 26 x 133	2.12 x 1.00 x 5.12	0.20	0.44	
	LDA50F		10.0	4.3	3.5	2.1	55 x 26 x 195	2.20 x 1.04 x 7.80	0.25	0.55	
	LDA75F		15.0	6.3	5.0	3.2	55 x 32 x 222	2.20 x 1.28 x 8.88	0.32	0.70	
	LDA100W		20.0	8.5	6.7	4.3	62 x 35 x 222	2.48 x 1.40 x 8.88	0.36	0.79	TÜV
	LDA150W		30.0	12.5	10.0	6.3	75 x 37 x 222	3.00 x 1.48 x 8.88	0.51	1.12	
	LDA 300W		5.0	12.0	15.0	24.0	108 x 47 x 275	4.25 x 1.85 x 10.82	0.90	2.12	
	LDA 300W-SNF*		5.0	12.0		24.0	117.5 x 86 x 313	4.62 x 3.38 x 12.32	2.00	4.68	

* Chassy, Cover & Fan Option

48V AVAILABLE ON ALL P SERIES, SAFETY APPROVALS ARE PENDING.

SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A) 3V	5V	12V	24V	SIZE (W x H x D) (mm)	(inch)	WEIGHT (kg)	(lb.)	SAFETY
UAW	UAW500S	AC85 ~ 132V DC 170 ~ 264V	100	100A	43	22	145 x 45 x 278 (308*)	5.6 x 1.8 x 11 (12.12*)	2.4 (2.6*)	5.28 (5.72*)	
	UAW250S		50.0	50.0	21.5	11	95 x 35 x 278	3.74 x 1.40 x 10.94	1.10	2.42	
	UAW125S		25	25A	10.5	5.2	95 x 25 x 200	3.7 x 1 x 7.8	0.55	1.21	

WITH POWER FACTOR CORRECTION

*OPTIONAL FAN

SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A) 3V	5V	12V	24V	SIZE (W x H x D) (mm)	(inch)	WEIGHT (kg)	(lb.)	SAFETY
UAF	UAF500S	AC85 ~ 264	5	12	15	24	140 x 45 x 278	5.51 x 1.77 x 10.94	2.10	4.64	

WITH POWER FACTOR CORRECTION

SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A) V5	12V	15V	24V	SIZE (W x H x D) (mm)	(inch)	WEIGHT (kg)	(lb.)	SAFETY
PAA	PAA50F	AC85 ~ 264V	10.0	4.3	3.5	2.2	85 X 37 X 159	3.35 X 1.45 X 6.26	0.40	0.88	
	PAA75F		15.0	6.3	5.0	3.2	93 X 42 X 175	3.66 X 1.65 X 6.88	0.50	1.10	
	PAA100F		20.0	8.5	7.0	4.5	93 X 50 X 189	3.66 X 1.96 X 7.44	0.70	1.54	
	PAA150F		30.0	13.0	10.0	6.5	93 X 65 X 199	3.66 X 2.55 X 7.83	0.90	1.98	
	PAA300F		60.0	27.0	22.0	14.0	120 X 92 X 190	4.72 X 3.62 X 7.48	2.20	4.85	
	PAA600F		120.0	53.0	43.0	27.0	190 X 92 X 200	7.48 X 3.62 X 7.87	4.00	8.81	

(SINGLE OUTPUT) ON BOARD SWITCHERS

SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A) 5V	12V	SIZE (W x H x D) (mm)	(inch)	WEIGHT (kg)	(lb.)	SAFETY
YS*	YS5	AC85 ~ 132V DC 110 ~ 170V	1.0	0.45	50 x 18.5 x 43	1.97 x 0.73 x 1.69	0.065	0.14	
	YS10		2.0	0.90	58 x 18.5 x 45	2.28 x 0.73 x 1.77	0.075	0.17	
	YS15		3.0	1.30	65 x 20.5 x 45	2.56 x 0.81 x 1.77	0.100	0.22	
YAS	YAS5	AC85 ~ 264V DC 110 ~ 340V	1.0	0.45	58 x 19.5 x 45	2.28 x 0.76 x 1.77	0.075	0.17	TÜV
	YAS10		2.0	0.90	65 x 21.0 x 45	2.56 x 0.82 x 1.77	0.100	0.22	

(DUAL OUTPUT)

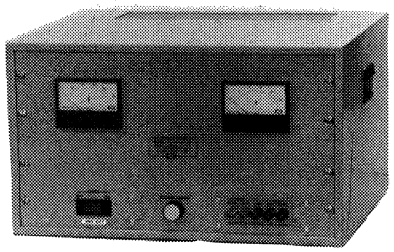
SERIES NAME	MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (V)/CURRENT (A) ±12V (24V)	±15V (30V)	SIZE (W x H x D) (mm)	(inch)	WEIGHT (kg)	(lb.)	SAFETY
YW*	YW5	AC85 ~ 132V DC 110 ~ 170V	0.22	0.17	50 x 18.5 x 43	1.97 x 0.73 x 1.69	0.065	0.14	
	YW10		0.45	0.35	58 x 18.5 x 45	2.28 x 0.73 x 1.77	0.075	0.17	
	YW15		0.65	0.50	65 x 20.5 x 45	2.56 x 0.81 x 1.77	0.100	0.22	
YAW	YAW5	AC85 ~ 264V DC 110 ~ 340V	0.22	0.17	58 x 19.5 x 45	2.28 x 0.76 x 1.77	0.075	0.17	TÜV
	YAW10		0.45	0.35	65 x 21.0 x 45	2.56 x 0.82 x 1.77	0.100	0.22	

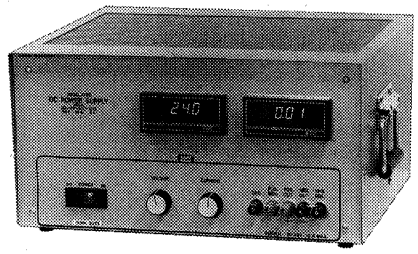
* YS and YW approved UL & CSA only

BOTH OUTPUTS CONNECTED IN SERIES, SINGLE 24V AND 30V ARE POSSIBLE.

DC POWER SUPPLIES

REGULATED DC POWER SUPPLIES





MODEL NUMBER	MAXIMUM VOLTAGE	MAXIMUM CURRENT
VR-5-50	5V	50A
VR-5-100	5V	100A
VR-5-200	5V	200A
VR-5-500	5V	500A
VR-5-1000	5V	1000A
VR-10-50	10V	50A
VR-10-100	10V	100A
VR-10-200	10V	200A
VR-10-300	10V	300A
VR-10-500	10V	500A
VR-20-30	20V	30A
VR-20-40	20V	40A
VR-20-50	20V	50A
VR-20-100	20V	100A
VR-20-200	20V	200A
VR-20-300	20V	300A
VR-40-20	40V	20A
VR-40-30	40V	30A
VR-40-40	40V	40A
VR-40-50	40V	50A
VR-40-100	40V	100A
VR-40-200	40V	200A

MODEL NUMBER	MAXIMUM VOLTAGE	MAXIMUM CURRENT
VR-60-10	60V	10A
VR-60-20	60V	20A
VR-60-30	60V	30A
VR-60-40	60V	40A
VR-60-50	60V	50A
VR-60-100	60V	100A
VR-80-5	80V	5A
VR-80-10	80V	10A
VR-80-20	80V	20A
VR-80-30	80V	30A
VR-80-40	80V	40A
VR-80-50	80V	50A
VR-100-5	100V	5A
VR-100-10	100V	10A
VR-100-20	100V	20A
VR-100-30	100V	30A
VR-100-40	100V	40A
VR-150-1	150V	1A
VR-150-2	150V	2A
VR-150-5	150V	5A
VR-150-10	150V	10A
VR-150-20	150V	20A
VR-150-30	150V	30A

MODEL NUMBER	MAXIMUM VOLTAGE	MAXIMUM CURRENT
VR-200-1	200V	1A
VR-200-2	200V	2A
VR-200-5	200V	5A
VR-200-10	200V	10A
VR-200-20	200V	20A
VR-300-0.5	300V	0.5A
VR-300-1	300V	1A
VR-300-2	300V	2A
VR-300-5	300V	5A
VR-300-10	300V	10A
VR-300-20	300V	20A
VR-400-0.5	400V	0.5A
VR-400-1	400V	1A
VR-400-2	400V	2A
VR-400-5	400V	5A
VR-400-10	400V	10A
VR-500-0.5	500V	0.5A
VR-500-1	500V	1A
VR-500-2	500V	2A
VR-500-5	500V	5A
VR-500-10	500V	10A

TRIPLE RANGE REGULATED DC POWER SUPPLIES

MODEL NUMBER	MAXIMUM VOLTAGE	MAXIMUM CURRENT
VR-15/30/60-20/10/5L-AV	0-15/30/60V	20/10/5A
VR-50/100/200-6/3/0.6L-AV	0-50/100/200V	6/3/0.6A

SPECIFICATIONS

Input Voltage: - 120V, or 240V single-phase, or 208V or 480V or 600V three-phase 60Hz
- Unit will operate with ±10% change in input voltage.

Output Voltage: - Continuously variable from zero to the maximum voltage indicated in above table.

Output Current: - Zero to maximum indicated in above table.
- Current is limited to approximately 10% greater than this, even on a short circuit.

Line Regulation: - If the input line voltage changes ±10% from its nominal 120 V, the output voltage will change no more than ±0.03% or ±15 mV, whichever is greater (at any load current within rating).

Load Regulation: - For changes in load current from zero to rated maximum, the output voltage will change no more than 0.15% or 50 mV, whichever is greater (at any line voltage within rating).

Ripple: - The rms value of the ripple voltage will be no greater than 0.05% or 20 mV, whichever is greater (at any line voltage or load current within rating).

Short Circuit Proof: - Output may be shorted continuously without damage to the unit. Power supply recovers automatically to normal when short is removed.

For more information, please contact:

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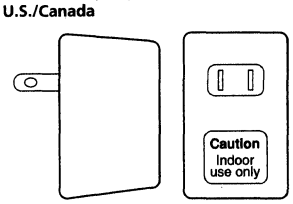

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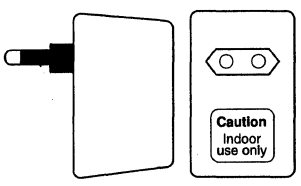
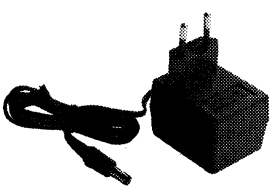
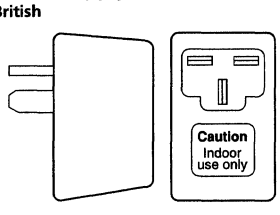
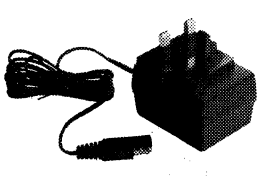
European Turret



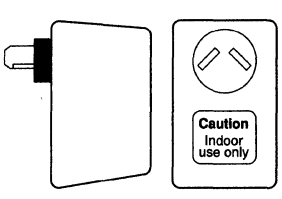


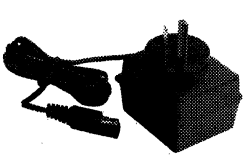
Power Supply
British





Power Supply
Australia





Non-Regulated Output AC to AC Types in 50mA Increments

Output Volts	Output Current
3.0VAC	50mA-800mA
3.6VAC	50mA-700mA
4.5VAC	50mA-1.0A
5.0VAC	50mA-600mA
6.0VAC	50mA-2.0A
7.5VAC	50mA-1.9A
9.0VAC	50mA-1.8A
10.0VAC	250mA-1.7A
12.0VAC	50mA-1.5A
14.0VAC	50mA-1.2A
15.0VAC	50mA-1.2A
16.0VAC	250mA-1.1A
18.0VAC	50mA-1.0A
21.0VAC	50mA-850mA
24.0VAC	50mA-750mA

AC to DC Types in 50mA Increments

Output Volts	Output Current
3.0VDC	50mA-600mA
3.6VDC	50mA-500mA
4.5VDC	50mA-800mA
5.0VDC	50mA-400mA
6.0VDC	50mA-1.4A
7.5VDC	50mA-1.3A
9.0VDC	50mA-1.2A
10.0VDC	250mA-1.1A
12.0VDC	50mA-1.2A
14.0VDC	650mA-850mA
15.0VDC	150mA-800mA
16.0VDC	50mA-800mA
18.0VDC	50mA-700mA
21.0VDC	50mA-600mA
24.0VDC	50mA-550mA

Ordering Information

Be sure to specify the input and output options you require. Many other connectors and plug configurations are available; simply forward your custom requirement and our engineering department will be happy to work with you.

DP D 015 008 X

Model	Type	Volts	Current	Special
DP - Plug-In DT - Desk Top R - Regulated D/C A - A/C	A - A/C D - D/C	Shown in 10ths (015 = 1.5V)	mA x 10 (010 = 100mA)	G - Ground Pin C - Center Tap D - Dual output S - Switchable Input

DPS 120 120 U

Model	Volts	Current	Special
DPS - Plug-In DTS - Desk Top	Shown in 10ths (015 = 1.5V)	mA x 10 (010 = 100mA)	U - Universal Input E - European Input B - British Input A - Australian Input

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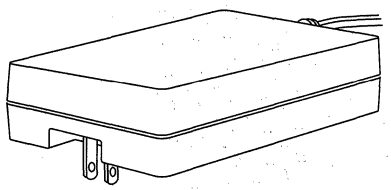
power supplies

Shrink it! Models are getting smaller and smaller. Power ratings are getting higher and higher. Many models available up to 30 Watts. Configurations available in wall mount and desk top models. Applications include: telephone battery chargers, lap top power supply, medical instrument power supply, power source for measuring instruments, broad applications of power supply for battery chargers.

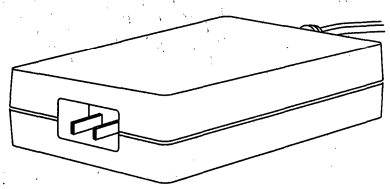
15 Watts with "Flip Out" Blades



MODEL	DC OUTPUT		UL	CUL	TUV	CE	T-MARK
DPS-050300-UF	5V	3A	•	•			
DPS-060250-UF	6V	2.5A	•	•			
DPS-070210-UF	7V	2.1A	•	•			
DPS-090166-UF	9V	1.66A	•	•			
DPS-100150-UF	10V	1.5A	•	•			
DPS-120125-UF	12V	1.25A	•	•			
DPS-150100-UF	15V	1.0A	•	•			
DPS-160090-UF	16V	0.9A	•	•			
DPS-180083-UF	18V	0.83A	•	•			
DPS-200075-UF	20V	0.75A	•	•			
DPS-240062-UF	24V	0.62A	•	•			

Input: Universal

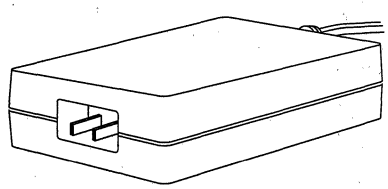
15 Watts with Two Prong Input



MODEL	DC OUTPUT		UL	CUL	TUV	CE	T-MARK
DTS-050300-UD	5V	3A	•	•	•	•	
DTS-060250-UD	6V	2.5A	•	•			
DTS-070210-UD	7V	2.1A	•	•			
DTS-090166-UD	9V	1.66A	•	•			
DTS-100150-UD	10V	1.5A	•	•			
DTS-120125-UD	12V	1.25A	•	•	•	•	
DTS-150100-UD	15V	1.0A	•	•			
DTS-160090-UD	16V	0.9A	•	•			
DTS-180083-UD	18V	0.83A	•	•			
DTS-200075-UD	20V	0.75A	•	•			
DTS-240062-UD	24V	0.62A	•	•	•	•	

Input: Universal

20 Watts with Two Prong Input



MODEL	DC OUTPUT		UL	CUL	TUV	CE	T-MARK
DTS-050400-UD	5V	4A	•	•	•	•	•
DTS-060330-UD	6V	3.3A	•	•			
DTS-070280-UD	7V	2.8A	•	•			
DTS-090220-UD	9V	2.2A	•	•			
DTS-100200-UD	10V	2.0A	•	•			
DTS-120165-UD	12V	1.65A	•	•	•	•	•
DTS-150130-UD	15V	1.3A	•	•			
DTS-160125-UD	16V	1.25A	•	•			
DTS-180110-UD	18V	1.1A	•	•			
DTS-200100-UD	20V	1.0A	•	•			
DTS-240085-UD	24V	0.85A	•	•	•	•	•
DTS-120200-UD	12V	2A	•	•	•	•	•

Input: Universal

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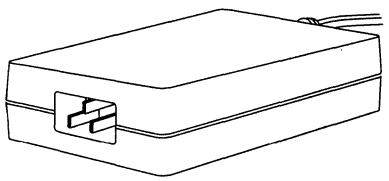
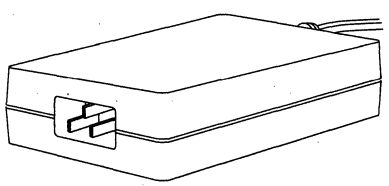
20 Watts with IEC 320 Input



MODEL	DC OUTPUT		UL	CUL	TUV	CE	T-MARK
DTS-050400-U	5V	4A	•	•	•	•	•
DTS-060330-U	6V	3.3A	•	•			
DTS-070280-U	7V	2.8A	•	•			
DTS-090220-U	9V	2.2A	•	•			
DTS-100200-U	10V	2.0A	•	•			
DTS-120165-U	12V	1.65A	•	•	•	•	•
DTS-150130-U	15V	1.3A	•	•			
DTS-160125-U	16V	1.25A	•	•			
DTS-180110-U	18V	1.1A	•	•			
DTS-200200-U	20V	1.0A	•	•			
DTS-240085-U	24V	0.85A	•	•	•	•	•
DTS-120200-U	12V	2A	•	•	•	•	•

Input: Universal

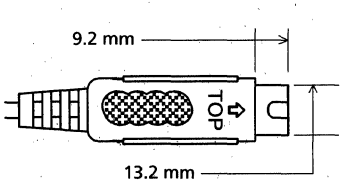
30 Watts with IEC 320 Input

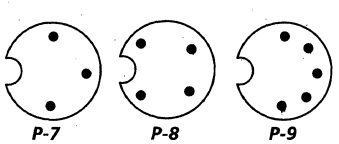


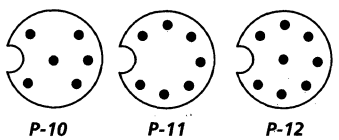
MODEL	DC OUTPUT		UL	CUL	TUV	CE	T-MARK
DTS-5124062-U	5V/4A	12V/0.6A 12V/0.2A	•	•	•	•	
DTS-5123610-U	5V/3.6A	12V/1A	•	•	•	•	
DTS-050500-U	5V	5A	•	•	•	•	
DTS-090330-U	9V	3.3A	•	•	•	•	
DTS-120250-U	12V	2.5A	•	•	•	•	
DTS-150200-U	15V	2A	•	•	•	•	
DTS-240125-U	24V	1.25A	•	•	•	•	

Input: Universal

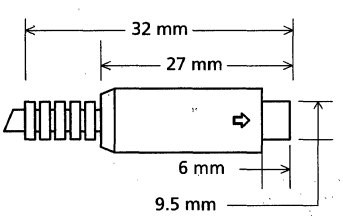
DIN Plug Output Option

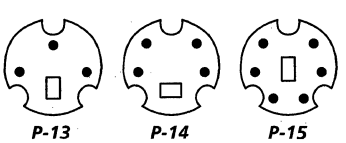


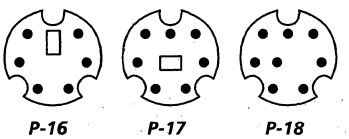




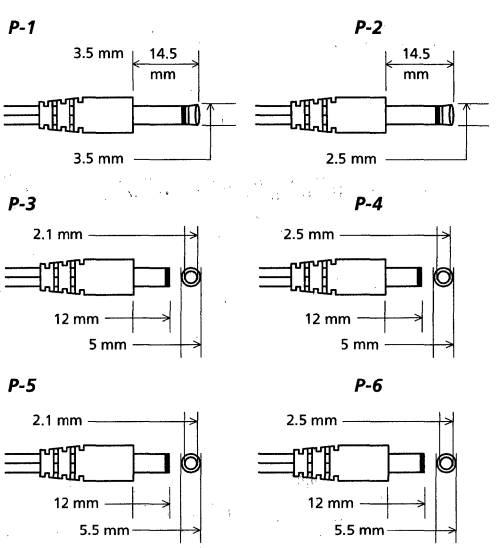
MINI-DIN Plug Output Option



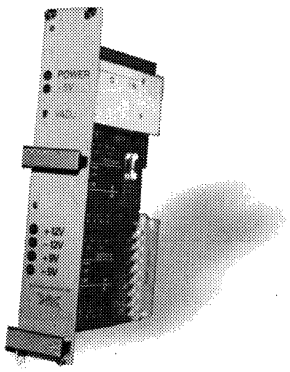


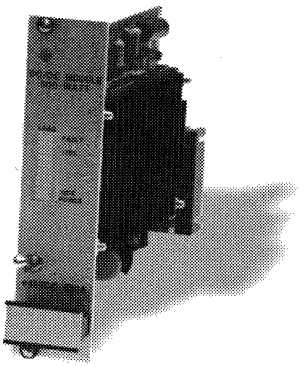


Standard Output Options

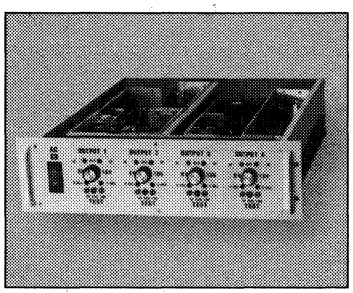


AJ's Power Source... Introducing Real Hot-Swap Power Supplies





UMEC



LAMBDA

All AJ's Power Source Inc. products begin with a standard power supply or high density module manufactured by a major power supply company to strict performance, quality, and reliability specifications. Thereafter, we enhance and package the power supply to meet the unique requirements of a specific industry or customer. This results in a product that is far more reliable than a custom product and far quicker to obtain.

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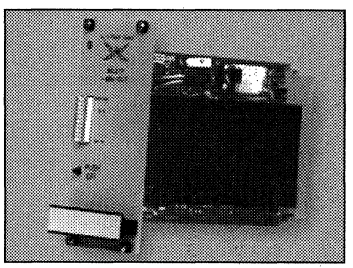
EOS



Compact PCI Power Giving You a Headache?

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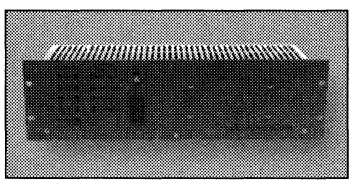
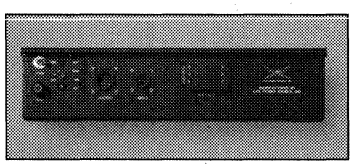
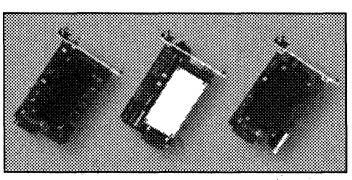
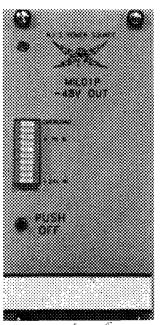


VICOR



POWER VOLT





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- VME Systems
- Medical
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Standard Modules / Descriptions Available

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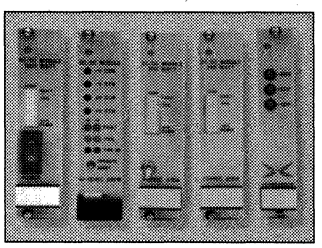

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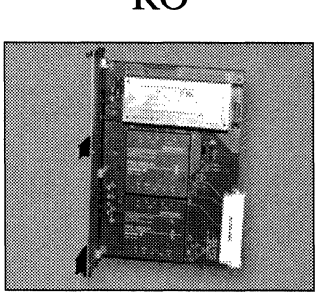
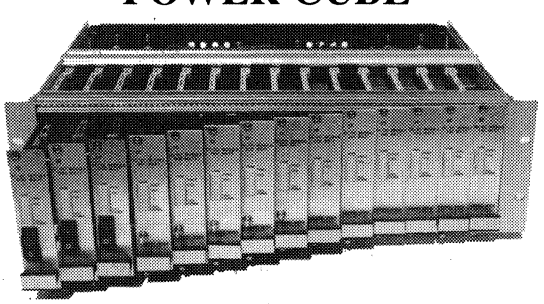


POWER CUBE



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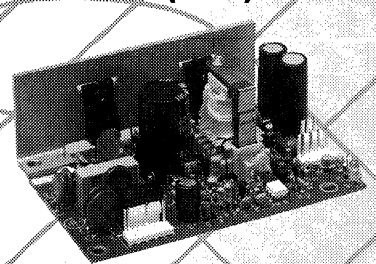
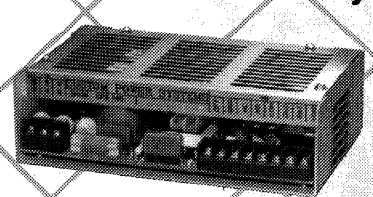
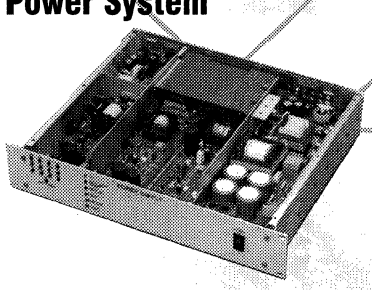


Industrial 140 W Battery Charger



Fully Integrated Telecom Power System



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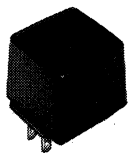
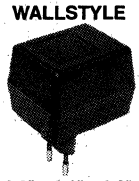
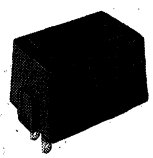
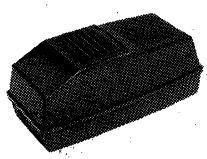
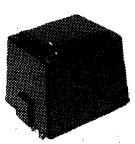
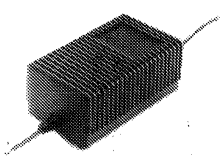
	
2.1" x 2.1" x 1.7" 12 VA or 4 W max.	2.3" x 3.1" x 2.0" 20 VA or 9 W max.
'D2' SIZE WALL PLUG-IN OR DESKTOP	**DPC DESK TOP**
	
2.1" x 3.2" x 1.5" 12 VA or 9 W max.	2.5" x 5.1" x 2.0" 20 VA or 13 W max.
'E' SIZE WALL PLUG-IN OR DESKTOP	**'H' DESK TOP**
	
2.8" x 3.8" x 2.7" 56 VA or 35 W max.	3.8" x 6.3" x 3.0" 100 VA or 70 W max.

HOUSING MATERIAL:
- Black ABS, self extinguishing

INPUT/OUTPUT CORDS:
- All industry standard miniature molded cordsets are stocked.
- IEC Connectors, unit and cord mounted.

OPTIONS:
- LED charge or power-on indicator light.
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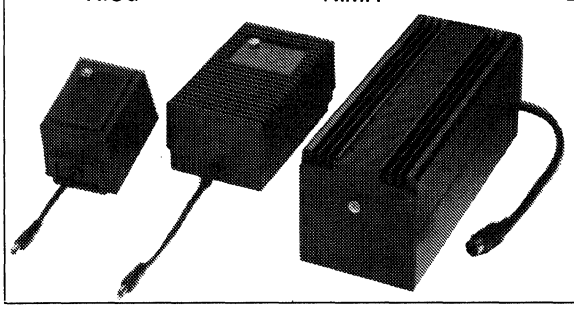
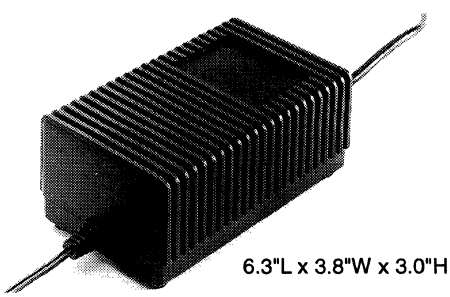
-ΔV	ΔT/Δt	2 PHASE	3 PHASE
NiCd	NiMH	Li ION	LEAD ACID & GELS



- Many built in safety features
- Quick delivery
- Small quantity orders available
- 15 minute to 4 hour charging
- Many choices of output/input cords

LINEAR POWER SUPPLY



6.3"L x 3.8"W x 3.0"H

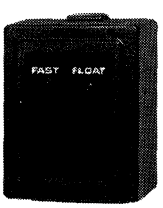
Line Regulation	.1%
Load Regulation	3%
Ripple	1mv RMS max.
Single Outputs	5 VDC @ 2.5 a mps 12 VDC @ 2 amps 15 VDC @ 1.5 amps 24 VDC @ 1 amp 48 VDC @ .5 amp
Dual & Triple Outputs	Many combinations available call factory for information

AVAILABLE OPTIONS
- 115/230 Switch Selectable input
- 210-252 VAC 60/50 Hz input • 100 VAC 60/50 Hz input
- Remote Sensing gives 1% load regulation
- Overvoltage Protection (Crowbar Type)

BATTERY CHARGERS

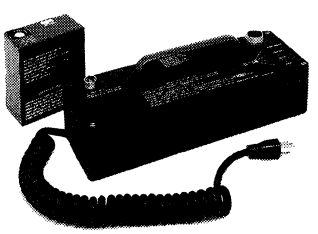
Commercial

MULTI STAGE/WITH DISCHARGE



WALL PLUG-IN DUAL STAGE

Military



FOR NICAD MILITARY BATTERIES

FSCM 54337

e-mail:ddanhall@aol.com
http://eemonline.com/dandbpower

D&B Power, Inc.

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MLP SERIES 1 kV – 30 kV, 10 W – 30 W

Modular OEM Regulated DC to DC Converters

SYSTEM FEATURES

- High reliability and experience - over 10,000 units in use worldwide
- Cost-effective for OEM applications, as well as R&D use
- Protected against overload, short circuit and arc over conditions
- Highly efficient switchmode technology
- Efficiency greater than 70%
- Low stored energy
- Meets UL 1950 certification
- Custom configurations available

MLP SERIES THEORY OF OPERATION

The MLP series is a compact DC to DC converter that offers a versatile, highly regulated HV source for various OEM and lab applications.

This unit utilizes proprietary switchmode circuitry incorporating a PWM driven inverter operating at 25 kHz, to enable this high voltage power supply series to supply fully adjustable output current from zero to maximum output voltage.

All units provide remote analog programming, test points and (TTL) enables. Units 3 kV and below are sufficiently isolated from case, enabling the outputs to be grounded in either direction, for easy polarity reversal. MLP units are resistant to overload, sustained short circuits and arc over conditions. One new option for reversible units is a center tap available for +/- output. For example: 1 kV = +/- 500V.

MLP SERIES APPLICATIONS

- Mass Spectrometers
- Plasma Etch
- Photomultipliers
- CRTs
- Electrophoresis
- Laboratory R&D

PERFORMANCE SPECIFICATIONS

Input Voltage: 24-32 VDC @ 1.7 amp maximum
Output: adjustable voltage from 0 to maximum rating via remote analog program
Voltage regulation:
Line: ± 0.02% for ±10% input line change
Load: ± 0.05% for NL to FL change

Current regulation:
Line: ± 0.05% for ±10% input line change
Load: ± 0.05% for 0 to maximum rated output voltage change
Ripple: .1% RMS
Stability: 0.01%/hr after 1/2 hr. warm-up,0.02%/8 hr
Efficiency: greater than 70% at maximum power

PHYSICAL SPECIFICATIONS

1. Reverse polarity units: 3.75″W x 5″D x 1.75″H (9.5 x 12.7 x 4.4 cm)
Weight: 6.5 lb. (2.9 kg)
2. Single polarity units: 5.8″W x 5.7″D x 2.3″H (14.7 x 14.5 x 14.8 cm)
Weight: 7.5 lb (3.4 kg)
Input Connector: 9-pin Amp metri-mate with male pins, "mini D"
High Voltage Connector:
Option 1: 18″ flying lead
Option 2: Alden connector or equivalent rated by voltage

Models	Output Voltage (kV)	Output	Output Power Watt
MLP1-10R	0-1.0	0-10	10
MLP1-20R	0-1.0	0-20	20
MLP1-30*	0-1.0	0-30	30
MLP2-5R	0-2.0	0-5	10
MLP2-10R	0-2.0	0-10	20
MLP2-15*	0-2.0	0-15	30
MLP3-3.3R	0-3.0	0-3.3	10
MLP3-6.6R	0-3.0	0-6.6	20
MLP3-10*	0-3.0	0-10	30

Models	Output Voltage (kV)	Output	Output Power Watt
MLP6-1.6*	0-6.0	0-1.6	10
MLP6-3.3*	0-6.0	0-3.3	20
MLP6-5.0*	0-6.0	0-5.0	30
MLP10-1.0*	0-10	0-1.0	10
MLP10-2.0*	0-10	0-2.0	20
MLP10-3.0*	0-10	0-3.0	30
MLP15-.66*	0-15	0-.66	10
MLP15-1.3*	0-15	0-1.3	20
MLP15-2.0*	0-15	0-2.0	30

Models	Output Voltage (kV)	Output	Output Power Watt
MLP20-0.5*	0-20	0-0.5	10
MLP20-1.0*	0-20	0-1.0	20
MLP20-1.5*	0-20	0-1.5	30
MLP25-0.4*	0-25	0-0.4	10
MLP25-0.8*	0-25	0-0.8	20
MLP25-1.2*	0-25	0-1.2	30
MLP30-.33*	0-30	0-.33	10
MLP30-.66*	0-30	0-.66	20
MLP30-1.0*	0-30	0-1.0	30

*Note: Please indicate P for positive or N for negative polarity with respect to ground.

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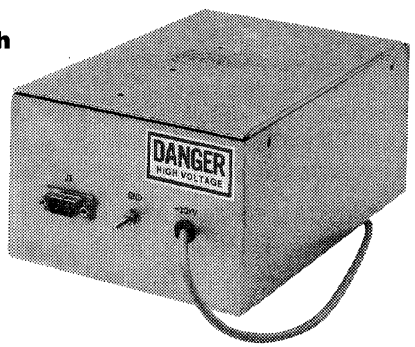
MHP SERIES 1 kV – 50 kV, 40 W – 60 W

Modular OEM Regulated High Voltage DC to DC Converters



SYSTEM FEATURES

- High reliability and experience - over 7,500 units in use worldwide
- Cost-effective for OEM or R&D applications
- Protected against overload, short circuit and arc over conditions
- Highly efficient switchmode technology
- Efficiency greater than 70%
- Low stored energy
- Meets UL 1950 certification
- Custom configurations available

MHP SERIES THEORY OF OPERATION

The MHP series is a compact DC to DC converter that offers a versatile, highly regulated HV source for OEM and lab applications.

This unit utilizes proprietary switchmode circuitry incorporating a PWM driven inverter operating at 25 kHz, enabling this high voltage power supply series to deliver fully adjustable output current from zero to the maximum output voltage.

All units provide remote analog programming, test points and (TTL) compatible enable. MHP's are immune to overload, sustained short circuits and arc over conditions.

MHP SERIES APPLICATIONS

- Capillary Zone Electrophoresis
- X-ray Spectrometers
- Photomultipliers
- CRT's
- Electron Beam Processing
- Laboratory R&D

PERFORMANCE SPECIFICATIONS

Input Voltage: 24 VDC @ 3.3 amps maximum
Output: adjustable voltage from 0 to maximum rating via remote analog program
Voltage regulation:
Line: ± 0.02% for ±10% input line change
Load: ± 0.05% for NL to FL change
Current regulation:
Line: ± 0.05% for ±10% input line change
Load: ± 0.05% for 0 to maximum rated output voltage change
Ripple: .1% RMS
Stability: 0.01%/hr after 1/2 hr. warm-up, 0.02%/8 hr
Efficiency: greater than 70% at maximum power

PHYSICAL SPECIFICATIONS

Unit Dimensions: 5.6˝W x 8˝D x 3.5˝H (14.2 x 20.3 x 8.9 cm)
Weight: 9 lbs (4.1 kg)
Input Connector: 9-pin Amp metri-mate with male pins, "mini D"
High Voltage Connector:
Option 1: 18˝ flying lead
Option 2: Alden connector or equivalent rated by voltage

Models	Output Voltage (kV)	Output	Output Power Watt
MHP1-40	0-1	0-40	40
MHP1-60	0-1	0-60	60
MHP2-20	0-2	0-20	40
MHP2-30	0-2	0-30	60
MHP3-13.3	0-3	0-13.3	40
MHP3-20	0-3	0-20	60
MHP6-6.6	0-6	0-6.6	40
MHP6-10	0-6	0-10	60
MHP10-4	0-10	0-4	40
MHP10-6	0-10	0-6	60
MHP15-2.6	0-15	0-2.6	40
MHP15-4	0-15	0-4	60
MHP20-2	0-20	0-2	40
MHP20-3	0-20	0-3	60
MHP25-1.6	0-25	0-1.6	40
MHP25-2.4	0-25	0-2.4	60
MHP30-1.3	0-30	0-1.3	40
MHP30-2.0	0-30	0-2.0	60
MHP40-1	0-40	0-1	40
MHP40-1.5	0-40	0-1.5	60
MHP50-0.8	0-50	0-0.8	40
MHP50-1.2	0-50	0-1.2	60

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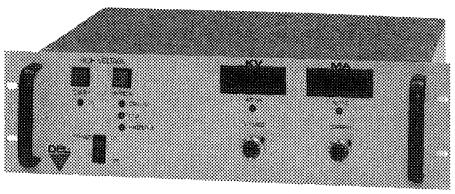
RLPS SERIES 60 W – 300 W

Switchmode Power Converters



SYSTEM FEATURES

- Uses the most advanced switching technology available
- Compact design and lightweight
- Cost-effective power conversion
- Low stored energy
- Constant voltage/constant current operation with automatic crossover
- Units 30kV and below are reversible
- Overvoltage, overcurrent, arc and short circuit protected
- CE Mark

RLPS SERIES THEORY OF OPERATION

The DEL RLPS Series offers a low stored energy, high voltage source with arc and short circuit immunity, low RFI noise and excellent output regulation and ripple.

This series incorporates a field-proven, pulse-width modulated, IGBT driven inverter which operates at 25 kHz. Our proprietary switching technique reduces switching losses and internal power dissipation, thus offering lower component temperatures, higher reliability and efficiency greater than 85%.

The combination of DEL's patented control system and proprietary protection circuits enables the supply to operate under arcing and transient conditions without damage or interruption.

RLPS SERIES APPLICATIONS

- X-ray Analyzers
- Electrostatics
- E-Beam Systems
- CRT Testing
- Ion Implantation/Suppression
- DC Diode Sputtering
- Laboratory R&D

PERFORMANCE SPECIFICATIONS

Input Voltage: 115, 220 VAC, single-phase 50/60 Hz
Output: continuously adjustable from 0 to maximum rated output via local or remote controls
Voltage regulation: Line: ± 0.005% for ±10% input line change
Load: ± 0.005% for NL to FL change
Current regulation: Line: ± 0.05% for ±10% input line change
Load: ± 0.05% for 0 to maximum rated output voltage change
Ripple: 0.05% pk-pk at maximum output
Stability: 0.01%/hr after 1/2 hr. warm-up, 0.02%/8 hr
Efficiency: greater than 85% at maximum power

PHYSICAL SPECIFICATIONS

Unit Dimensions: All models are housed in a standard 5-1/4″ high, 16″ deep, 19″ rack (13.3 x 40.6 x 48.3 cm).
Models 30 kV and below are reversible.
Output Connector: 10 feet (3.05 meters) of appropriately rated HV shielded cable.
Front panel control and metering:

1. HV on push button with light
2. HV off/reset push button with light
3. Voltage and current control by 10 turn potentiometers (0.1% resolution)
4. 3-1/2 digit LED digital panel meters for both voltage and current,1% accuracy
5. Voltage and current mode lights
6. Interlock indicator
7. Polarity indicator
8. Fault indicator
9. Remote/Local indicator

60 Watts	Output	
Models	**kV**	**mA**
RLPS1-60R	0-1	60
RLPS2-60R	0-2	30
RLPS3-60R	0-3	20
RLPS5-60R	0-5	12
RLPS10-60R	0-10	6
RLPS15-60R	0-15	4
RLPS20-60R	0-20	3
RLPS30-60R	0-30	2
RLPS40-60*	0-40	1.5
RLPS50-60*	0-50	1.2
RLPS60-60*	0-60	1.0

100 Watts	Output	
Models	**kV**	**mA**
RLPS1-100R	0-1	100
RLPS2-100R	0-2	50
RLPS3-100R	0-3	33.3
RLPS5-100R	0-5	20
RLPS10-100R	0-10	10
RLPS15-100R	0-15	6.66
RLPS20-100R	0-20	5
RLPS30-100R	0-30	3.33
RLPS40-100*	0-40	2.5
RLPS50-100*	0-50	2
RLPS60-100*	0-60	1.66
RLPS75-100*	0-75	1.33
RLPS100-100*	0-100	1
RLPS125-100*	0-125	0.8

(RLPS SERIES CONTINUED ON NEXT PAGE)

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(RLPS SERIES CONTINUED)

Models	kV	mA
RLPS1-150R	0-1	150
RLPS2-150R	0-2	75
RLPS3-150R	0-3	50
RLPS5-150R	0-5	30
RLPS10-150R	0-10	15
RLPS15-150R	0-15	10
RLPS20-150R	0-20	7.5
RLPS30-150R	0-30	5
RLPS40-150*	0-40	3.75
RLPS50-150*	0-50	3
RLPS60-150*	0-60	2.5
RLPS75-150*	0-75	2
RLPS100-150*	0-100	1.5
RLPS125-150*	0-125	1.2

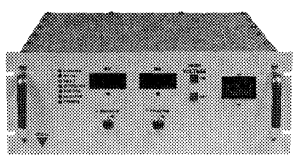
300 Watts Output

Models	kV	mA
RLPS1-300R	0-1	300
RLPS2-300R	0-2	150
RLPS3-300R	0-3	100
RLPS5-300R	0-5	60
RLPS10-300R	0-10	30
RLPS15-300R	0-15	20
RLPS20-300R	0-20	15
RLPS30-300R	0-30	10
RLPS40-300*	0-40	7.5
RLPS50-300*	0-50	6
RLPS60-300*	0-60	5
RLPS75-300*	0-75	4
RLPS100-300*	0-100	3
RLPS125-300*	0-125	2.4

*Note: Indicate P for positive, N for Negative, R for Reversible

RHVS SERIES 500 W-10 kW

Switchmode Power Converters



SYSTEM FEATURES

- Uses the most advanced switching technology available
- Compact design and lightweight
- Cost-effective power conversion
- Low stored energy
- Constant voltage/constant current operation with automatic crossover
- Overvoltage, overcurrent, arc and short circuit protected
- Low EMI and RFI
- CE mark

RHVS SERIES THEORY OF OPERATION

The DEL RHVS series provides very well regulated, low ripple high voltage in a highly efficient, compact design. The improvements in size and performance over traditional high voltage power supplies are due to the high frequency (greater than 25 kHz) operation and unique control circuitry of the RHVS field-proven design.

A patented control system maintains a constant frequency over the operating output range. Constant frequency operation allows a dynamic response time of less than 2 milliseconds, and one of the most precise ripple specifications in the industry at maximum power level. The combination of this control system and our experience in proprietary protection circuitry enables these supplies to operate under arcing and extreme transient conditions without damage or interruptions.

RHVS SERIES APPLICATIONS

- CW Magnetron
- Vacuum Deposition and Sputtering
- E-Beam Processing
- Ion Implantation/Extraction
- Radar Modulators
- Sputtering
- Laboratory R & D

PERFORMANCE SPECIFICATIONS

Input Voltage: 500 W units: switchable between 115 and 220 VAC; 1000 W units: specify 115 or 220 VAC. Above 2.5 kW: specify 208, 380, 480 VAC, 3-phase.
Output: continuously adjustable from 0 to maximum rated output via local or remote controls.
Voltage regulation: Line: ± 0.005% for ±10% input line change
Load: ± 0.005% for NL to FL change
Current regulation: Line: ± 0.05% for ±10% input line change
Load: ± 0.05% for 0 to maximum rated output voltage change
Ripple: 0.05% RMS at maximum output
Stability: 0.01%/hr after 1/2 hr. warm-up, 0.02%/8hr
Efficiency: greater than 85% min. at maximum power
Response Time of Arc Detector: 5 microseconds
Recovery Time after Arc: 10 milliseconds

PHYSICAL SPECIFICATIONS

500 W to 2.5 kW units: 7″H x 17″D x 19″ rack (17.8 x 43.2 x 48.3cm)
5-10 kW units: 7″H x 24″D x 19″ rack (17.8 x 61.0 x 48.3 cm) plus high voltage section starting from 5″ (12.7 cm) high
Output connection: 10 feet (3.05 meters) of appropriately rated high voltage shielded cable
Front panel control and metering:

1. HV on push button with light
2. HV off/reset push button with light
3. Voltage and current control by 10 turn potentiometers (0.1% resolution)
4. 3 1/2 digit LED digital panel meters for both voltage and current,1% accuracy
5. Voltage and current mode lights
6. Interlock indicator
7. Polarity indicator
8. Fault indicator
9. Local Remote indicator
10. Front panel circuit breaker

(RHVS CONTINUED ON NEXT PAGE)

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(RHVS SERIES CONTINUED)

Voltage kV	Current (mA)	500 Watts
1	500	RHVS1-500R
2	250	RHVS2-500R
3	166	RHVS3-500R
5	100	RHVS5-500R
10	50	RHVS10-500R
15	33	RHVS15-500R
20	25	RHVS20-500R
30	16.6	RHVS30-500R
40	12.5	RHVS40-500*
50	10	RHVS50-500*
60	8.3	RHVS60-500*
80	6.25	RHVS80-500*
100	5	RHVS100-500*
125	4	RHVS125-500*

Current (mA)	1 Kilowatt
1(A)	RHVS1-1000R
500	RHVS2-1000R
333	RHVS3-1000R
200	RHVS5-1000R
100	RHVS10-1000R
66.6	RHVS15-1000R
50	RHVS20-1000R
33	RHVS30-1000
25	RHVS40-1000*
20	RHVS50-1000*
16.6	RHVS60-1000*
12.5	RHVS80-1000*
10	RHVS100-1000*
8	RHVS125-1000*

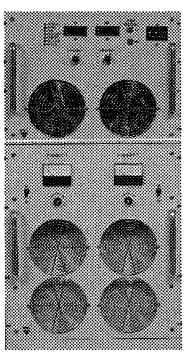
Current (mA)	2.5 Kilowatt
2.5 (A)	RHVS1-2500R
1.25(A)	RHVS2-2500R
833	RHVS3-2500R
500	RHVS5-2500R
250	RHVS10-2500R
167	RHVS15-2500R
125	RHVS20-2500R
84	RHVS30-2500*
63	RHVS40-2500*
50	RHVS50-2500*

Voltage kV	Current (mA)	6 Kilowatt
1	6(A)	RHVS1-6000R
2	3(A)	RHVS2-6000R
3	2(A)	RHVS3-6000R
5	1.2(A)	RHVS5-6000R
10	600	RHVS10-6000R
15	400	RHVS15-6000R
20	300	RHVS20-6000R
30	200	RHVS30-6000*
40	150	RHVS40-6000*
50	120	RHVS50-6000*

Voltage kV	Current (mA)	10 Kilowatt
1	10(A)	RHVS1-10,000R
2	5(A)	RHVS2-10,000R
3	3.3(A)	RHVS3-10,000R
5	2(A)	RHVS5-10,000R
10	1(A)	RHVS10-10,000R
15	666	RHVS15-10,000R
20	500	RHVS20-10,000R
30	333	RHVS30-10,000*
40	250	RHVS40-10,000*
50	200	RHVS50-10,000*

RHVS-HP SERIES 15 kV-20 kW

Switchmode Power Converter



RHVS-HP SERIES APPLICATIONS

- X-ray Tube Testing
- Electron Beam Welding
- CW Klystron
- Sputtering
- Laboratory R & D
- Laser Cutting and Welding

PERFORMANCE SPECIFICATIONS

Input Voltage: 208, 380, 480 VAC, three-phase
Output: continuously adjustable from 0 to maximum rated output via local or remote controls.
Voltage regulation:
Line: ± 0.005% for ±10% input line change
Load: ± 0.005% for NL to FL change
Current regulation:
Line: ± 0.05% for ±10% input line change
Load: ± 0.05% for 0 to maximum rated output voltage change

Ripple: 0.05% RMS at maximum output
Stability: 0.01%/hr after 1/2 hr. warm-up,0.02%/8 hr
Efficiency: greater than 85% min. at maximum power

PHYSICAL SPECIFICATIONS

15-20 kW units: 12″H x 24″D x 19″ rack (30.5 x 61.0 x 48.3 cm), plus high voltage section starting at 8-3/4″ (22.2 cm)

Voltage kV	15 Kilowatt	Current (mA)
1	RHVS-HP1-15,000R	15(A)
2	RHVS-HP2-15,000R	7.5(A)
3	RHVS-HP3-15,000R	5(A)
5	RHVS-HP5-15,000R	3(A)
10	RHVS-HP10-15,000R	1.5(A)
15	RHVS-HP15-15,000R	1(A)
20	RHVS-HP20-15,000	750
30	RHVS-HP30-15,000	500
40	RHVS-HP40-15,000*	375
50	RHVS-HP50-15,000*	300

NOTE: Higher output or custom models available; consult factory.

(RHVS-HP SERIES CONTINUED ON NEXT PAGE)

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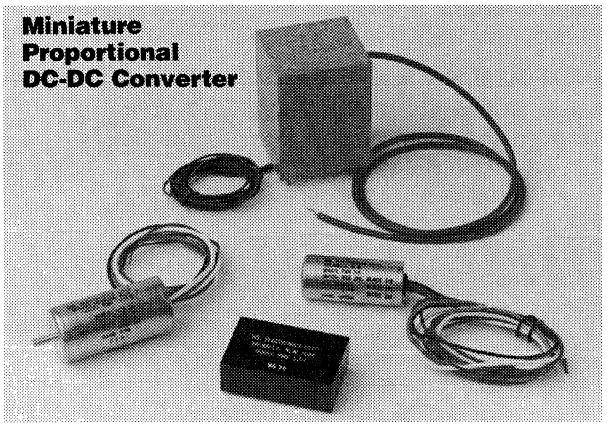
(RHVS-HP SERIES CONTINUED)

kV	20 Kilowatt	Current mA
1	RHVS-HP1-20,000R	20(A)
2	RHVS-HP2-20,000R	10(A)
3	RHVS-HP3-20,000R	6.6(A)
5	RHVS-HP5-20,000R	4(A)
10	RHVS-HP10-20,000R	2(A)

kV	20 Kilowatt	Current mA
15	RHVS-HP15-20,000R	1.3(A)
20	RHVS-HP20-20,000	1(A)
30	RHVS-HP30-20,000	666
40	RHVS-HP40-20,000*	500
50	RHVS-HP50-20,000*	400

*Note: Indicate P for Positive, N for Negative or R for Reversible

PMS SERIES 1.5 W - 6.5 W



SYSTEM FEATURES

- High reliability, backed by extensive field experience
- Compact, lightweight units, suitable for OEM applications
- Low cost, stock deliveries
- Output, momentary short circuit protected
- Fully shielded
- Isolated output, enabling user to select output polarity
- Arc and short-circuit protected
- Customizable to your specific requirements

PMS SERIES THEORY OF OPERATION

The Del PMS Series is a family of highly reliable, compact DC to DC proportional converters for use as power sources for photomultipliers and other tube applications. The series utilizes high frequency technology (25 kHz) with low energy storage and arc protection. A free running flyback circuit is incorporated to provide stable output voltage levels.

Insulated 8˝ long, high voltage output leads are floating, and fully isolated from the input leads and the case. Shielding is provided by a steel case, except for PC-board mountable units, PMS 1-7-7 and 1-23.

The PMS series is used worldwide for a broad range of applications. It meets the stringent standards we set for high quality power conversion products.

PMS SERIES APPLICATIONS

- Photomultiplier Tubes
- CRT Focus and Bias
- Electrostatics
- Ink-jet Printers
- Geiger Tubes
- Plasma Etch
- Ionization Chambers

PERFORMANCE SPECIFICATIONS

MTBF: Over 100,000 hours
Efficiency: Greater than 65%

ENVIRONMENTAL SPECIFICATION

Temperature:
Operating: 0°C - + 50°C
Storage: -35°C to + 85°C
Temperature Coefficient: 100 ppm/°C

*Note: Specify positive or negative polarity with order

Model	Input DC	Voltage	Current	Ripple P-to-P	Size & Mounting L x W x H or Diameter x L	Mounting
PMS 1-1	3-15V	300-1500V	1 mA	1.5V	1 x 2.25 in 2.5 x 5.7cm	Loop Clamp
PMS 1-7-7	3-15V	300-1500V	1 mA	6.0V	2.4 x 1.5 x 0.81 in 6.1 x 3.8 x 2.0 cm	P.C. Board
PMS 1-23	3-15V	300-1500V	1 mA	6.0V	1.5 x 1.5 x 0.6 in 3.8 x 3.8 x 1.5 cm	P.C. Board
PMS 3-.5	3-15V	300-3000V	0.5 mA	7.5V	1.25 x 2.37 in 3.2 x 6.0 cm	8/32 Studs
PMS 5-.5	3-15V	500-5000V	0.5 mA	10.0V	1.43 x 3.12 in 3.6 x 7.9 cm	8/32 Studs
PMS 8-.8	3-15V	800-8000V	0.8 mA	8.0V	2.5 x 3 in 6.3 x 7.6 cm	8/32 Studs
PMS 10-.025	3-15V	3kV-10kV	0.025 mA	50.0V	2.06 x 2.31 x 3.12 in 5.2 x 5.9 x 5.9 cm	4 Studs

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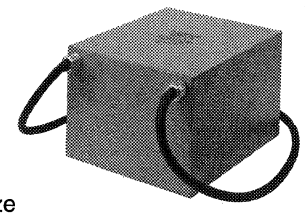
S-SERIES 10 W – 30 W

Ruggedized Modular High Voltage Power Supply

SYSTEM FEATURES



- Compact, modular construction ideal for OEM applications
- Low-cost per watt
- Solid state rectifiers
- Low ripple, high stability
- Reversible polarity to utilize positive and negative voltage

S-SERIES THEORY OF OPERATION

The DEL S-Series unregulated high voltage DC modules offers a low cost, compact and rugged voltage source, that can be utilized in many high voltage applications. This power supply is designed to operate on either a 115 VAC or 125 VAC input line at 50/60 Hz. The output can be varied from 0-100% of rated output by means of a variable auto transformer on the input voltage line. Two shielded high voltage output cables are provided so that either positive or negative polarity can be utilized.

All units incorporate a step-up transformer and voltage doubler rectifier assembly to provide high voltage output. The S-Series units are recommended for commercial, industrial and laboratory use, where reliable high voltage DC power is required.

S-SERIES APPLICATIONS

- CRT Displays
- Ion Implantation
- Material Processing
- Ion Pumps - Microwave Tubes
- Grid Biasing
- Laboratory R&D

PERFORMANCE SPECIFICATIONS

Input Voltage: 0-115/0-125 VAC, 50/60 Hz
Regulation: Line: Output voltage is directly proportional to line variations
Load: Unregulated, approximately 15% no load to full load
Polarity: Reversible
Ripple: 1%

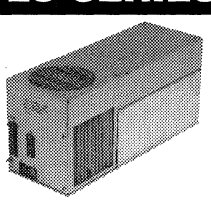
Models	Output Voltage (kV)	Output Current (mA)	Dimensions H x W x D	Weight (lb)
PS 1-10-1	1	10	3-1/2 x 3 x 5 in 8.9 x 7.6 x 12.7 cm	5 2.3 kg
PS 2.5-5-3	2.5	5	3-1/2 x 3 x 5 in 8.9 x 7.6 x 12.7 cm	5 2.3 kg
PS 2.5-10-1	2.5	10	4 x 3-3/4 x 5-1/2 in 10.2 x 9.5 x 14.0 cm	6-1/2 2.9 kg
PS 5-5-4	5	5	4 x 3-3/8 x 5-1/4 in 10.2 x 8.6 x 13.3 cm	7-1/2 3.4 kg
PS 5-10-2	5	10	4-3/8 x 3-3/4 x 5-1/2 in 11.1 x 9.5 x 14.0 cm	9 4.1 kg
PS 10-5-1	10	5	4-3/8 x 3-3/4 x 5-1/2 in 11.1 x 9.5 x 14.0 cm	10 4.5 kg
PS 10-10-3	10	10	5 x 4-3/8 x 6-3/4 in 12.7 x 11.1 x 17.1 cm	14-1/2 6.6 kg
PS 15-5-1	15	5	5-3/4 x 5 x 6-3/4 in 14.6 x 12.7 x 17.1 cm	19-1/2 8.8 kg

Models	Output Voltage (kV)	Output Current (mA)	Dimensions H x W x D	Weight (lb)
PS 15-10-2	15	10	6-1/8 x 6-1/8 x 6-1/2 in 15.6 x 15.6 x 16.5 cm	22-1/2 9.2 kg
PS 20-5-3	20	5	6-1/8 x 6-1/8 x 6-1/2 in 15.6 x 15.6 x 16.5 cm	21 9.5 kg
PS 20-10-1	20	10	6-3/4 x 6-1/4 x 7-1/4 in 17.1 x 15.9 x 18.4 cm	27-1/2 12.5 kg
PS 25-5-1	25	5	6-3/4 x 6-1/4 x 7-1/4 in 17.1 x 15.9 x 18.4 cm	27-1/2 12.5 kg
PS 25-10-1	25	10	7-1/2 x 6-1/2 x 8-1/2 in 19.0 x 16.5 x 21.6 cm	38 17.2 kg
PS 30-5-8	30	5	7-1/2 x 6-1/2 x 7-3/4 in 19.0 x 16.5 x 19.7 cm	38 17.2 kg
PS 30-10-3	30	10	8 x 7-3/4 x 8-3/4 in 20.3 x 19.7 x 22.2 cm	50 22.7 kg
PS 40-3-3	40	3	6-1/2 x 6-1/2 x 11 in 16.5 x 16.5 x 27.9 cm	48 21.8 kg

CLS SERIES 150 W – 1kW

CO_2 Laser Power Supplies

SYSTEM FEATURES



- Highly reliable field-proven technology for today's demanding CO_2 laser requirements
- Efficient, high frequency design
- Compact, modular unit designed for OEM applications
- Meets UL 544 guideline for leakage current
- Potted HV assemblies for maintenance-free operation to meet specific requirements
- Ballastless
- Open- and short-circuit protected for full operation in stressful environments

CLS SERIES THEORY OF OPERATION

The DEL CLS series of high voltage CO_2 laser power supplies are used worldwide for today's demanding industrial and medical CO_2 laser applications.

By removing ballast resistance normally required for loop stability, these current regulated supplies are capable of achieving high system efficiency. Our proprietary driver circuit, utilizing high frequency (25 kHz) regulator technology, delivers the performance that has come to be expected from DEL by our worldwide customer base.

Standard units are available in power ratings up to 1000 watts and various output configurations. Medical or industrial grounding is available to accommodate a broad range of applications.

DEL also offers an extensive line of special products for laser applications that are configured to meet specific laser tube requirements.

(CLS SERIES CONTINUED ON NEXT PAGE)

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(CLS SERIES CONTINUED)

CLS SERIES APPLICATIONS

- **Medical**
  Laser Surgery
  Cosmetic Surgery
- **Industrial**
  Laser Machining, including cutting, trimming and welding

PERFORMANCE SPECIFICATIONS

Input Voltage: 110/220 VAC, selectable, 50/60 Hz
Output: check product offerings for appropriate model
Regulation: 0.5% -1 ms setting time
Ripple: 1% (<1 kHz); 5% (>1 kHz)
Efficiency: 85% typical
Polarity: positive or negative
Pulse Rate: 1 kHz - 150 microseconds rise time
Isolation: medical or industrial
Cooling: air cooled

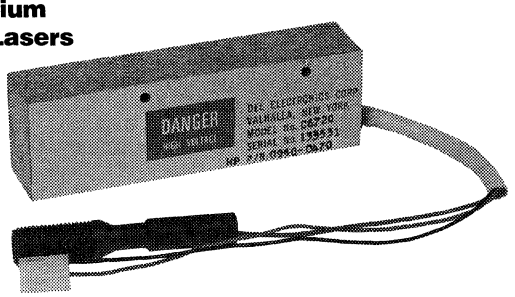
PHYSICAL SPECIFICATIONS

Size: 6.75″ H x 14.44″ D x 5.25 W″
(17.1 x 36.7 x 13.3 cm)
Weight: 15 lb (6.8 kg)
Output Connection: 3 ft of appropriately rated shielded HV cable with connector (Alden 8101QMS1NLD40)

Models	Watts	Strike Voltage (kV)	Operating Voltage (kV)	Output Current (mA)
CLS30-150	150	30	10 to 20	1 to 15
CLS50-150	150	50	15 to 30	1 to 10
CLS30-300	300	30	10 to 30	1 to 25
CLS50-300	300	50	15 to 30	1 to 20
CLS30-500	500	30	10 to 20	1 to 30
CLS50-500	500	50	15 to 30	1 to 30
CLS30-1000	1000	30	10 to 20	1 to 50
CLS50-1000	1000	50	15 to 30	1 to 40

HeNe SERIES

High Voltage Power Supplies for Helium Neon Lasers



SYSTEM FEATURES

- Small, compact size
- Ideal for laser measurement and alignment applications
- Low cost
- High precision ripple; 1% RMS
- Suitable for battery or portable units where DC input is required
- Custom units available to meet specific requirements
- Protection features include: reverse input power, short circuit and repeated arc protection

HeNe SERIES THEORY OF OPERATION

This laser power supply implements high frequency switching technology which facilitates compact design and low output current ripple for 2mW HeNe lasers. Our system-tested design is available for multiple laser configurations and can be modified to suit higher powered laser tubes.

DEL's precise and highly efficient power supplies are right for your demanding laser specifications.

PERFORMANCE SPECIFICATIONS

Input: 12 - 16 VDC
Output Voltage and Current: refer to product offerings
Efficiency: 75% minimum
Ripple: 1% RMS
Start Voltage: up to 10 kV

PHYSICAL SPECIFICATIONS

Size: Starting at 1″ H x 1.5″ W x 4.7″ L
(2.5 x 3.8 x 11.9 cm)
Weight: 1.5 lb (0.68 kg)
HV Receptacle: AMP LGH connector 816753-1 or equivalent
Molex Connector: Red: Input (+) Black: Ground

Series	Output Voltage	Output
HeNe-6	1200-1750 VDC	2-3.5 mA
HeNe-12	1400-2000 VDC	3.5-6.0 mA
HeNe-17.5	1850-2500 VDC	3.0-7.0 mA

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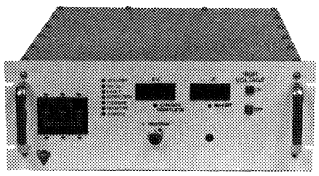
CDS SERIES 2 kJ/s – 25 kJ/s

Constant Power Capacitor Charging Power Supplies



SYSTEM FEATURES

- Highly reliable, field proven technology
- Cost-effective power conversion
- Proprietary protection circuits including overvoltage, overcurrent and open circuit faults
- Fully programmable output voltage
- Repetition rates to 1 kHz
- dv/dt fast shutdown
- Local or remote control
- CE Mark

CDS SERIES THEORY OF OPERATION

The Del CDS Series of high voltage power supplies are designed to charge capacitors and pulse forming networks. These current regulated models utilize proprietary high frequency switching techniques and advanced high voltage that contribute to the superior reliability, protection and performance of these units. Our patented circuitry enables this supply to operate without damage in rugged environments that frequently pose threats to traditional units.

Standard units are available with average charge rates up to 25 kJ/S and output voltages up to 50 kV. Units can be paralleled to provide charge rates up to 50 kJ/S. Custom units are available with charge rates, voltages and unit dimensions modified to meet specific requirements.

CDS SERIES APPLICATIONS

- Holmium/Yag lasers
- Pulsed applications
- E-Beam systems
- Capacitor banks
- Fusion technology
- Laboratory R & D

PERFORMANCE SPECIFICATIONS

Input Voltage: 2 kJ/S: 220 VAC single-phase, 50/60 Hz
5 kJ/S-25 kJ/S: 208, 380, 480 VAC 3-phase
Output: continuously adjustable from 0 to maximum rated output via local or remote controls.
Voltage regulation:
Line: ± 0.1% for 10% input line change
Load: ± 0.1% for NL to FL change
Efficiency: 85% min. at full load
Cooling: forced air
Polarity: positive or negative
Protection: overvoltage, overcurrent, open circuit and dv/dt shutdown

PHYSICAL SPECIFICATIONS

Size: 2kJ/S: 7″ H x 17″D x 19″ rack
(17.8 x 43.2 x 48.3 cm) 5kJ/S: 7″H x 24″D x 19″ rack
(17.8 x 61.0 x 48.3 cm) plus high voltage section starting from 5″ (2.3 meters) high 10kJ:
12″H x 24″D x 19″ rack
(30.5 x 61.0 x 48.3 cm) plus high voltage section starting from 5″ (2.3 meters) high
25kJ: 18″H x 34″D x 19″ rack
(45.7 x 61.0 x 48.3 cm) plus high voltage section starting from 5″ (2.3 meters) high
Output Connector: 10 ft of appropriately rated high voltage shielded cable
Front panel control and metering:

1. HV on push button with indicator
2. HV off/reset push button with standby indicator
3. Voltage and current control by 10 turn potentiometers (0.1% resolution)
4. 3 1/2 digit LED digital panel meters for both voltage and current, 1% accuracy
5. Charge complete indicator
6. Interlock indicator
7. Inhibit indicator

Model Number	Output Voltage (kV)
CDS 2-2000 (2 kJ/S)	0-2
CDS 5-2000	0-5
CDS 10-2000	0-10
CDS 20-2000	0-20
CDS 30-2000	0-30
CDS 40-2000	0-40
CDS 2-5000 (5 kJ/S)	0-2
CDS 5-5000	0-5
CDS 10-5000	0-10
CDS 20-5000	0-20
CDS 30-5000	0-30
CDS 40-5000	0-40

Model Number	Output Voltage (kV)
CDS 2-10000 (10 kJ/S)	0-2
CDS 5-10000	0-5
CDS 10-10000	0-10
CDS 20-10000	0-20
CDS 30-10000	0-30
CDS 40-10000	0-40
CDS 2-25000 (25 kJ/S)	0-2
CDS 5-25000	0-5
CDS 10-25000	0-10
CDS 20-25000	0-20
CDS 30-25000	0-30
CDS 40-25000	0-40

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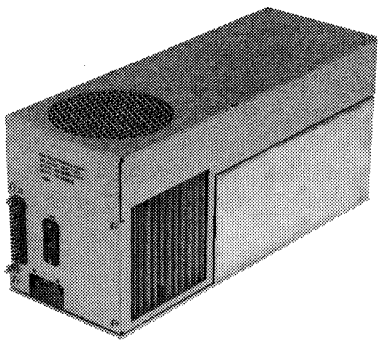
CDS MODULAR SERIES 500 J/s - 1000 J/s

Modular Capacitor Charging Power Supply



SYSTEM FEATURES

- Highly reliable, field-proven technology
- Cost-effective power conversion
- Proprietary protection circuits including overvoltage, overcurrent and open circuit faults
- Low stored energy
- Fully programmable output voltage
- Repetition rates to 1kHz
- dv/dt fast shutdown
- Local or remote control

CDS MODULAR SERIES THEORY OF OPERATION

DEL Electronics now offers the CDS-M series of modular capacitor charging power supplies to its power conversion customer base. Using the same high performance design that is a hallmark of DEL engineering, this offshoot of the CDS series is ideal for OEM applications where weight and size are a factor.

This compact, lightweight module incorporates field-proven, high frequency pulse-width modulation topology to deliver the performance that has come to be expected from DEL electronics.

CDS MODULAR SERIES APPLICATIONS

- Holmium/Yag lasers
- Pulsed applications
- E-Beam systems
- Capacitor banks
- E-Beam Processing

PERFORMANCE SPECIFICATIONS

Input Voltage: 115, 220 VAC single-phase, 50/60 Hz
Output: continuously adjustable from 0 to maximum rated output via local or remote controls.
Voltage regulation:
Line: ± 0.1% for 10% input line change
Load: ± 0.1% for NL to FL change
Efficiency: 85% min. at full load
Polarity: positive or negative
Protection: overvoltage, overcurrent and open circuit

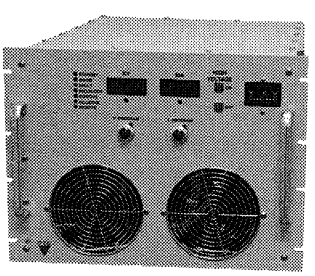
PHYSICAL SPECIFICATIONS

Size: 6.75″ H x 14.44″ D x 5.25″ W
(17.1 x 36.7 x 13.3 cm)
Weight: 15 lb. (6.8 kg)
Output Connector: 3 ft (0.91 meters) of appropriately rated HV cable with connector (Alden 8101QMS1NLD40)

Model Number	Output Voltage (kV)
CDS-M2-500 Jls	0-2
CDS-M10-500	0-10
CDS-M20-500	0-20
CDS-M30-500	0-30
CDS-M40-500	0-40
CDS-M50-500	0-50
CDS-M2-1000 Jls	0-2
CDS-M10-1000	0-10
CDS-M20-1000	0-20
CDS-M30-1000	0-30
CDS-M40-1000	0-40
CDS-M50-1000	0-50

XR-GEN SERIES

Anode or Grounded High Voltage Generator for X-ray Applications



SYSTEM FEATURES

- Extensive field experience has resulted in superior reliability and significant improvement over previous available technology
- Proprietary protection circuitry with state-of-the-art arc protection from over 40 years' experience
- Exceptional stability through precision feedback control circuitry
- DC output and emission current continuously adjustable within full functional range
- Integrated Filament Supply
- Custom units are available to meet the demand of today's x-ray applications
- RS 232 interface option

(XR-GEN SERIES CONTINUED ON NEXT PAGE)

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(XR-GEN SERIES CONTINUED)

XR-GEN SERIES THEORY OF OPERATION

The DEL XR-Gen Series is the definitive source for today's rugged x-ray environments in a broad range of x-ray applications. This series incorporates a field-proven pulse width modulation topology with an IGBT driven inverter operating at above 25 kHz. Proprietary protection circuitry joined to the control system allows the generator to operate under arcing and severe transient conditions without damage or power interruptions, as well as for high stability.

This highly efficient, compact unit contains an integrated filament supply which provides regulation to emission current and can be used with either anode or cathode (floating filament) ground units.

DEL offers its expertise in providing solutions for today's commercial x-ray requirements.

XR-GEN SERIES APPLICATIONS

- Medical Fluoroscopy
- Airport Baggage Screening and Explosive Detection
- Material Processing
- Bottle and Food Inspection

PERFORMANCE SPECIFICATIONS

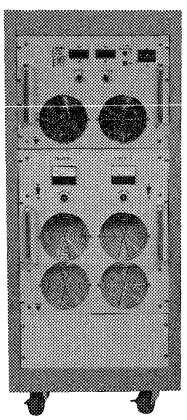
Input: 115 V/230 VAC, 50-60/Hz, single phase for units below 2.5 kW; 208, 380, 480 VAC, 3-phase for units above 2.5 kW

Output: Continually adjustable over the entire range from zero to rated voltage or current. Check chart for appropriate model.
Filament Power: 12 VAC, 5 A (other levels available)
Voltage Regulation: Line: ± 0.005% for 10% line change
Load: ± 0.005% for NL to FL change
Ripple: 0.1% pk-pk of rated output voltage
Emission Current Rise Time: < 0.5 sec from 5% -100%
Polarity: anode or cathode grounded, depending on customer requirement
Stability: 0.01% per hour after 1/2 hour warmup, 0.05% per 8 hr
Protection: overvoltage, overcurrent, arc and adjustable short circuit

XR Gen125-X-N or P 125 kV Current	XR Gen 140-X-N or P 140 kV Current	XR Gen 160-X-N or P 160 kV Current
0-10 mA	0-10 mA	0-10 mA
0-20 mA	0-20 mA	0-20 mA
0-30 mA	0-30 mA	
0-40 mA	0-40 mA	
0-50 mA		

XR-GEN 18000 (ROTATING ANODE) SERIES

High Voltage 18 kW Generator for Rotating Anode X-ray Systems



SYSTEM FEATURES

- Superior reliability and performance for today's high powered analytical x-ray applications
- More than 40 years' experience providing high voltage power conversion solutions
- Significant improvements over previously available designs at this power level
- Overvoltage, arc and short circuit protection
- 85% efficiency
- Low EMI and RFI
- RS-232 Interface option
- Modifications are available to meet specific x-ray system requirements

XR-GEN 18000 (Rotating Anode) SERIES THEORY OF OPERATION

The DEL XR-GEN 18000 is a high voltage generator dedicated to rotating anode x-ray systems, typically featured in analytical x-ray applications.

The proprietary DEL high frequency PWM switchmode technology enables switching at frequencies above 25 kHz to drive the superior performance and reliability of this unit. The combination of a patented control system and field-proven protection circuitry enables this unit to operate under arcing and extreme transient conditions without damage or interruptions. The DC output voltage and emission current are continuously adjustable from zero to the maximum rating, via front panel or remote controls. DEL Electronics has been an industry leader in providing high voltage, high power products for a broad range of applications.

(XR-GEN 18000 SERIES CONTINUED ON NEXT PAGE)

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(XR-GEN 18000 SERIES CONTINUED)

PERFORMANCE SPECIFICATIONS

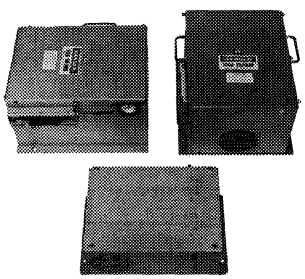
Input Voltage: 208/380 VAC, 3-phase, ± 10%, 50/60 Hz
High Voltage Output: negative 0 - 60 kV
Emission Current Output: 0 - 300 mA
Output Voltage Regulation:
Line: ± 0.005% for ±10% input line change
Load: ± 0.005% for NL to FL change
Output Voltage Ripple: 0.5% pk-pk
Stability: 0.05% per 10% input voltage variation at frequency changes <1 Hz
Efficiency: greater than 85% at maximum power
Emission Current Regulation:
Load: 0.2% for NL to FL change
Filament Power: 0 - 15 VAC, 15 A
Bias Output Voltage: 0 - 1 kV
Bias Current: 0 - 5 mA
Bias Ripple: 0.5% RMS

PHYSICAL SPECIFICATIONS

2 Sections:
Driver: 10″H x 22″D x 19″ rack (25.4 x 55.9 x 48.2 cm)
High Voltage: 14″H x 22″D x 19″ rack (35.6 x 55.9 x 48.2 cm)
Weight: 300 lb (136 kg)

XR-GEN CT SERIES

6 to 36 kW Gantry Mountable X-ray Generator for Helical CT & Double Ended Applications



SYSTEM FEATURES

- Compact, modular Gantry mountable system for CT scanner applications
- "3 module"- design includes anode, cathode and power conditioner for low-line protection
- Field-proven, high frequency switchmode technology with over 10 years system experience
- Precise ripple for improved image enhancement quality
- Proprietary control and protection circuitry for top performance in arc over conditions
- Units can be modified to meet specific system requirements, including higher voltage levels
- Cost-effective for today's competitive market place

XR-GEN CT SERIES THEORY OF OPERATION

The DEL XR-Gen-CT Series is now being offered for Helical CT scanner applications. Our high performance design has been used by leading medical system manufacturers located around the world.

This cost-effective system incorporates proprietary, high frequency PWM switchmode technology, operating at frequencies above 25 kHz.

The unit consists of an integrated dual filament for small and large focal spot selection. These compact, lightweight x-ray generators are ideal for spiral scanning systems where high performance, high voltage is of the utmost importance.

PERFORMANCE SPECIFICATIONS

Input Voltage: 208/380/480 Vac, 50/60 Hz, 3phase
Auxiliary voltage: 120 VAC, single-phase
Output Voltage: ±75 kV (150 kV total)
Emission Current: depending on model
Output Power: models ranging from 6-36 kW
Output Voltage Regulation: Load: ±0.1% maximum for 0 to full load variation
Emission Current Regulation: Load: ± 0.1% maximum for 0 to full load variation
Output Voltage Accuracy: ± 0.5%
Duty Cycle: 25% maximum for full power
Efficiency: greater than 85% maximum,
Stabilizing Time: The output voltage will be in regulation in less than 50 mS from the rise of the input command signal
Maximum stored energy in HV: -10 Joules
Dual Filament: small and large focal spot. Selection: 20 VAC @ 7A maximum (25 kHz)
System Fault: exposures will be inhibited or terminated in the event of a system fault detected by the system controller

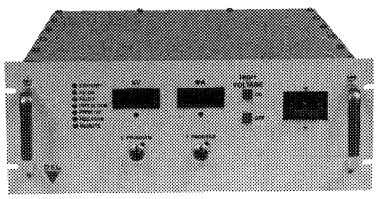
Models	Voltage	Emission Current (mA)
6 kW XR Gen CT 6000	± 75	50
15kW XR Gen CT 15000	± 75	100
24 kW XR Gen CT 24000	± 75	200
36 kW XR Gen CT 36000	± 75	300

Note: Custom units are available with higher voltage and power levels. Please contact factory for assistance.

DEL ELECTRONICS CORP.
One Commerce Park, Valhalla, NY 10595
(800) 811-0638 • (914) 686-3600 • Fax (914) 686-5424
www.delpower.com • sales@delpower.com

XR-3000D/XR-3000F SERIES

3 kW X-ray Generator for Diffraction and Fluorescence Applications



SYSTEM FEATURES

- Vast improvements over previously available technology
- Model XR-3000D for x-ray diffraction applications
- Model XR-3000F for x-ray fluorescence applications
- Full adjustment from front panel or remote control for both beam voltage and emission current
- Compact size, lightweight
- Provision for water flow, vacuum and safety interlock inputs
- X-ray on lamp and water flow control outputs
- Solid encapsulants guarantee maintenance free operation
- Flexibility of design to accommodate varied system requirements

XR-3000 (D OR F MODELS) SERIES THEORY OF OPERATION

DEL Electronics now offers its expertise in analytical x-ray to provide the DEL XR-3000D and XR-3000F generators for diffraction and fluorescence applications.

This series incorporates our proprietary, high frequency switchmode technology to provide DC high voltage at switching frequencies greater than 25 kHz. These units contain an integrated filament supply and the control circuitry required for filamentry emission control. Constant beam current or constant beam power modes are user selectable.

DEL is able to modify these units for specific customer requirements. We offer over 40 years' experience and skill in high voltage power conversion to offer an improved x-ray unit from what has been previously available at reasonable cost.

PERFORMANCE SPECIFICATIONS

Input Voltage: 220 Vac, single-phase, ±10%, 50/60 Hz
High Voltage Output: XR-3000D - 0 to 60 kV, negative / XR-3000F - 0 to 60 kV, positive
Maximum Output Power: 3 kW
Output Voltage Regulation:
Line: ±0.05% for ±10% input line change
Load: ± 0.05% for NL to FL change
Emission Current Regulation:
Line: ±0.05% for ±10% input line charge
Load: ± 0.01% for NL to FL line change
Ripple: 0.05% RMS
Filament Power: 0 to 7.5 VDC, 0 to 7 A
Stability: 0.01% per 8 hr., after 1/2 hr. warm-up
Efficiency: 85%

PHYSICAL SPECIFICATIONS

Size: 7″H x 20″D x 19″ rack (17.8 x 50.8 x 48.3 cm)
Weight: 90 lb (40.8 kg)
• **Front panel control and metering:**
Potentiometers are provided for tube voltage, tube current limit and filament current limit. Front panel switches include power On, x-ray On/Off.
Status Indicators on front panel:
- Power On
- Enable
- Interlock On/Off
- Overvoltage
- Overcurrent
- Arc indicator

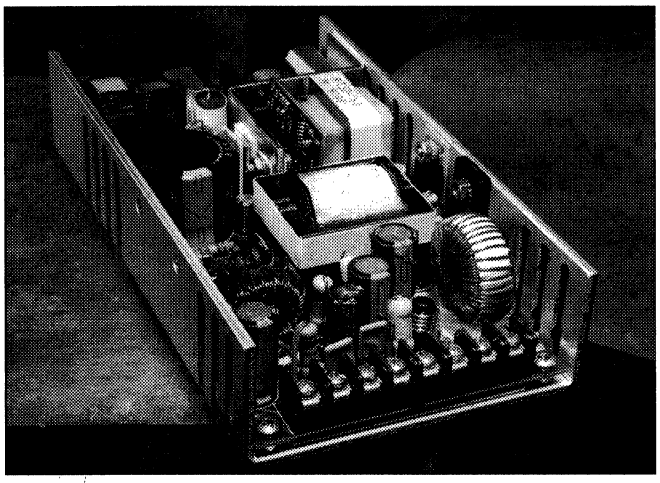
Remote Interface: Independent 0 to + 5 V inputs for 0 to maximum voltage and current outputs.
Accuracy is ± (0.1% of setting + 0.1% of maximum).
The programming input impedance is greater than 1MΩ.
Monitor: Two 0 to + 5 V outputs, proportional to 0 to maximum high voltage and current output.
Accuracy is ± 0.1% of reading for voltage, and ± 0.25% of reading for current. The monitor output impedance is 10kΩ.

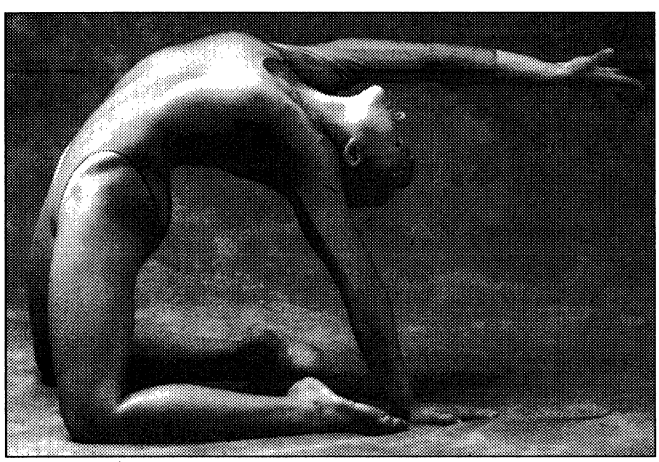
ADDITIONAL FEATURES

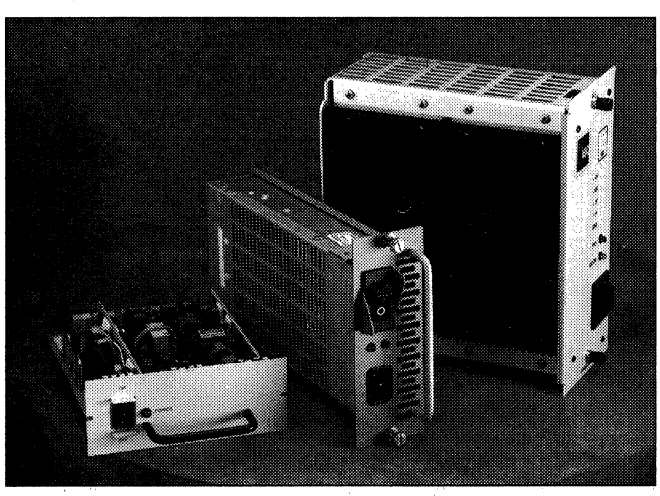
Safety Lamp Output: A safety lamp output is provided. High voltage operation can not proceed without the safety lamp illuminated.
Water Flow Control: A water flow control output is provided. Filament operation can not proceed without a water flow interlock input.
Safety Interlocks: Provision for safe reliable operation to be dependent upon appropriate input of external interlocks is included.
• **Rear panel controls:**
Water flow switch (24 VDC signal to turn on cooling water to x-ray tube), fail safe interlock (24 VDC signal to energize an external x-ray on lamp. This feature will operate when high voltage is turned On).
• **Output connection:** 75 kV, 3 conductor Federal standard x-ray connector

Digital Power Corporation

Digital Power, Corporation
41920 Christy Street
Fremont, CA 94538
510-657-2635 phone
510-657-6634 fax
Website: www.digipwr.com
E-mail: sales@digipwr.com







Digital Power switching power supplies use

- Rugged double sided PC boards with plated through holes
- Premium grade 105°C electrolytic output caps
- Robust, reliable two-transistor forward and half-bridge designs
- Low cost Mexican and Chinese manufacturing centers

flexibility SERIES

- Safety approvals remain intact
- $250 documentation charge
- Standard, modified and custom switchers, 1-4 outputs
- 50W to 350W
- Active Power Factor Correction
- CE certification
- UL544 and UL2601 medical approvals
- 3-6 week modified standard configuration turnaround

Value Added SERVICE

- Custom sheet metal including front panel with handle
- Hot swappable chassis & connectors
- Output isolation OR'ing diodes
- AC line switch/filter
- Fan with speed control, overtemperature shut off
- Inhibit/enable

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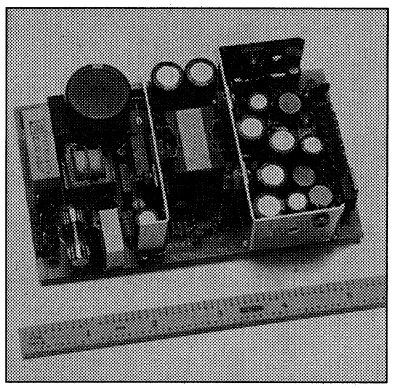
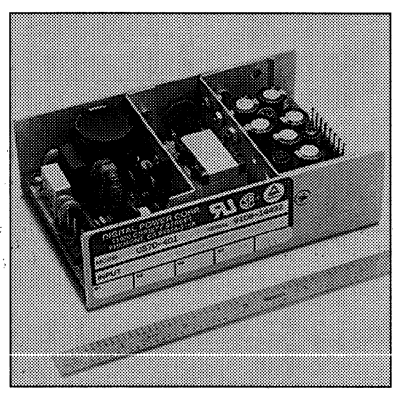
Website: www.digipwr.com
E-mail: sales@digipwr.com

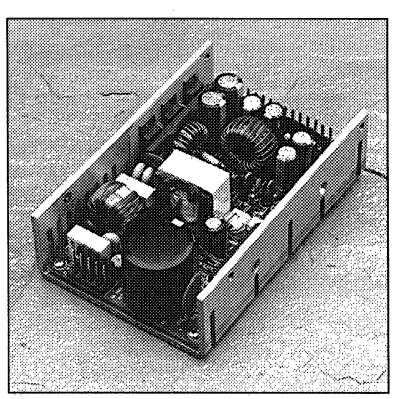
Base model description	Input Voltage/Model Number (many more models available-contact the factory)				Output Rating
	90-264VAC	+12VDC	+24VDC	+48VDC	
50W CE certified Medical[c] (UL544) 5.0"x3.0"x1.2"	US50-105	DN50-105[a]	DM50-105[b]	DP50-105	+5V @ 10.0A
	US50-112	DN50-112[a]	DM50-112[b]	DP50-112	+12V @ 4.2A
	US50-124	DN50-124[a]	DM50-124[b]	DP50-124	+24V @ 2.0A
	US50-201	DN50-201[a]	DM50-201[b]	DP50-201	+5V @ 5.0A +12V @ 2.0A
	US50-301	DN50-301[a]	DM50-301[b]	DP50-301	+5V @ 5.0A +12V @ 2.0A -12V @ 1.0A
	US50-401	DN50-401[a]	DM50-401[b]	DP50-401	+5V @ 5.0A +12V @ 2.0A -12V @ 1.0A -5V @ 0.5A
flexibility options	US50	DN50	DM50	DP50	V1: ±3.3V to ±48V V2: ±2V to ±48V V3: ±2V to ±48V V4: ±2V to ±48V
	Specify a 50W switcher with custom output voltages and retain safety agency approval				



70W CE certified Medical[c] (UL544) 5.0"x3.2"x1.5"	US70-105	DN70-105[a]	DM70-105[b]	DP70-105	+5V @ 10.0A
	US70-112	DN70-112[a]	DM70-112[b]	DP70-112	+12V @ 5.0A
	US70-124	DN70-124[a]	DM70-124[b]	DP70-124	+24V @ 2.7A
	US70-201	DN70-201[a]	DM70-201[b]	DP70-201	+5V @ 7.0A +12V @ 4.0A
	US70-301	DN70-301[a]	DM70-301[b]	DP70-301	+5V @ 8.0A +12V @ 4.0A -12V @ 2.0A
	US70-401	DN70-401[a]	DM70-401[b]	DP70-401	+5V @ 7.0A +12V @ 4.0A -12V @ 2.0A -5V @ 2.0A
flexibility options	US70	DN70	DM70	DP70	V1: ±3.3V to ±48V V2: ±2V to ±48V V3: ±2V to ±48V V4: ±2V to ±48V
	Thousands of semi-custom 70W models available for only $250 documentation fee				



100W CE certified Medical[c] (UL544/UL2601) 5.0"x3.3"x1.5"	US100-105	DN100-105[a]	DM100-105[b]	DP100-105	+5V @ 15.0A
	US100-112	DN100-112[a]	DM100-112[b]	DP100-112	+12V @ 8.0A
	US100-124	DN100-124[a]	DM100-124[b]	DP100-124	+24V @ 4.0A
	US100-201	DN100-201[a]	DM100-201[b]	DP100-201	+5V @ 15.0A +12V @ 6.0A
	US100-301	DN100-301[a]	DM100-301[b]	DP100-301	+5V @ 10.0A +12V @ 2.0A -12V @ 1.0A
	US100-401	DN100-401[a]	DM100-401[b]	DP100-401	+5V @ 5.0A +12V @ 2.0A -12V @ 1.0A -5V @ 0.5A
flexibility options	US100	DN100	DM100	DP100	V1: ±3.3V to ±48V V2: ±2V to ±48V V3: ±2V to ±48V V4: ±2V to ±48V
	Get the semi-custom voltages you want without giving up the safety agency approval you need				



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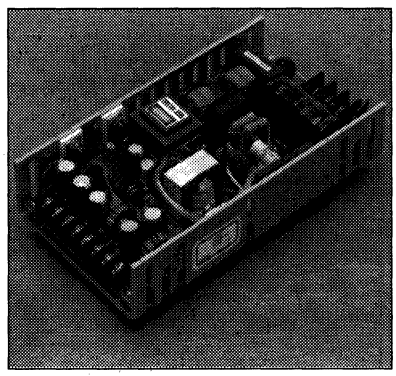
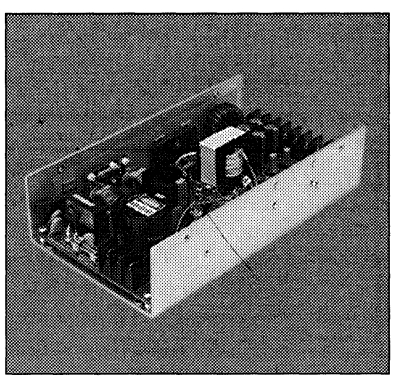
Website: www.digipwr.com
E-mail: sales@digipwr.com

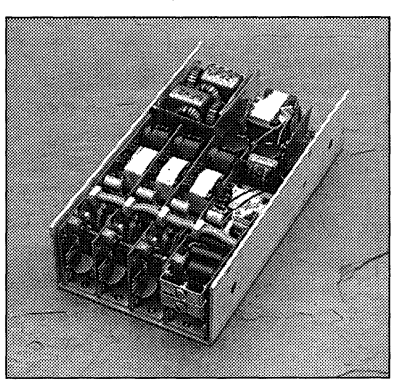
Base model description	Input Voltage/Model Number (many more models available-contact the factory)				Output Rating
	90-264VAC	+12VDC	+24VDC	+48VDC	
150W PFC[d] CE certified 6.8"x3.8"x1.5"	US150-105	DN150-105[a]	DM150-105[b]	DP150-105	+5V @ 25A
	US150-201	DN150-201[a]	DM150-201[b]	DP150-201	+5V @ 20A +12V @ 8A
	US150-301	DN150-301[a]	DM150-301[b]	DP150-301	+5V @ 20A +12V @ 8A -12V @1A
	US150-401	DN150-401[a]	DM150-401[b]	DP150-401	+5V @15A +12V @ 6A -12V @1A -5V @1A
flexibility options	US150	DN150	DM150	DP150	V1: ±3.3V to ±48V V2: ±2V to ±48V V3: ±2V to ±48V V4: ±2V to ±48V
	This is where you can specify custom output voltages without giving up safety agency approval				



250W PFC[d] CE certified Medical[c] (UL544/UL2601) 8.0"x4.5"x2.0"	US250-112	DM250-112[b]	DP250-112	+12V @ 30A
	US250-124	DM250-124[b]	DP250-124	+24V @ 12.5A
	US250-205	DM250-205[b]	DP250-205	+5V @ 30A +5V @ 15A
	US250-201	DM250-201[b]	DP250-201	+5V @ 30A +12V @ 12A
	US250-301	DM250-301[b]	DP250-301	+5V @ 30A +12V @ 12A -12V @ 2.5A
	US250-401	DM250-401[b]	DP250-401	+5V @ 30A +12V @ 8A -12V @ 2.5A -5V @ 2.5A
flexibility options	US250	DM250	DP250	V1: ±3.3V to ±48V V2: ±2V to ±48V V3: ±2V to ±48V V4: ±2V to ±48V
	It's quick and easy to get custom ouput voltages with instant safety approval			



300W PFC[d] CE certified 8.0"x4.5"x2.0"	UP300-105	+5V @ 50A
	UP300-112	+12V @ 25A
	UP300-115	+15V @ 20A
	UP300-124	+24V @ 12.5A
	UP300-148	+48V @ 6.2A
	UP300-201	+5V @ 40A +12V @ 12A
flexibility options	UP300	V1: ±3.3V to ±48V V2: ±2V to ±48V
	Just a $250 documentation fee for your choice of output voltages plus safety approval	

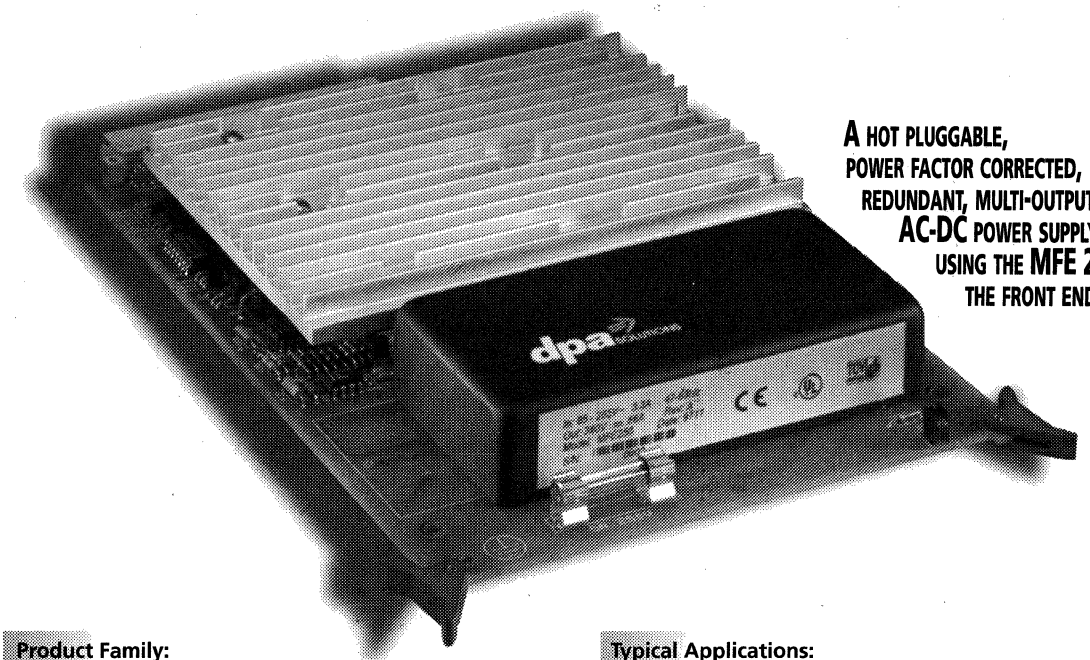


350W PFC[e] CE certified 9.0"x5.0"x2.5"	US350-205	5V @ 50A 5V @ 20A
	US350-401	5V @ 50A 12V @ 3A 12V @ 15A 5V @ 5A
flexibility modules	*Select your outputs from these US350 modules while retaining product safety approval*	3.3V @ 20A 5V @ 50A 12V @ 15A 13.5V @ 6A 15V @ 12A 24V @ 8A 48V @ 1.5A

Note a: 12V input models are subject to 50% derating. Contact the factory for details.
Note b: 24V input models are subject to 20% derating. Contact the factory for derails.
Note c: Models available with UL544 and UL2601 medical approval.
Note d: PFC optional. contact the factory for details.
Note e: PFC included. All US350 outputs are floating and can be referenced as either positive or negative.

FRONT END CONVERTERS FOR POWERING YOUR DC-DC MODULES

FULLY INTEGRATED • PFC • BOARD MOUNTABLE



A HOT PLUGGABLE, POWER FACTOR CORRECTED, REDUNDANT, MULTI-OUTPUT AC-DC POWER SUPPLY CARD USING THE MFE 250 AS THE FRONT END.

Product Family:
- Modular Front End Series (MFE)

Models:
- MFE 250: 250 W
- MFE 500: 500 W
- MFE 750: 750 W
- MFE 1400: 1400 W

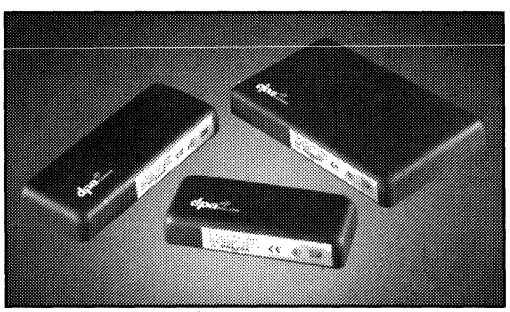
Description:
- The MFE is the first fully integrated, board or chassis mountable, AC-DC front end converter for powering DC-DC modules. There is NO need for additional EMI filtering or bulk capacitance.

Key Features:
- **Power factor correction**
- **Class B EMI compliance**
- **Integral hold-up capacitors (16mS minimum)**
- **Complete safety agency approvals including CE mark**
- Regulated output voltage
- Integral phase control for inrush limiting, current limit, input overvoltage protection, and short circuit protection.
- Low profile 1.1" to 1.5"
- No additional heatsinks required
- 100°C operating temp.
- Auxiliary supply output
- Complete monitoring signals
- Overtemperature warnings and shutdown

Typical Applications:
- Hot plug AC-DC power supplies
- Telecom front ends
- Distributed architectures
- Quick turn designs

Other Applications:
- Industrial motor controls
- System upgrades for EMC compliance

Optional Configurations:
- Chassis mount interface with terminal blocks
- Integral IEC receptacles and fuses



MFE PRODUCT FAMILY

CE c UL us VDE

dpa SOLUTIONS

33 Comac Loop, Ronkonkoma, NY 11779
Tel: (516) 471-6300 • Fax: (516) 471-0101
http://www.dpasolutions.com
sales@dpasolutions.com

ISO 9001 CERTIFIED

DYNAGE Power & Magnetics

Division of Oakleaf, Inc.
551 Third Avenue, P.O.Box 95
Canistota, SD 57012
Tel:(605)296-3462
Fax:(605)296-3231

Web Site: www.dynage.com *E-Mail: sales@dynage.com*

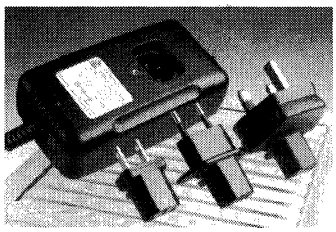
Regulated DC Power Supplies

Switching Regulated (worldwide)

Wall Plug-in with Interchangeable Plug Adapters

- **Up to 30 watts output**
- **Size 126 X 70 X 45 mm**

Patent Pending



Universal input of 88 to 264 vac and with interchangeable plug adapters to be able to match the wall receptacle of any country in the world.

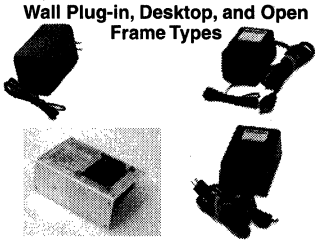
Switching Regulated DC Power Supplies

Wall Plug-in, Desktop, and Open Frame Types

Catalog product line consists of: (a) wall plug-in models of 7.5 watts through 30 watts, (b) desktop models of 7.5 watts through 100 watts, and (c) open frame models of 7.5 watts through 100 watts.

Linear Regulated

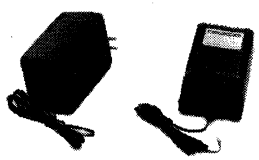
Wall Plug-in, Desktop, and Open Frame Types

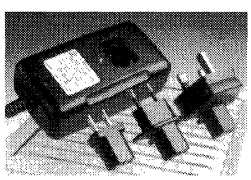


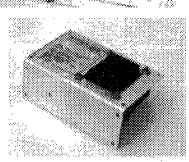
Catalog product models consist of: (a) wall plug-ins up to 12 watts, (b) desktops up to 20 watts, and (c) open frames, including Q Series, up to 100 watts.

Battery Chargers

Sealed Lead-Acid Chargers



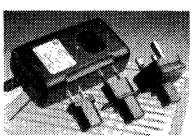


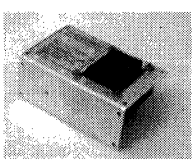


- **Switching and Linear Regulated Models**
- **Wall Plug-in, Desktop, and Open Frame Types**
- **Single and dual mode models offered**
- **Universal input wall plug-in is offered with interchangable plug adapters** (patent pending)

Nickel-Cadmium (& NI-MH) Chargers

- **Switching and Linear Regulated Models**
- **Wall Plug-in, Desktop, and Open Frame Types**
- **Models available with microprocesor-based charge control**
- **4C to C/20 charge rates are offered**
- **Universal input wall plug-in is offered with interchangable plug adapters** (patent pending)



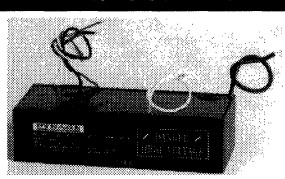


High Voltage DC Power Supplies

HV DC/DC Converters

- 12VDC or 24VDC Input
- Constant current or constant voltage output
- Output voltages to 100 KVDC
- Output currents to 20 mA

HV AC/DC Converters



- 100, 120, 220, 230, or 240 VAC Input
- Constant current or constant voltage output
- Output voltages to 100 KDVC
- Output current to 20 mA

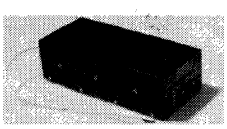
Custom HV Power Supplies

APPLICATIONS INCLUDE:

Laser Ignition	Photomultiplier Tubes
Electrostatic Precipitators	CRT's
Capacitor Charging	Neon Tubes
X-Ray Services	Electrophoresis
Pulsed Lasers	CW Lasers
Arc Lamps	Flocking
Ionizer Sources	Ion Pumps

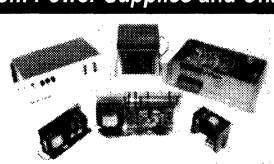
Other Power Supplies & Battery Chargers

Electric Vehicle SLA Battery Chargers



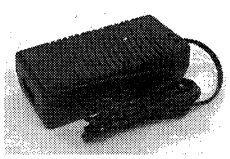
- Enclosed • Rain Resistant
- Switch-mode type
- 200, 400, 800, and 1200 watt versions are offered for various battery voltages
- Special charge protocols can be accomodated
- "State of charge" meters also available

Custom Power Supplies and Chargers



- Dynage will design, to your specifications, for a wide range of applications. At Dynage, custom power supplies any chargers are professionally designed and skillfully manufactured to achieve outstanding reliability and performance.

SLA Battery Charger (worldwide)

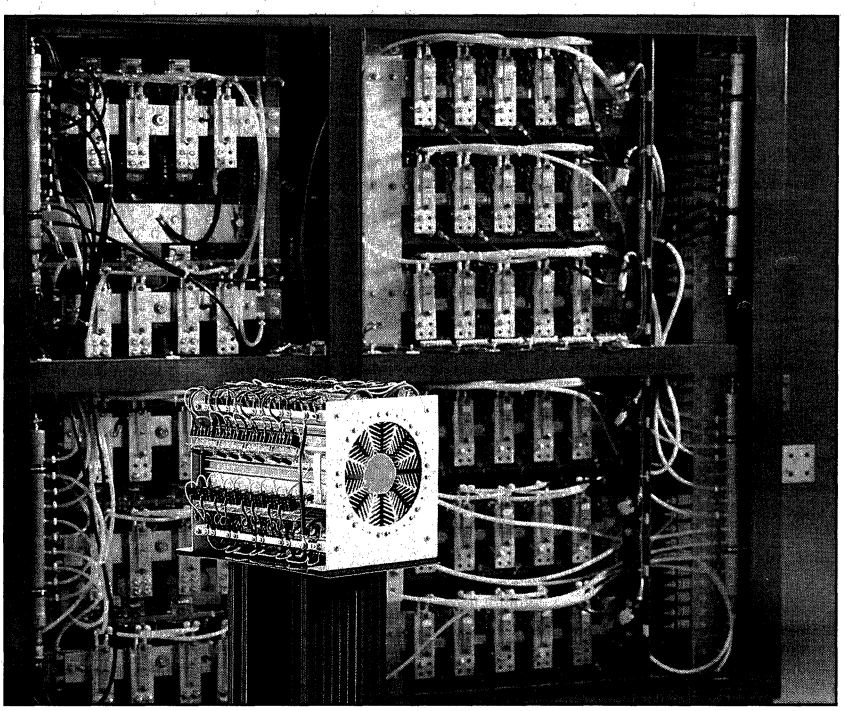


- Catalog models offered
- Single mode and dual mode models offered
- For 6, 12, 24, and 48 v batteries
- Desktop unit with IEC320 input connector
- Up to 40 watts in desktop

LOW PRICES ***Call or FAX us with your requirements! Ask for product bulletins.*** ***HIGH QUALITY***

The Precision Decision...

Our Laboratory Systems



Features
- Regulated Voltage
- Regulated Current
- Remote Current Programming
- Remote Voltage Programming
- Overvoltage Protection
- Constant Current Control
- Constant Voltage Control
- Automatic Crossover
- Step Start System
- Phase Loss Indication
- Overtemperature Protection
- Digital Meters
- 10 Turn Potentiometers

Operational Ranges
Output:
- Up to 30,000 A
- Up to 1,000 V
- Up to 1,000 kW systems

Input:
- 115-600 VAC
- Phase: 1 or 3
- 50 or 60 Hz
- Special inputs up to 25 kV

Operation
- Single Quadrant
- Bipolar
- Two Quadrant
- Four Quadrant
- Parallel
- Series

Specifications

Control
SCR– Primary or secondary SCR regulated units are available. These units feature dependable, reliable heavy duty construction.

SCR with transistor voltage bucker filter – Ultra low ripple with fast response time is achievable using an SCR supply followed by an active voltage bucker filter.

Transistor – Full series pass transistor regulators are available up to 10 kW. Also available in almost an unlimited range are full series pass transistor regulators with either SCR or variable autotransformer pre-regulators.

Regulation Range
Voltage Regulator (line effect)
.1% – .01% of rating
Voltage Regulator (load effect)
.1% – .01% of rating
Current Regulator (line effect)
.1% – .001% of rating
Current Regulator (load effect)
.1% – .001% of rating
Stability
.1% – .001%
Tempco better than 3 ppm per °C

Programming
Digital programming is achievable through IEEE 488, RS 232, RS 422 and RS 485 or custom designed interfaces. Programming is achievable with up to 18 bit resolution for current, voltage or both.

Systems
Dynapower has engineered and installed entire precision power systems for laboratories and research facilities around the world. This includes power supply design, system programming and on-site installation. Dynapower ensures that the power supply is capable of operating with a floating ground. All systems use ultra-stable components to ensure overall system stability. We welcome opportunities where special design and engineering are required.

Cooling

Forced Air
Special care is taken in the design of air-cooled rectifiers. Totally enclosed ball bearing motors are used to drive shrouded fan blades and deliver a maximum volume of air over the semiconductors and transformers. Electronic components are separated from the hot air flow by internal panels. This electronic and thermal isolation increases the life of the electronics and eases maintenance.

Liquid Cooling
Dynapower has led the industry in the development of liquid cooling. Only electrolytically pure copper components are used for heat sinks and busing. Dynapower manufactures all of its own copper heat sinks to ensure their reliability and long-term performance. Strict attention is given to design and construction to ensure that the maximum amount of heat is removed from each component.

Industrial Strength

Our Industrial Systems

Features
- Constant Current Control
- Constant Voltage Control
- Automatic Crossover
- Soft Start
- Remote Control Station
- Electrolytically Pure Copper Busing
- Electrolytically Pure Copper Transformers
- Heavy Duty Industrial Grade Construction
- Custom Designs Available

Operational Ranges

Output:
- Up to 75,000 A
- Up to 800 V
- Up to 5,000+ kW systems

Input:
- 220/440 or high voltage
- 3 Phase
- 50/60 Hz
- Special input available

Protection Features
- Electronic Short Circuit Detection
- I^2T Current Limiting Fuses
- Electronic Phase Imbalance Detector
- Thermal Overload Relays
- Diode Overtemperature Detection
- Thyristor Overtemperature Detection
- Transformer Overtemperature Detection
- Electronic DC Overload Detection
- Liquid-Cooled Units Only: Liquid Flow Detector Liquid Leak Detector

DYNAPOWER CORPORATION

Regulator Specifications

Low Voltage

Low voltage industrial rectifiers use primary thyristors for regulation. These thyristors are placed on the low current, high voltage primary side of the transformer. Each pair of devices is protected against voltage transients by a resistor capacitor snubber network.

High Voltage

High voltage industrial rectifiers use a number of parallel thyristors on the secondary side of the transformer. The thyristors are used at a minimum safety factor of 250% and are matched for similar current carrying characteristics. These techniques ensure efficiency and reliability.

Ripple

The DC output will contain a 5% RMS ripple when operated at rated voltage and rated current. Ripple filters are available to reduce output ripple.

Rating

All components are rated for 100% continuous full load service at 40°C ambient.

Power Factor

All units have a 90% power factor at rated output.

Cooling

Forced Air

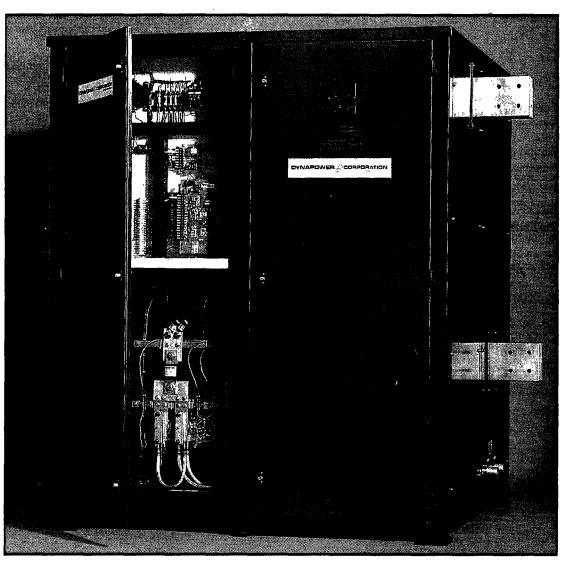
Harsh industrial conditions require that special care is taken in the design of air-cooled rectifiers. A maximum volume of air is delivered by totally enclosed ball bearing motors that are used to drive shrouded blades. Semiconductors and transformers are cooled by this forced passage of air. Internal panels separate the electronic components from the flow of hot air. Thermal and electronic parts are isolated for easier maintenance and increased life of the system.

Liquid Cooling

A leader in the development of liquid cooling, Dynapower uses only the highest quality materials in its manufacturing. All heat sinks and busing are made of electrolytically pure copper components to give dependable long-term performance. The design and construction are critical to secure the removal of the maximum amount of heat from each component.

Heat Exchangers

The availability of clean, low conductivity water is a problem in some locations. A closed-loop heat exchanger can be used to ensure the integrity of the unit. Using either an air-to-liquid or liquid-to-liquid heat exchanger, the proper cooling for the unit is available while guaranteeing the circulation of clean, low conductivity cooling throughout the unit.



Inside Left: (Rear) 180 kW full series pass transistor DC power supply regulated to 10 ppm. (Front) Bipolar transistor bank with regulation of 10 ppm.

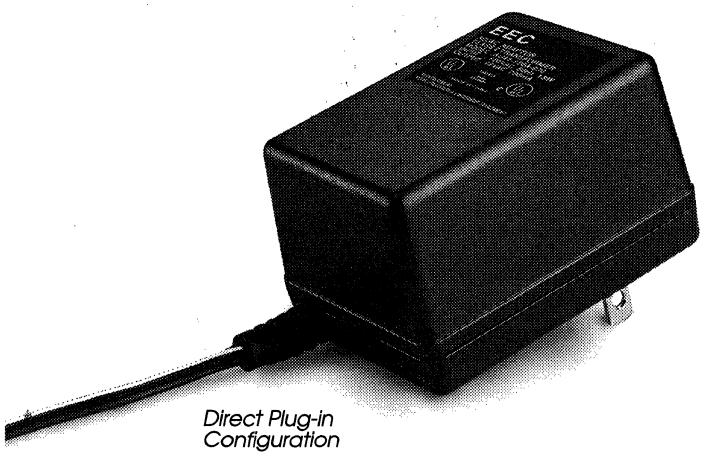
Inside Right: 240 kW industrial grade DC power supply featuring complete solid state design, water cooling and heavy duty construction.

P.O. Box 9210 ■ South Burlington, VT 05407 ■ (802) 860-7200 ■ 1-800-292-6792 ■ FAX: (802) 864-3782
23890 Industrial Park Drive ■ Farmington Hills, MI 48335 ■ (810) 471-1800 ■ FAX: (810) 471-1862

AC Adapter Series

Eastland Electronics Co., Inc.

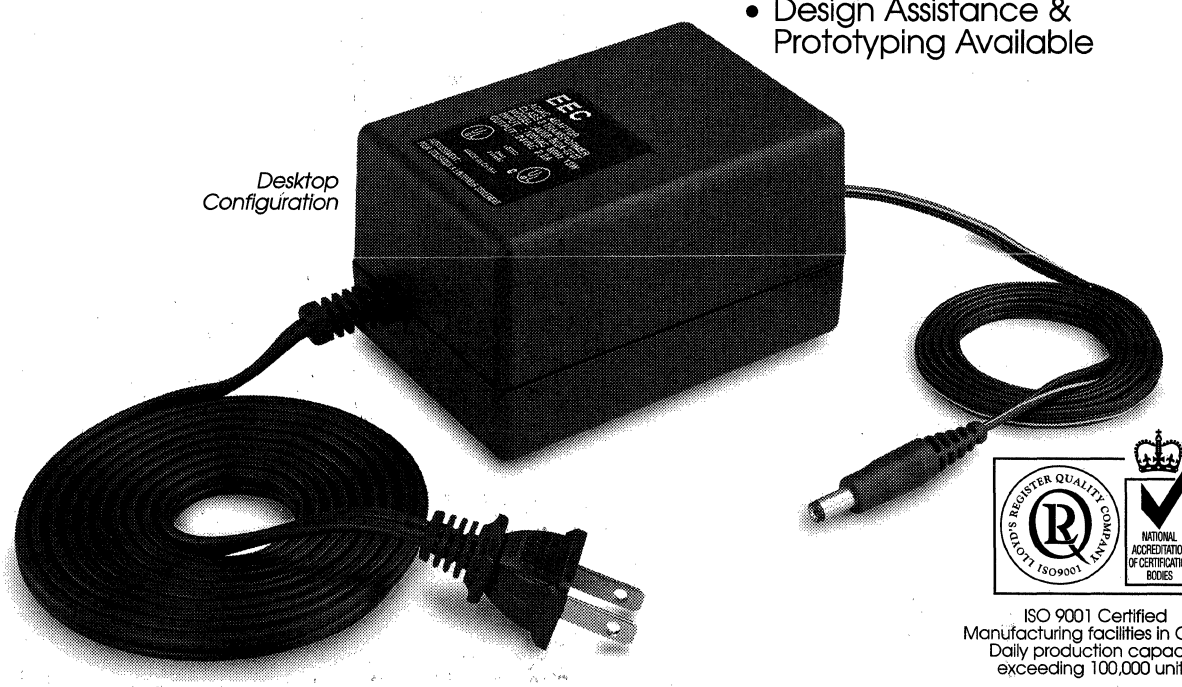
The Widest Selection of Standard & Custom Designed AC & DC Power Supplies



Direct Plug-in Configuration

- AC/DC Output
- Regulated or Unregulated Output
- Direct Plug-in or Desktop
- All North American Models UL, cUL or CSA Listed
- All European Models TUV Approved & CE Marked
- Adapters for U.K., Australia & Japan Available
- ISO 9001/2 & BABT Certified Production Facilities
- Design Assistance & Prototyping Available

Desktop Configuration



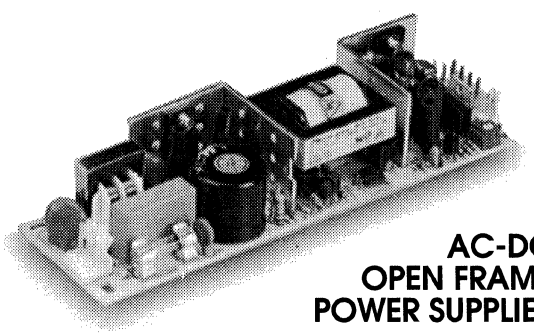
ISO 9001 Certified
Manufacturing facilities in China.
Daily production capacity
exceeding 100,000 units.

LISTED AND LISTED

AC Adapter Series

UNIVERSAL SWITCHING POWER SUPPLIES

- 90-264 VAC Input
- ± 2% Line Regulation
- ± 5% load Regulation
- Single and Multiple Outputs
- UL, CSA, TUV, CE
- Available in Direct Plug-in Configuration



AC-DC OPEN FRAME POWER SUPPLIES

OTHER QUALITY PRODUCTS AVAILABLE:

- Linear Power Supplies
- Custom Designed Cable Assemblies
- Open Frame Switching Power Supplies
- AC Cord Sets
- Power Transformers
- Plugs, Jacks, & Connectors
- DC-DC Converters
- Telephone Coupling Transformers

Call, Write or Fax for our Power Components Catalog

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300 Wheeler Road • Hauppauge, NY 11788 • (516) 232-2525 • Fax: (516) 232-2549
Visit us at www.eastlandny.com

EG&G OPTOELECTRONICS

LEADERSHIP in MILITARY and HIGH RELIABILITY Power Supplies

BOEING D1-9000
NAVMAT P-4855-A1

Defense and Aerospace

Militarized (Off-The-Shelf) (MOTS/COTS) and Full MIL

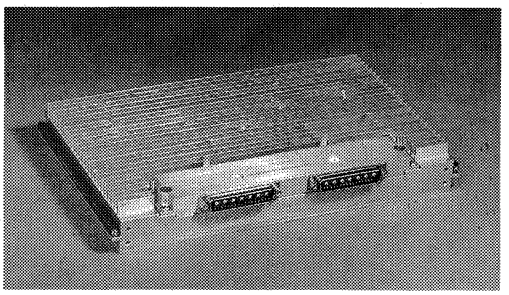
■ STANDARD ■ CUSTOM ■ APPLICATION SPECIFIC

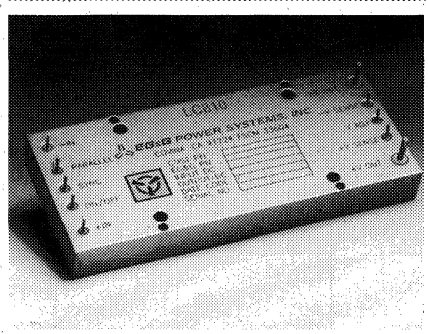
Power Supply Expertise-Over 30 Years of Power System Design and Manufacture
Charter Member of the Navy Ad Hoc Committee for Power Supplies (NAVMAT P-4855-1A)

VME...MULTI-MISSION POWER SUPPLIES (MOTS/COTS)

- ☐ *VME Chassis Standard 6U & 9U , 1 - 3 Slots*
- ☐ *Automatic Current Sharing (all outputs), N+1 Capabilities*
- ☐ *Versatile SMT Construction for Custom Configurations*
- ☐ *Single and Multiple Outputs to 400W*
- ☐ *AC or DC Inputs to MIL-STD-704 and DOD-STD-1399*
- ☐ *Universal Power Factor Correction to IEC555-2, THD<5%*
- ☐ *EMI to MIL-STD-461D, FCC 20780, Part 15, and VDE0871 - Level B*

Shown: 9U Size





HIGH DENSITY DC-DC CONVERTERS (MOTS/COTS & FULL MIL)

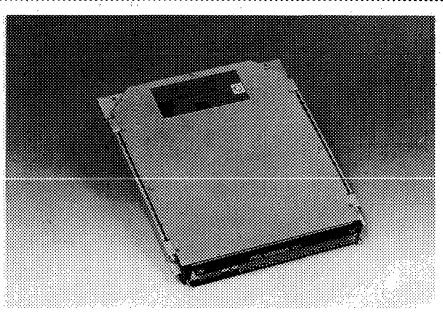
- ☐ *Full MIL Qualified*
  OR
- ☐ *Designed to Meet MIL Spec (COTS with -40°C to +85°C)*
- ☐ *125W, Single, Dual or Triple Outputs*
- ☐ *Fixed Frequency/Parallelable/ Synchronous Operation Pins*
- ☐ *On/Off Control*
- ☐ *MIL-STD-704 and MIL-STD-1275 Wide Input Range*
- ☐ *NAVMAT Derating and NAVINS ESS*
- ☐ *Ruggedized for Harsh Environment Applications*

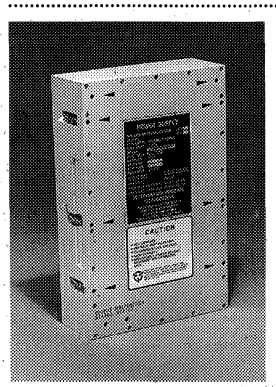
Shown: LC810 Series Model

SEM-E STANDARD AND CUSTOM PLUG-IN POWER SUPPLIES

- ☐ *Fully Conduction Cooled through Side Rails*
- ☐ *MIL-STD-1389 Compliant*
- ☐ *Plug-in Connectors*
- ☐ *1 - 7 Outputs, Up to 250W, Tailored to Your Requirements*
- ☐ *Low Profile: 0.58" or 1.18"*

Shown: SEM-E Size





NAVY STANDARD POWER SUPPLIES AND PERIPHERALS

- ☐ *7 Different Models to MIL-P-24764*
- ☐ *100,000 hr MTBF*
- ☐ *Meets US Navy's Most Rigorous Shock and Environmental Requirements (MIL-S-901, MIL-E-16400)*
- ☐ *Qualified by NSWC (Crane, IN)*
- ☐ *2.48" x 6.8" x 10.8"*
- ☐ *14 pounds maximum*
- ☐ *1KW, up to 3 Outputs*
- ☐ *Low Life Cycle Cost*

Shown: / 7 ("Slash Seven") Model

LEADERSHIP IN MIL- QUALIFIED AND SEVERE ENVIRONMENT POWER SYSTEMS
For additional information or to consult an Applications Engineer, Contact us at:
EG&G OPTOELECTRONICS • 1330 East Cypress Street, Covina, CA 91724 -2103
Tel: 626/967-9521 • Fax: 626/967-3151 • E-Mail: eod@egginc.com

ISO 9001 Certified

EG&G OPTOELECTRONICS

LEADERSHIP in MILITARY and HIGH RELIABILITY Power Supplies

BOEING D1-9000
NAVMAT P-4855-A1

Application - Specific Standard and Custom Products

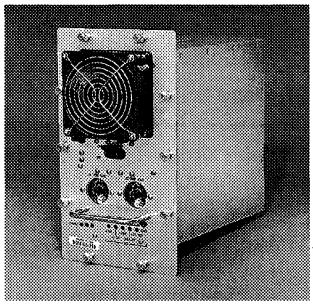
■ FULL MIL ■ MILITARIZED OFF-THE-SHELF (MOTS/COTS)
■ INDUSTRIAL-RUGGEDIZED/HARSH ENVIRONMENTS ■ LOW AND HIGH VOLTAGE
■ FAA ■ COMMERCIAL AIRCRAFT ■ MEDICAL ■ OPTOELECTRONICS

Power Supply Expertise-Over 30 Years of Designing and Building Power Systems
Charter Member of the Navy Ad Hoc Committee for Power Supplies (NAVMAT P-4855-1A)

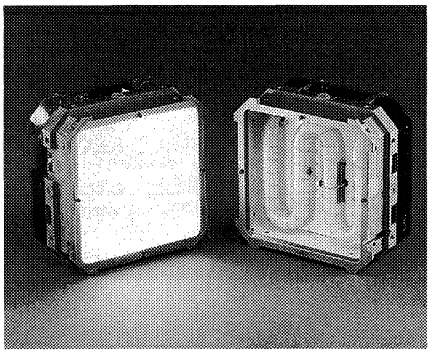
Unique and Demanding Applications - Industrial and Critical Requirements

FAA (FEDERAL AVIATION ADMINISTRATION) POWER SUPPLIES (COTS)

- ☐ *High Reliability*
- ☐ *N+1 Redundancy*
- ☐ *Self-Cooled*
- ☐ *Redundant Input Source Capability*
- ☐ *Up to 5 Outputs*
- ☐ *<5% Harmonic Input Currents*
- ☐ *"Hot Swap" Replacement Capability*
- ☐ *Fast Turnaround, High Volume Production*



Shown: Model PB3562



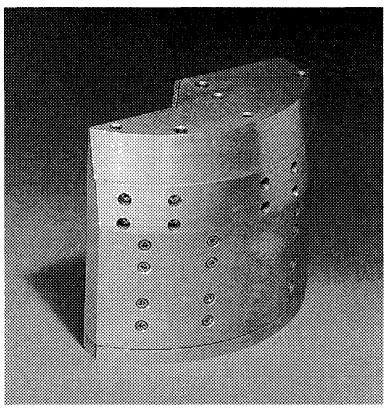
BACKLIGHT DRIVER ASSEMBLIES

- ☐ *Wide Dynamic Dimming Range - Night Vision Goggle to Sunlight Readable*
- ☐ *Hot or Cold Cathode Fluorescent Lamp Technology*
- ☐ *Digital Interface & Control Circuitry*
- ☐ *Military or Industrial Temperature Range*
- ☐ *Closed Loop Photopic Feedback Control Circuitry*
- ☐ *Mechanical Packaging Options*

Shown: 3-ATI Size

CUSTOM MUNITION POWER SUPPLIES

- ☐ *Low Cost*
- ☐ *High Density*
- ☐ *High Volume Production Capability*
- ☐ *Unique Packaging Configurations*
- ☐ *Harsh Environment Durability*
- ☐ *Mechanically Rugged - including Ballistic/Gunfire Shock*
- ☐ *High and Low Voltage*
- ☐ *DTUPC (Designed to Unit Production Costs)*



Shown: Brilliant Munition Model

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NOMOGRAPH VOLTAGE DROP

NOMOGRAPH OF VOLTAGE DROP ACROSS LOAD SUPPLY LEADS (as a function of wire size and load current)

THIS NOMOGRAPH CAN BE USED TO FIND:

Maximum current carrying capacity recommended for any standard wire size.*

1) With a straight edge, connect from the wire size on Scale 2 to the point "A" on Scale 3.
2) Read I_{max} on Scale 1.

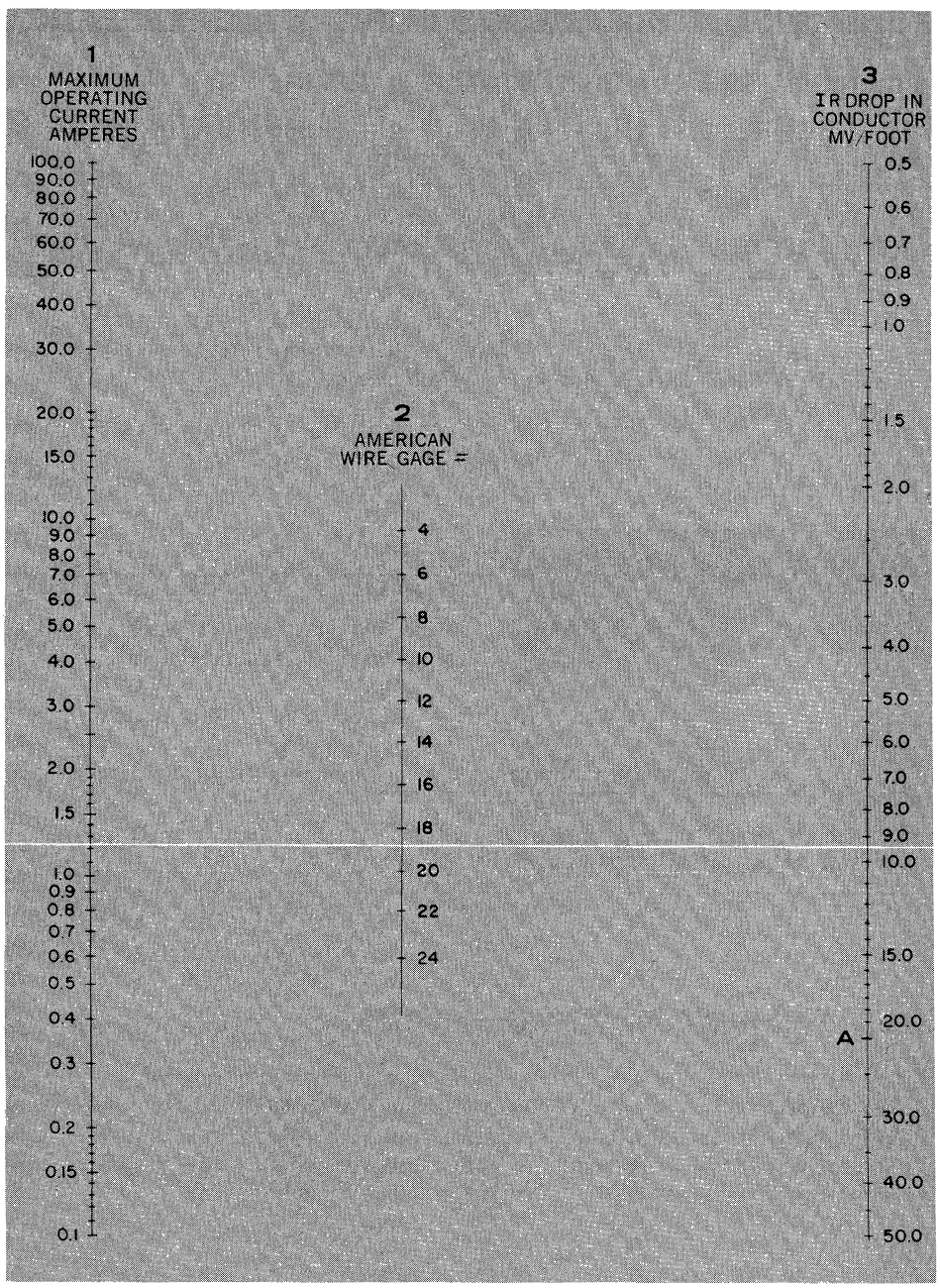
Voltage drop in millivolts per foot for known wire size and operating current.

1) With a straight edge, connect the known current on Scale 1 and the wire size on Scale 2.
2) Read voltage drop on Scale 3.

Wire size required for known operating current and known maximum tolerable voltage drop across supply leads.

1) Determine maximum tolerable drop in millivolts **per foot** of lead (sum of positive and negative leads).
2) Connect the value on Scale 3 (as determined in step 1) to the known current on Scale 1.
3) Read wire size on Scale 2.

** Based on an arbitrary minimum 500 circular mils per ampere. High-temperature class insulation will safely allow higher currents.*

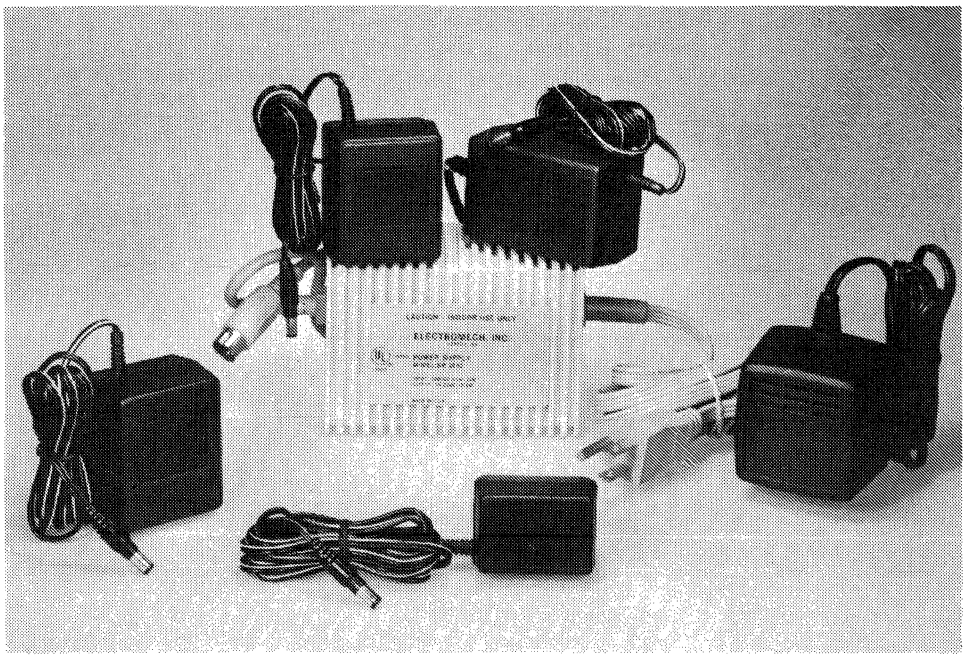


NOTE: A voltage stabilized Power Supply controls the voltage across its output terminals. Hence, the wire conductors used to connect the load must be considered as part of the load. At high load currents, the voltage drop across the supply leads may appreciably degrade stablization at the load. Kepco models equipped with the *remote error sensing* feature can automatically compensate for voltage drops of up to 500 mV across each load supply lead.

Electromech

POWER SUPPLIES

WALL PLUG-IN/DESK TOP POWER SOURCES • TAILORED TO YOUR EXACT NEEDS



- **FULL ISOLATION**
- **AC/AC**
- **AC/DC (unreg)**
- **AC/DC (reg)**
- **BATTERY CHARGERS**
- **LINEAR SUPPLIES**

FEATURES

Power—.1VA to 40VA (WALL PLUG-IN)
.1VA to 1KVA (DESK TOP)

Input—100VAC to 240VAC

Freq.—47Hz to 400Hz

Output—.1V to 200V (WALL PLUG-IN)
.1V to 1KV (DESK TOP)

Current—.01A to 5A (WALL PLUG-IN)
.01A to 400A (DESK TOP)

Termination—CONNECTORS, SCREW TERM. ETC.

SERVICES

- DESIGNED TO YOUR SPECIFICATIONS
- DESIGNED TO UL/CSA/VDE/IEC
- FIRST ARTICLE ENGINEERING SAMPLE WITHIN ONE (1) WEEK
- NO MINIMUM ORDER QUANTITY
- NO ENGINEERING CHARGE
- 100% Q.A.

Electromech — THE LAST WORD IN POWER SUPPLIES

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PRODUCT SELECTOR

LOW VOLTAGE-HIGH CURRENT

OUTPUT RANGES AVAILABLE

SERIES	TYPE OF POWER SUPPLY	VOLTAGE	CURRENT	POWER (kW)
ELS	High Density Switcher-Microprocessor Controlled	0-7.5 to 0-600	0-5 to 0-500	1.5 to 5
EMS	Switching Power Supply	0-7.5 to 0-600	0-3.5 to 0-600	0.6 to 5
ESS	Switching Power Supply	0-7.5 to 0-600	0-16 to 0-1000	10 to 15
TCR	SCR Power Supply	0-7.5 to 0-1500	0-1 to 0-900	0.5 to 10
EMHP	SCR Power Supply	0-10 to 0-600	0-30 to 0-3000	20 to 90
BOS/S	Bipolar (4 Quadrant)	0-20 to 0-200	0-1 to 0-20	100 to 400
MK	Single Output Power Supply	2 to 48	18 to 300	750 - 1500

HIGH VOLTAGE-HIGH CURRENT

OUTPUT RANGES AVAILABLE

SERIES	TYPE OF POWER SUPPLY	VOLTAGE (kV)	CHARGING RATE (J/s)	POWER (W)
500A	HV Capacitor Charging/ HV Constant Voltage	0-1 to 0-40	500	500
102A	HV Capacitor Charging/ HV Constant Voltage	0-1 to 0-40	1,000	1,000
152A	HV Capacitor Charging/ HV Constant Voltage	0-1 to 0-40	1,500	1,500
202A	HV Capacitor Charging/ HV Constant Voltage	0-1 to 0-40	2,000	2,000
402	HV Capacitor Charging	0-1 to 0-50	4,000	N/A
802	HV Capacitor Charging	0-1 to 0-50	8,000	N/A
XR	HV Capacitor Charging	0-1 to 0-50	4000-8000	N/A
XR-DC	HV Capacitor Charging	0-1 to 0-50	N/A	4000-10000
203	HV Capacitor Charging/ HV Constant Voltage	0-1 to 0-50	20,000	30,000
303	HV Capacitor Charging/ HV Constant Voltage	0-1 to 0-50	30,000	50,000
YD	YAG Arc Lamp Source	150/250V (35-50A)	N/A	4,6
ESKI	YAG Arc Lamp Source	150/250V (50-100A)	N/A	6,8,10

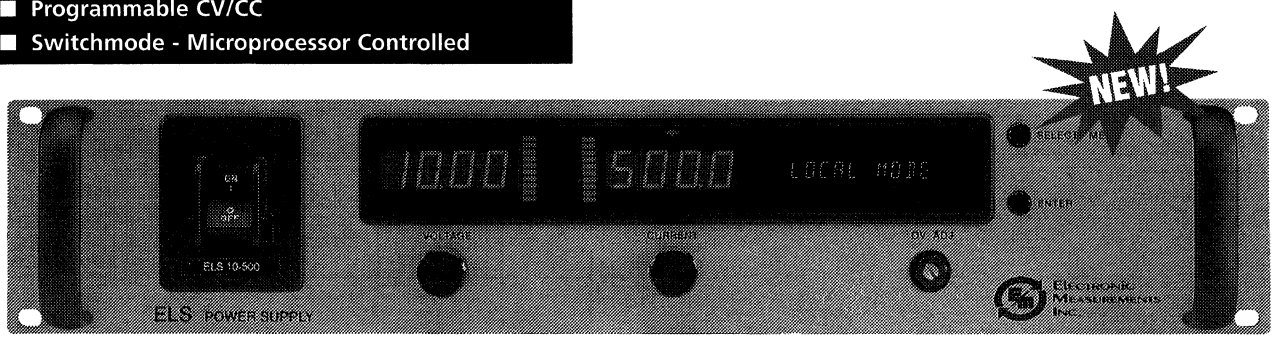
For other voltage/current/wattage requirements, consult factory.

PHONE: 732-922-9300 • FAX: 732-922-9334 • Internet: www.emipower.com

ELECTRONIC MEASUREMENTS INC.

THE ELS SERIES

- 3 KiloWatts - 5 KiloWatts
- Programmable CV/CC
- Switchmode - Microprocessor Controlled



Just the Beginning ... of a new technology. These 3-5 kW power supplies are the cornerstone of an entire new series.

A New Level Of Performance

The ELS Series represents the culmination of 50 years of engineering expertise in the development of switchmode power supplies for scientific, medical, burn-in and process control applications. ELS achieves a new level of performance, efficiency, package density and ease of use opening a wide variety of applications.

A New Standard Of Excellence

ELS is ***the*** power supply to which others will be compared. Main features include:

HIGHEST POWER PER CUBIC INCH — For wide range, rack mount, CV/CC power supplies — 50% improvement over prior models.
5.0 kW - 4.71 watts per in^3 (0.287 watts per cm^3) - 1061 in^3 (0.017 m^3) - 2U package

EASE OF USE - In addition to standard voltage and current meters, the front panel features a ten character intelligent information display for system programming, diagnostics, monitor, testing and safety status.

HIGH EFFICIENCY AND POWER FACTOR CORRECTED - Efficiency ranging from 84 to 92% depending on output voltage, with active power factor correction of up to 0.999. This means lower utility, installation and operating costs, reduced harmonic distortion and more reliable systems operation.

Technical Innovation

ELS utilizes the latest technologies (multiple patents applied for) to bring increased benefits to power supply users.
Microprocessor Based Controller
= Advanced Operator Control
Higher 100 kHz Switching Frequency
= Lower Noise, Smaller Size

Technical Innovation (continued)

Soft Switching Technology
= Lower Noise, Higher Efficiency
New Transformer Magnetics
= Smaller Size, Improved Reliability
Fewer Internal Power Cables
= Improved Reliability, Lower Noise

SPECIFICATIONS
Inputs: (±10%)

230 VAC Single Phase
208 VAC Three Phase
Consult factory for additional inputs.

Efficiency:

84 - 92% - depending on output voltage

Power Factor:

Single Phase Active PFC (optional) 0.999 nominal at full load
Three Phase Passive PFC (standard) 0.90 nominal at full load

Programming:

ELS power supplies respond either to the setting of the front panel controls or to external control signals. Zero to 10 volt programming is available as an option.

The standard RS232 interface allows the user to program and measure the output voltage and current of an ELS Supply via a computer. The local and remote programming signals are software selectable over the interface, along with a wide variety of monitor, protection, and diagnostic functions.

All these functions are addressed through the front panel or through standard RS232 communication programming interface via a D89 connector on rear panel or optional IEEE 488.2 interface.

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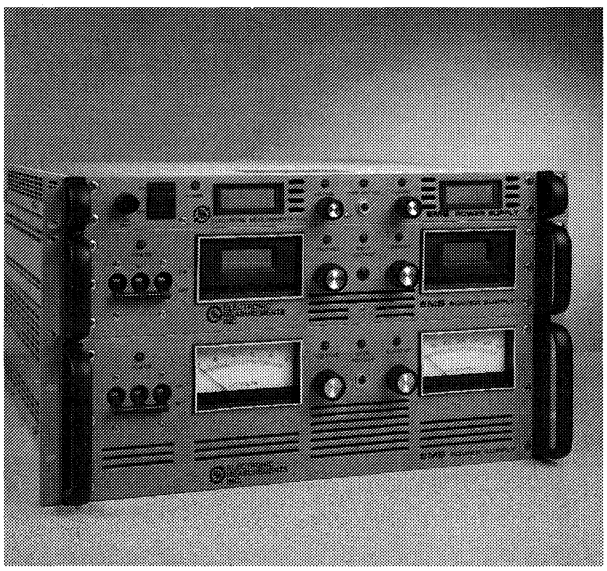
ELECTRONIC MEASUREMENTS INC.

THE EMS SERIES

CE

- 600 Watts - 5 KiloWatts
- Constant Voltage/Constant Current
- Programmable Switchmode Power Supplies



SPECIFICATIONS
Standard input voltage:

600 W models: 115 VAC (standard), 220 VAC (optional) single phase
1 kW models: 115 VAC (standard), 220 VAC (optional) single phase
2 kW models: 220 VAC, single phase
2.5 kW models: 220 VAC, single phase and 208 VAC, three phase (user selectable)
5 kW models: 208 VAC, three phase
All models 50/60 Hz
Softstart AC inrush
Consult factory for other inputs

Output characteristics

Regulation: 0.1%
Stability: 0.05%
Transient response: 650 microseconds for 30% load change (models up to 20 VDC)
Operating temperature: 0-50°C full output, derate above 50°C

Protective features

Overvoltage (up to 300 VDC outputs)
Overtemperature
Overcurrent

Programming

Front panel controls and remote analog resistance, voltage and current programming (standard); 0-5 V and 0-10 V (optional)
RS232 and IEEE-488 (optional)

Mechanical (all models 19" rack mountable)

600 W and 1 kW models: 1 3/4" H, 17" H, 15 lbs. (7 kg)
2 kW and 2.5 kW models: 3 1/2" H, 18" H, 30 lbs. (13 kg)
5 kW models: 5 1/4" H, 21" D, 60 lbs. (27 kg)

OUTPUT RATINGS			RIPPLE (mV) P-P CARRIER	MODEL NUMBER
WATTS	VOLTS (DC)	AMPS		
600	0-7-5	0-75	100	EMS 7.5-75
1000	0-7-5	0-130	75	EMS 7.5-130
2000	0-7-5	0-250	75	EMS 7.5-250
2500	0-7-5	0-300	75	EMS 7.5-300
5000	0-7-5	0-600	75	EMS 7.5-600
600	0-10	0-60	100	EMS 10-60
1000	0-10	0-100	75	EMS 10-100
2000	0-10	0-200	75	EMS 10-200
2500	0-10	0-250	75	EMS 10-250
5000	0-10	0-500	75	EMS 10-500
600	0-20	0-30	100	EMS 20-30
1000	0-20	0-50	75	EMS 20-50
2000	0-20	0-100	75	EMS 20-100
2500	0-20	0-125	75	EMS 20-125
5000	0-20	0-250	75	EMS 20-250
600	0-30	0-20	100	EMS 30-20
1000	0-30	0-33	75	EMS 30-33
2000	0-30	0-65	75	EMS 30-65
2500	0-30	0-80	75	EMS 30-80
5000	0-30	0-165	75	EMS 30-165
600	0-40	0-15	100	EMS 40-15
1000	0-40	0-25	75	EMS 40-25
2000	0-40	0-50	75	EMS 40-50
2500	0-40	0-60	75	EMS 40-60
5000	0-40	0-125	75	EMS 40-125
600	0-60	0-10	100	EMS 60-10
1000	0-60	0-18	75	EMS 60-18
2000	0-60	0-33	75	EMS 60-33
2500	0-60	0-40	75	EMS 60-40
5000	0-60	0-80	75	EMS 60-80
600	0-80	0-7.5	100	EMS 80-7.5
1000	0-80	0-13	100	EMS 80-13
2000	0-80	0-25	100	EMS 80-25
2500	0-80	0-30	100	EMS 80-30
5000	0-80	0-60	100	EMS 80-60
1000	0-100	0-10	100	EMS 100-10
2000	0-100	0-20	100	EMS 100-20
2500	0-100	0-25	100	EMS 100-25
5000	0-100	0-50	100	EMS 100-50
1000	0-150	0-7	120	EMS 150-7
2000	0-150	0-13	120	EMS 150-13
2500	0-150	0-16	120	EMS 150-16
5000	0-150	0-33	120	EMS 150-33
1000	0-300	0-3.5	150	EMS 300-3.5
2000	0-300	0-6	150	EMS 300-6
2500	0-300	0-8	150	EMS 300-8
5000	0-300	0-16	150	EMS 300-16
1000	0-600	0-1.6	250	EMS 600-1.6
2000	0-600	0-3.3	250	EMS 600-3.3
2500	0-600	0-4	250	EMS 600-4
5000	0-600	0-8	250	EMS 600-8

For non-standard outputs and inputs, consult factory.

UL & CE Safety Marks Available. Consult factory for more information

5 YEAR WARRANTY

ELECTRONIC MEASUREMENTS INC.

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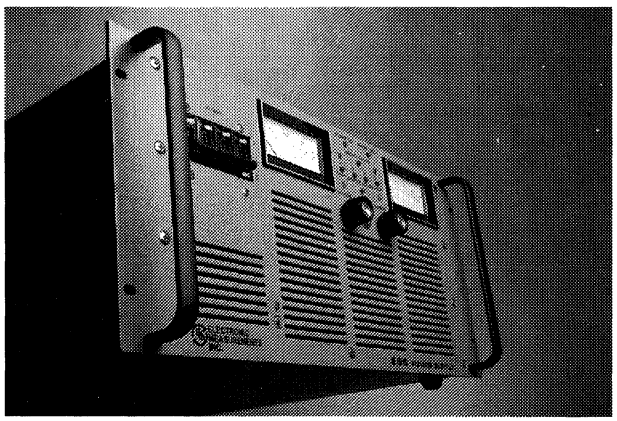
THE ESS SERIES

CE

- 10 and 15 KiloWatts
- Programmable DC Power Supplies
- CV/CC Auto Crossover



SPECIFICATIONS

Standard input voltage:

208 VAC (190-250 V) (standard)
380 VAC, 5 wire (342-418 V) (optional)
415 VAC, 5 wire (396-484 V) (optional)
480 VAC, 5 wire (432-528 V) (optional)
All models 50/60 Hz
Softstart AC inrush
Power Factor: 0.93

Output characteristics

Regulation: 0.1%
Stability: 0.05%
Efficiency: 85-91%
Transient response: 650 microseconds for 30% load change (models up to 20 VDC)
Operating temperature: 0-50°C full output, derate above 50°C

Protective features

Overvoltage
Overtemperature
Overcurrent

Programming

Front panel controls and remote analog resistance, voltage and current programming (standard); 0-5 V and 0-10 V (optional)
Internal RS232 and IEEE-488 (optional)

Mechanical

Size: 19" W x 8 3/4" H x 22" D
Weight: all models: 105 lbs. (50 kg)

Applications

- Burn-in
- Test and measurement
- Magnetic coils
- DC motors
- Medical
- RF amplifiers

10 kW MODELS			
MODEL	VOLTS	AMPS	RIPPLE (p-p)
ESS 7.5-1000	0-7.5	0-1000	60 mV
ESS 10-1000	0-10	0-1000	60 mV
ESS 12.5-800	0-12.5	0-800	60 mV
ESS 20-500	0-20	0-500	60 mV
ESS 25-400	0-25	0-400	60 mV
ESS 30-330	0-30	0-330	60 mV
ESS 33-300	0-33	0-300	60 mV
ESS 40-250	0-40	0-250	60 mV
ESS 50-200	0-50	0-200	75 mV
ESS 60-165	0-60	0-165	75 mV
ESS 80-125	0-80	0-125	100 mV
ESS 100-100	0-100	0-100	100 mV
ESS 125-80	0-125	0-80	100 mV
ESS 160-62	0-160	0-62	120 mV
ESS 200-50	0-200	0-50	135 mV
ESS 220-46	0-220	0-46	135 mV
ESS 300-33	0-300	0-33	150 mV
ESS 400-25	0-400	0-25	200 mV
ESS 500-20	0-500	0-20	300 mV
ESS 600-16	0-600	0-16	300 mV

15 kW MODELS			
MODEL	VOLTS	AMPS	RIPPLE
ESS 20-750	0-20	0-750	60 mV
ESS 30-500	0-30	0-500	60 mV
ESS 40-375	0-40	0-375	75 mV
ESS 50-300	0-50	0-300	75 mV
ESS 60-250	0-60	0-250	75 mV
ESS 80-185	0-80	0-185	100 mV
ESS 100-150	0-100	0-150	100 mV
ESS 125-125	0-125	0-125	120 mV
ESS 150-100	0-150	0-100	120 mV
ESS 160-93	0-160	0-93	120 mV
ESS 200-75	0-200	0-75	130 mV
ESS 250-60	0-250	0-60	140 mV
ESS 300-50	0-300	0-50	150 mV
ESS 330-45	0-330	0-45	150 mV
ESS 350-40	0-350	0-40	150 mV
ESS 400-37	0-400	0-37	200 mV
ESS 500-30	0-500	0-30	300 mV

For non-standard outputs and inputs, consult factory.
UL & CE Safety Marks Available. Consult factory for more information
5 YEAR WARRANTY

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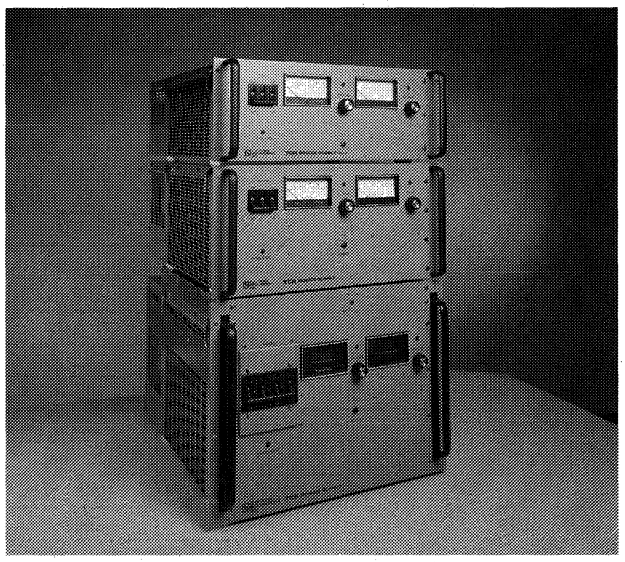
ELECTRONIC MEASUREMENTS INC.

THE TCR SERIES

- 600 Watts - 10 KiloWatts
- SCR Regulated
- Programmable CV/CC Auto Crossover



SPECIFICATIONS

Inputs:

600 W,1 kW and 1.8 kW: 115 VAC (standard), 220 VAC (optional)
2.8 kW: 220 VAC, single phase
2.5 kW, and 10 kW: 208 VAC (standard), 440 VAC (optional) three phase
Consult factory for additional inputs

Output characteristics

Regulation: 0.1%
Stability: 0.05%
Transient response: 30% load change will recover to 2% within 75 milliseconds
Operating temperature: 0-40°C, derate above 40°C

Protective features

Overvoltage (optional)
Overtemperature
Overcurrent

Programming

Front panel controls and remote analog programming (standard)
RS232 and IEEE-488 (optional)

Mechanical (all models 19" rack mountable)

600 W and 1 kW models: 3 1/2" H, 18 1/2" D, 60-65 lbs. (27-29 kg)
1.8 kW: 5 1/2" H, 18 1/2" D, 95 lbs. (43 kg)
2.5 and 2.8 kW: 7" H, 18 1/2" D, 125-180 lbs. (57-82 kg)
5 kW: 8 3/4" H, 22" D, 240 lbs. (109 kg)
10 kW: 12 1/4" H, 22" D, 350 lbs. (159 kg)

MODEL (1)	OUTPUT RATINGS		RIPPLE, (RMS)
	VOLTAGE	CURRENT	
TCR 7.5S70	0-7.5	0-70	80 mV
TCR 7.5S115	0-7.5	0-115	75 mV
TCR 7.5S200	0-7.5	0-200	80 mV
TCR 7.5S300	0-7.5	0-300	80 mV
TCR 7.5T300	0-7.5	0-300	30 mV
TCR 6T600	0-6	0-600	30 mV
TCR 6T900	0-6	0-900	30 mV
TCR 10S50	0-10	0-50	80 mV
TCR 10S90	0-10	0-90	75 mV
TCR 10S165	0-10	0-165	80 mV
TCR 10S240	0-10	0-240	80 mV
TCR 10T250	0-10	0-250	35 mV
TCR 10T500	0-10	0-500	35 mV
TCR 10T750	0-10	0-750	35 mV
TCR 20S30	0-20	0-30	80 mV
TCR 20S50	0-20	0-50	60 mV
TCR 20S90	0-20	0-90	80 mV
TCR 20S135	0-20	0-135	80 mV
TCR 20T125	0-20	0-125	20 mV
TCR 20T250	0-20	0-250	20 mV
TCR 20T500	0-20	0-500	20 mV
TCR 30S20	0-30	0-20	90 mV
TCR 30S30	0-30	0-30	60 mV
TCR 30S60	0-30	0-60	90 mV
TCR 30S90	0-30	0-90	90 mV
TCR 30T100	0-30	0-100	15 mV
TCR 30T200	0-30	0-200	15 mV
TCR 40S15	0-40	0-15	100 mV
TCR 40S25	0-40	0-25	60 mV
TCR 40S45	0-40	0-45	100 mV
TCR 40S70	0-40	0-70	100 mV
TCR 40T60	0-40	0-60	15 mV
TCR 40T125	0-40	0-125	15 mV
TCR 40T250	0-40	0-250	15 mV
TCR 50T200	0-50	0-200	18 mV
TCR 60S10	0-60	0-10	120 mV
TCR 60S18	0-60	0-18	70 mV
TCR 60S30	0-60	0-30	90 mV
TCR 60S45	0-60	0-45	90 mV
TCR 80S8	0-80	0-8	150 mV
TCR 80S13	0-80	0-13	80 mV
TCR 80S23	0-80	0-23	120 mV
TCR 80S34	0-80	0-34	100 mV
TCR 80T30	0-80	0-30	25 mV
TCR 80T60	0-80	0-60	25 mV
TCR 100T100	0-100	0-100	40 mV
TCR 120T20	0-120	0-20	40 mV
TCR 120T40	0-120	0-40	40 mV
TCR 150S4	0-150	0-4	300 mV
TCR 150S7	0-150	0-7	150 mV
TCR 150S12	0-150	0-12	200 mV
TCR 150S18	0-150	0-18	200 mV
TCR 160T15	0-160	0-15	60 mV
TCR 160T30	0-160	0-30	60 mV
TCR 160T60	0-160	0-60	60 mV
TCR 250T10	0-250	0-10	90 mV
TCR 250T20	0-250	0-20	90 mV
TCR 250T40	0-250	0-40	90 mV
TCR 300S2	0-300	0-2	500 mV
TCR 300S3	0-300	0-3	250 mV
TCR 300S6	0-300	0-6	300 mV
TCR 300S9	0-300	0-9	300 mV
TCR 500T5	0-500	0-5	125 mV
TCR 500T10	0-500	0-10	125 mV
TCR 500T20	0-500	0-20	125 mV
TCR 600S1	0-600	0-1	1000 mV
TCR 600S1.6	0-600	0-1.6	700 mV
TCR 600S3	0-600	0-3	700 mV
TCR 600S4.5	0-600	0-4.5	700 mV

(1) S = Single Phase T = Three Phase

5 YEAR WARRANTY

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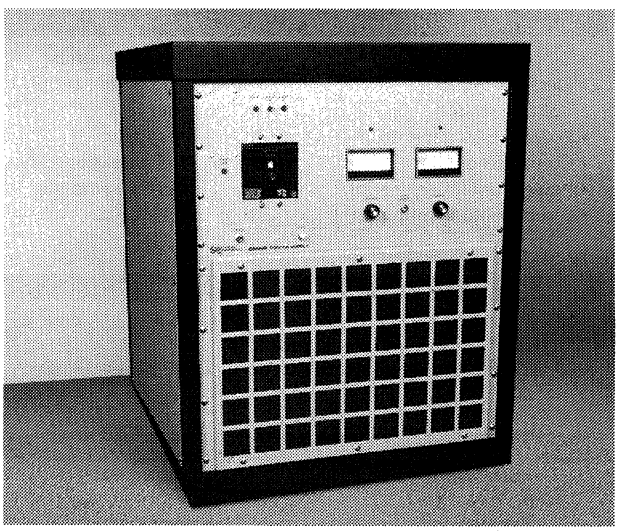
ELECTRONIC MEASUREMENTS INC.

THE EMHP SERIES

- 10 KiloWatts - 90 KiloWatts
- SCR Regulated
- Programmable CV/CC Auto Crossover



Features

- Meters and mode indicator lights.
- Remote Programming by resistance, voltage or current.
- Circuit Breaker Protection
- Contactor On/Off interlock control.
- Forced air cooling.
- Remote turn-on

MODEL	VOLTS	AMPS	60 Hz RIPPLE (mV RMS)
Size 1 (20 kW Maximum)			
EMHP 10-1000	0-10	0-1000	50
EMHP 20-750	0-20	0-750	60
EMHP 30-600	0-30	0-600	70
EMHP 30-650	0-30	0-650	70
EMHP 40-450	0-40	0-450	80
EMHP 40-500	0-40	0-500	80
EMHP 60-300	0-60	0-300	100
EMHP 60-330	0-60	0-330	100
EMHP 80-250	0-80	0-250	120
EMHP 150-130	0-150	0-130	180
EMHP 300-60	0-300	0-60	300
EMHP 600-30	0-600	0-30	400
SIZE 2 (30 kW Maximum)			
EMHP 10-1500	0-10	0-1500	50
EMHP 20-1000	0-20	0-1000	60
EMHP 20-1250	0-20	0-1250	60
EMHP 30-800	0-30	0-800	70
EMHP 30-950	0-30	0-950	70
EMHP 40-600	0-40	0-600	80
EMHP 40-750	0-40	0-750	80
EMHP 60-500	0-60	0-500	100
EMHP 80-375	0-80	0-375	120
EMHP 150-200	0-150	0-200	180
EMHP 300-100	0-300	0-100	300
EMHP 600-50	0-600	0-50	400
SIZE 3 (60 kW Maximum)			
EMHP 10-3000	0-10	0-3000	50
EMHP 20-1500	0-20	0-1500	60
EMHP 20-2500	0-20	0-2500	60
EMHP 30-1250	0-30	0-1250	70
EMHP 30-1800	0-30	0-1800	70
EMHP 40-1000	0-40	0-1000	80
EMHP 40-1500	0-40	0-1500	80
EMHP 60-750	0-60	0-750	100
EMHP 60-1000	0-60	0-1000	100
EMHP 80-600	0-80	0-600	120
EMHP 80-750	0-80	0-750	120
EMHP 150-350	0-150	0-350	180
EMHP 150-400	0-150	0-400	180
EMHP 300-200	0-300	0-200	300
EMHP 600-100	0-600	0-100	400
SIZE 3 1/2 (90 kW Maximum)			
EMHP 30-3000	0-30	0-3000	70
EMHP 40-2250	0-40	0-2250	80
EMHP 60-1500	0-60	0-1500	100
EMHP 80-1125	0-80	0-1125	120
EMHP 150-600	0-150	0-600	180
EMHP 300-300	0-300	0-300	300

For non-standard outputs and ratings over 90 kW, consult factory.

2 YEAR WARRANTY

SPECIFICATIONS

Inputs:

440 VAC, 60 Hz - optional inputs available

Output characteristics

Regulation: 0.1%
Stability: 0.05%
Operating temperature: 0-50°C, derate above 50°C

Programming

Front panel controls and remote analog resistance, voltage and current programming (standard); 0-5 V and 0-10 V (optional)
RS232 and IEEE-488 (optional)

Options

Overvoltage protection
Casters or I Beam base
Analog or digital meters
Digital programming interface

Mechanical

Size 1: 30" H x 22 1/4" W x 27 3/4" D, 500-750 lbs. (227-341 kg)
Size 2: 34 5/8" H x 27 1/2" W x 29 1/4" D, 750-900 lbs. (341-409 kg)
Size 3: 44 1/2" H x 27 1/2" W x 33 1/4" D, 1000-15000 lbs. (454-682 kg)
Size 3.5: 44 1/2" H x 27 1/2" W x 39" D, 1500 lbs. (682 kg)

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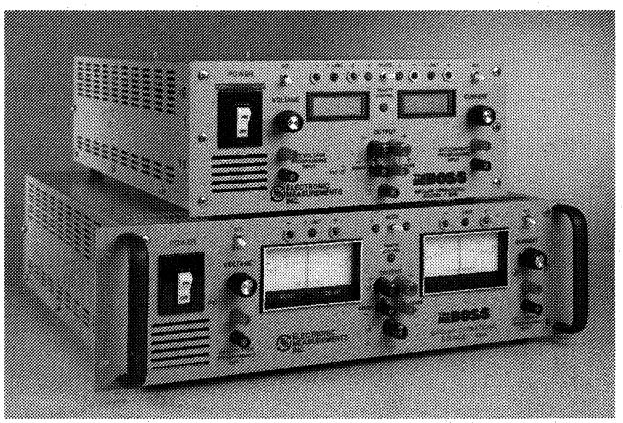
ELECTRONIC MEASUREMENTS INC.

THE BOS/S SERIES

■ 100-400 Watt Bipolar Power Supply

A Bipolar Operational Source/Sink power supply that provides many functions in addition to delivering DC voltage and current.



More than a dozen functions

- DC power supply
- Electronic load
- Voltage source
- Power-pulse generator
- Current source
- Power-function generator
- Direct-coupled amplifier
- Variable-gain amplifier
- Fast-slewing power supply
- DC amplifier
- AC power supply
- Differential amplifier
- Signal-inverting amplifier

Mechanical

100 W and 200 W: 12 1/2" W x 5 1/4" H x 17" D, 36-40 lbs. (16-18 kg) Rack Mount Optional
400 W: 19" W (Rack Mount Standard) x 5 1/4" H x 17" D, 55 lbs. (25 kg)

DYNAMIC SPECIFICATIONS

MODEL		DC OUTPUT RANGE Eo	DC OUTPUT RANGE Io	BANDWIDTH DC TO F < 3 dB FULL POWER V	BANDWIDTH DC TO F < 3 dB FULL POWER I	SLEWING RATE MAXIMUM LOAD 10 TO 90% SWING V	SLEWING RATE MAXIMUM LOAD 10 TO 90% SWING I
100W							
BOS/S	20-5	± 20 V	± 5	20 KHz	15 KHz	1.6 V/µs	.4 A/µs
BOS/S	50-2	± 50 V	± 2	20 KHz	15 KHz	4.0 V/µs	.15 A/µs
BOS/S	100-1	± 100 V	± 1	20 KHz	15 KHz	7.0 V/µs	.08 A/µs
200W							
BOS/S	20-10	± 20 V	± 10 A	20 KHz	10 KHz	1.6 V/µs	.8 A/µs
BOS/S	36-6	± 36 V	± 6 A	18 KHz	15 KHz	3.0 V/µs	.5 A/µs
BOS/S	50-4	± 50 V	± 4 A	18 KHz	12 KHz	4.0 V/µs	.3 A/µs
BOS/S	72-3	± 72 V	± 3 A	18 KHz	12 KHz	5.8 V/µs	.25 A/µs
BOS/S	100-2	± 100 V	± 2 A	18 KHz	12 KHz	6.0 V/µs	.15 A/µs
400W							
BOS/S	20-20	± 20 V	± 20 A	10 KHz	12 KHz	1.6 V/µs	1.6 A/µs
BOS/S	36-12	± 36 V	± 12 A	20 KHz	13 KHz	3.0 V/µs	1.0 A/µs
BOS/S	50-8	± 50 V	± 8 A	25 KHz	12 KHz	4.0 V/µs	.7 A/µs
BOS/S	72-6	± 72 V	± 6 A	20 KHz	12 KHz	5.8 V/µs	.5 A/µs
BOS/S	100-4	± 100 V	± 4 A	15 KHz	10 KHz	6.0 V/µs	.3 A/µs
BOS/S	200-2	± 200 V	± 2 A	10 KHz	2 KHz	4.0 V/µs	.05 A/µs

Input: 115 VAC standard, 220 VAC optional, 50/60 Hz

REGULATION

INFLUENCE	MAXIMUM EFFECT Voltage	MAXIMUM EFFECT Current
Source Voltage (%)	0.005	0.005
Load Change (100%)	0.005	1.0 mA
Time (8 hr. at ambient temperature, %)	0.008	0.008
Temperature (%/C)	0.01	0.03
Ripple (RMS, return grounded)	3.00 mV	0.05%

For higher wattage requirements, consult factory.

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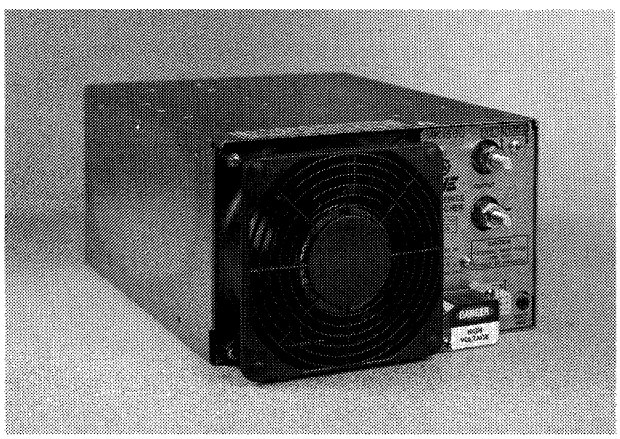
ELECTRONIC MEASUREMENTS INC.

THE MK SERIES

- Single Output
- 750-1500 Watt



SPECIFICATIONS

Single-phase (standard), 3-phase (optional)

MK 750 and MK 1000 units

120 VAC (+10%, -25%) 47-63 Hz (standard)
240 VAC (+10%, -25%) 47-63 Hz (optional)

MK 1500 units

240 VAC (+10%, -25%), 47-63 Hz (standard)

Efficiency

Up to 85% depending upon model

Protection

Voltage: Overvoltage shutdown (standard), crowbar overvoltage (optional)
Current: Automatic current limit/foldback
Thermal: Automatic shutdown when internal heat sink temperature exceeds safe limit. Automatic restarting when temperature returns to normal.
Reverse Voltage: Supply is protected from damage due to reverse polarity voltage across DC output terminals.

Cooling

Integral fan provides forced air cooling.

Operating Temperature

0° to 71°C ambient; full output to 50°C
Derate 2% per °C to 71°C

MODEL	VOLTS	AMPS
MK 750-2-150	2	150
MK 1000-2-200	2	200
MK 1500-2-300	2	300
MK 750-5-150	5	150
MK 1000-5-200	5	200
MK 1500-5-300	5	300
MK 750-12-65	12	65
MK 1000-12-87	12	87
MK 1500-12-130	12	130
MK 750-15-55	15	55
MK 1000-15-73	15	73
MK 1500-15-110	15	110
MK 750-18-46	18	46
MK 1000-18-61	18	61
MK 1500-18-92	18	92
MK 750-21-40	21	40
MK 1000-21-53	21	53
MK 1500-21-80	21	80
MK 750-24-35	24	35
MK 1000-24-47	24	47
MK 1500-24-70	24	70
MK 750-28-30	28	30
MK 1000-28-40	28	40
MK 1500-28-60	28	60
MK 750-36-24	36	24
MK 1000-36-33	36	33
MK 1500-36-48	36	48
MK 750-48-18	48	18
MK 1000-48-25	48	25
MK 1500-48-36	48	36

5 YEAR WARRANTY

Mechanical

5"H x 8" W x 11" D, 16 lbs. (7.3 kg)

Convenience Functions

Inhibit/Remote Shutdown
Margin Check
Power fail/output good signal

Agency Approvals

U.L. Recognized
C.S.A. Certified
TUV Approved (Specify MKA)

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ELECTRONIC MEASUREMENTS INC.

HIGH VOLTAGE AND LASER POWER SUPPLIES

- High Voltage
- Pulsed CW
- Power Supplies

A History of Innovation and Leadership

The High Voltage Products Division of EMI has been making quality High Voltage DC Power Supplies and Capacitor Charging Units since 1982. ALE Systems Inc. was conceived and formed to fill the need for a quality supplier of Switched Mode HVDC Supplies for the laser market. In 1987, when ALE was acquired by Electronic Measurements Inc., the company was already the world leader in its field. Today, EMI continues its innovation in the field of HV Supplies for Power Modulators, RF tubes and Gas Lasers.

Applications

- Pulsed Discharge Lasers
- CW Arc Lamp Lasers
- Fast Pulsed Power Systems
- Ultra-High Energy Capacitor Banks
- High Power Modulators
- Sputtering
- Particle Accelerators
- Lithotriptors
- Electrostatic Precipitators

SERIES	TYPE OF POWER SUPPLY	OUTPUT CHARACTERISTICS			
		Output Voltage	Charging Rate	Output Power	Input Voltage
500A	HV Capacitor Charging/HV Constant Voltage	0-1 kV to 0-40 kV	500 J/s	500 W	110V/230 VAC input, PFC (optional)
102A	HV Capacitor Charging/HV Constant Voltage	0-1 kV to 0-40 kV	1000 J/s	1000 W	110V/230 VAC input, PFC (optional)
152A	HV Capacitor Charging/HV Constant Voltage	0-1 kV to 0-40 kV	1500 J/s	1500 W	110V/230 VAC input, PFC (optional)
202A	HV Capacitor Charging/HV Constant Voltage	0-1 kV to 0-40 kV	2000 J/s	2000 W	230 VAC input, PFC (standard)
402	HV Capacitor Charging	0-1 kV to 0-50 kV	4000 J/s	•	208 or 400 VAC input
802	HV Capacitor Charging	0-1 kV to 0-50 kV	8000 J/s	•	208 or 400 VAC input
XR NEW!	HV Capacitor Charging	0-1 kV to 0-50 kV	4000-8000 J/s	•	208 or 400 or 480 VAC input
XR-DC	HV Constant Voltage	0-1 kV to 0-50 kV	•	4000 W-10,000 W	208 or 400 or 480 VAC input
203	HV Capacitor Charging/HV Constant Voltage	0-1 kV to 0-50 kV	20,000 J/s	30,000 W	208 or 480 VAC input
303	HV Capacitor Charging/HV Constant Voltage	0-1 kV to 0-50 kV	30,000 J/s	50,000 W	480 VAC input
YD	YAG Arc Lamp Source	150/250 V (35-50 A)	N/A	4, 6 kW	208/230 VAC 1 PH or 3 PH
ESKI	YAG Arc Lamp Source	150/250 V (50-100 A)	N/A	6, 8, 10 kW	208/400 VAC 1 PH or 3 PH

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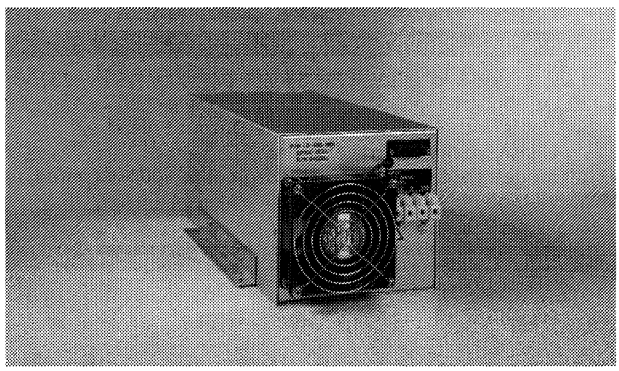
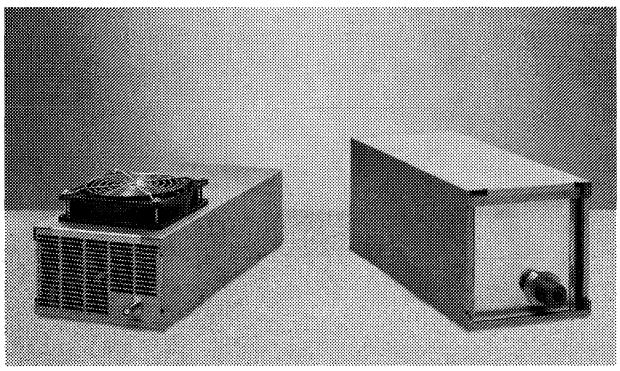
THE 500A/102A/152A/202A SERIES

- HV Capacitor Charging Modules
- 500 J/s, 1000 J/s, 1500 J/s, 2000 J/s
- Output Voltages to 40 kV





DESCRIPTION

The 500A/102A/152A/202A series of HV Charging Modules are small, low cost solutions for high performance applications in the field of pulsed discharge lasers, pulse power research and test installations.

Features

- Full remote control
- Open/short circuit protection
- Certified to meet EN60601 (TUV), UL2601
- Available with or without Power Factor Correction
- Interfaces with existing Series 500, 102, 152, 202 control
- Pulse Repetition Rate to 2 kHz
- Latest inverter topology eliminates "Ripple" effect on charged capacitor

Applications

- Excimer Lasers
- Pulsed YAG Lasers
- N_2 Lasers
- Dye Lasers
- TEA Lasers
- Grid Bias Supplies
- General Low To Medium Power PFN's
- Lithotriptors
- Precipitators

WEIGHT (All Series):		
OUTPUT VOLTAGES	PFC MODELS	NON PFC
1 kV through 6 kV	10 lbs. (4.5 kg)	8 lbs. (3.6 kg)
7 kV through 40 kV	16 lbs. (7.3 kg)	14 lbs. (6.4 kg)

RATINGS:		
SERIES	AVERAGE CHARGING RATE	VOLTAGE MODELS AVAILABLE (kV)
500A	500 J/s	0 to 1, 2, 4, 5, 10, 20, 30, 40
102A	1000 J/s	0 to 1, 2, 4, 5, 10, 20, 30, 40
152A	1500 J/s	0 to 1, 2, 4, 5, 10, 20, 30, 40
202A	2000 J/s	0 to 1, 2, 4, 5, 10, 20, 30, 40

Available with Positive or Negative Output Polarity
Please specify at time of order.

INPUT POWER REQUIREMENTS:		
SERIES	PFC MODELS	NON PFC
500A	110/220 VAC selectable	110/220 VAC selectable
102A	110/220 VAC selectable	110/220 VAC selectable
152A	110/220 VAC selectable	110/220 VAC selectable
202A	220 VAC	Not Available

DIMENSIONS:		
SERIES	PFC MODELS	NON PFC
500A	13" x 5.75" x 5.5"	13" x 5.75" x 5.5"
102A	13" x 5.75" x 5.5"	13" x 5.75" x 5.5"
152A	13" x 5.75" x 5.5"	13" x 5.75" x 5.5"
202A	13" x 5.75" x 5.5"	Not Available

1 YEAR WARRANTY

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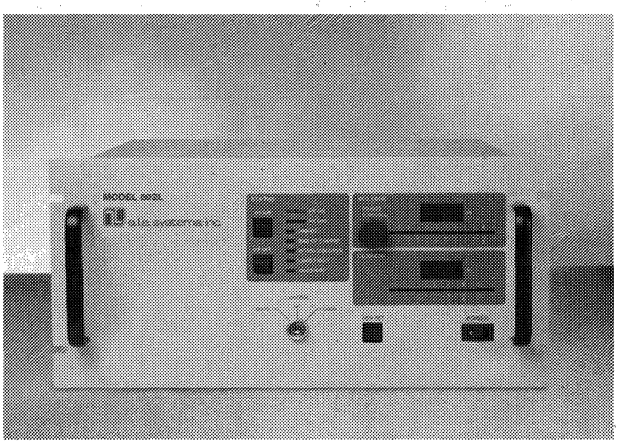
THE 402/802 SERIES

- HV Capacitor Charging Supplies
- 4000 J/s, 8000 J/s
- Output Voltages to 50 kV



DESCRIPTION

Available with voltage ranges between 0-1 kV to 0-50 kV, these supplies produce 4000 J/s (402) and 8000 J/s (802) average charging rates for direct capacitor charging of both high repetition rate and high energy, single shot applications.

All units incorporate IGBT inverter technology for trouble-free operation with protection against arcs, short and open circuit conditions.

Features

- Available in three configurations - instrumented, system and blank panel
- Fully adjustable output voltage
- Worldwide input voltages/frequencies
- Local/remote control (standard)
- Simple parallel operation for upgradeable increased power
- Repetition rates to 1 kHz
- Regulation 1% to 300 Hz

RATINGS:

SERIES	AVERAGE CHARGING RATE	PEAK CHARGING RATE
402	4000 J/s	5000 J/s
802	8000 J/s	9000 J/s

Standard Output Voltage Ranges

1 kV, 1.5 kV, 2 kV, 3 kV, 4 kV, 5 kV, 6 kV, 10 kV, 15 kV, 20 kV, 30 kV, 40 kV, 50 kV
Available with Positive or Negative Output Polarity
Please specify at time of order.
All models continuously variable from 0 to 100% of rated voltage output.

Input Requirements

208 VAC or 400 VAC or 480 VAC, 3 Phase, 50/60 Hz
Please specify at time of order.

Dimensions

402: 19" Rack x 17" D x 7" H (4U)
802: 19" Rack x 17" D x 8.75" H (5U)

Weight

402: (oil insulated)	63 lbs.	(29 kg)
402: (air insulated)	48 lbs.	(22 kg)
802: (oil insulated)	76 lbs.	(35 kg)
802: (air insulated)	61 lbs.	(28 kg)

CHASSIS CONFIGURATIONS

VERSION	MODEL	DESCRIPTION
Instrumented	402L 802L	• Volt, Amp Meters • Voltage Control Pot • Status Indicators • Full Remote Control • AC Line Contactor
System	402S 802S	• Status Indicators • Full Remote Control • AC Line Contactor
Blank	402-OEM 802-OEM	• Blank Front Panel • Full Remote Control • Optional Contactor Circuit Breaker or Straight Wired

1 YEAR WARRANTY

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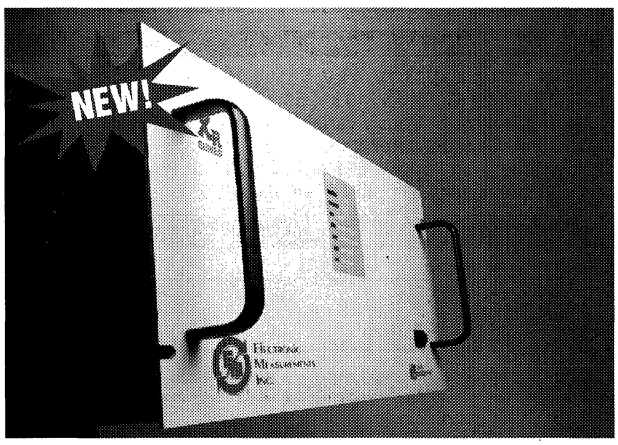
THE XR AND XR-DC SERIES

- High Performance HV, Capacitor Charging and DC Power Supplies
- Output Voltages to 50 kV
- 4000 J/s to 8000 J/s Capacitor Charging
- 10,000 W Continuous Output



DESCRIPTION

The XR Series are low cost solutions for high performance HV Capacitor Charging applications offering extremely low pulse to pulse repeatability. The XR-DC allows continuous DC operation with low ripple, low stored energy.

Applications include:

- High Performance Excimer Lasers
- Beam Kicker Magnet Modulators
- TV and RF Transmitters

XR-DC Applications

- Magnetrons, Klystrons, Tetrodes
- TWT Amplifiers
- Electron Beam Sources

Features

- High repeatability to better than 0.1% at repetition rates up to 1,500 Hz
- Air insulated output assemblies - models 1 kV to 6 kV
- Minimum stored energy
- Ultra fast command charge timing cycle
- Unlimited parallel capability for higher power
- Eliminates need for D-Qing
- On board external divider port for super high performance
- PIN compatibility with Series 802 and 402
- New high reliability cable and connector minimizes corona effects at high repetition rate

XR SPECIFICATIONS

Average charge rate: 4000 J/s to 8000 J/s (dependent on load capacitance and charge time - consult factory)
Peak charge rate: consult factory
Output voltages: 1, 3, 5, 6, 10, 20, 30, 40, 50 kV
Available with Positive or Negative Output Polarity
Please specify at time of order.

XR-DC SPECIFICATIONS

Output power: 10,000 Watts
Internal or external filter options: consult factory
Output voltages: 1, 3, 5, 6, 10, 20, 30, 40, 50 kV
Available with Positive or Negative Output Polarity
Please specify at time of order.

Input Requirements

208 VAC or 400 VAC or 480 VAC, 3 Phase, 50/60 Hz
Please specify at time of order.

Dimensions

19" rack x 17" D x 8.75" H (5U)

Weight

Models ≤6 kV 61 lbs. (28 kg)
Models ≤25 kV 76 lbs. (35 kg)
Models ≤50 kV 80 lbs. (36 kg)

CHASSIS CONFIGURATIONS

VERSION	MODEL	DESCRIPTION
Instrumented	XR 402L XR 602L XR 802L	• Volt, Amp Meters • Voltage Control Pot • Status Indicators • Full Remote Control • AC Line Contactor
System	XR 402S XR 602S XR 802S	• Status Indicators • Full Remote Control • AC Line Contactor
Blank	XR 402-OEM XR 602-OEM XR 802-OEM	• Blank Front Panel • Full Remote Control • Optional Contactor Circuit Breaker or Straight Wired

1 YEAR WARRANTY

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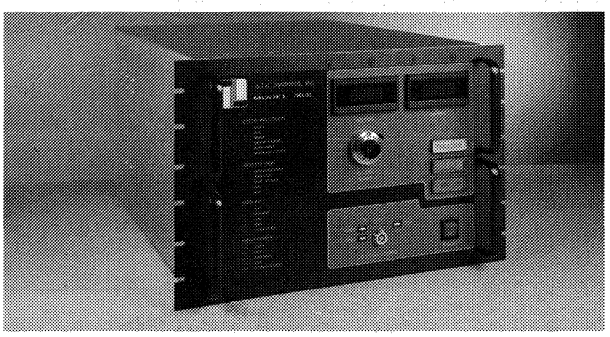
THE 203/303 SERIES

- High Voltage Capacitor Charging Supplies
- High Voltage DC Power Supplies



DESCRIPTION

The Series 203 and 303 of water cooled, High Voltage Power Supplies are designed to be configured in two modes of operation. In their most common format they are constant current Capacitor Charging Supplies which will directly charge HV capacitors and Pulse Forming Networks (PFNs). The second configuration allows operation as constant voltage, continuous output HVDC Power Supplies.

Features

- 303 generates 30 kJ/s average or 50 kW DC continuous; 203 is rated 20 kJ/s or 30 kW
- Unique "Heat Pipe" cooling design for maximum power density
- Thirteen standard models in each series with outputs from 1 kV to 50 kV
- Package height is only 12.25 inches (7U)
- Proven IGBT Switched Mode Design
- Full command charging: no need for complicated and expensive resonant charging circuits
- Tight pulse to pulse regulation: no need for "D-Qing"
- High EMI-RFI immunity for operation near pulse discharge
- 100 kV rated output cable and connector (30 to 50 kV models) for long shot life
- Simple parallel operation for increased power to 600 kJ/s average pulsed or 1000 kW average continuous
- Proven, assured long time reliability - even in the event of failure in the PFN

Applications

- High Power Modulators
- Lasers
- X-Ray
- Sputtering
- Electron Beam
- Ion Implantation
- CW and Pulsed Magnetron Heating
- RF Transmitters
- Precipitators

SPECIFICATIONS

OUTPUT POWER		
	203	303
Aver. Cap Charging	20,000 J/s	30,000 J/s
Peak Cap Charging	25,000 J/s	37,500 J/s
Constant DC Output	30 kW	50 kW

Standard Output Voltage Ranges

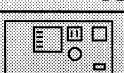
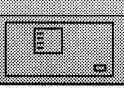
1 kV, 1.5 kV, 2 kV, 3 kV, 4 kV, 5 kV, 6 kV, 10 kV, 15 kV, 20 kV, 30 kV, 40 kV, 50 kV
All models continuously variable from 0 to 100% of rated voltage output.
Available with Positive or Negative Output Polarity Please specify at time of order.

MAX. OUTPUT CURRENT (Capacitor Charging Versions)	
203	303
$\frac{50\text{ kW pk.}}{V_{OUT}\text{ MAX.}}$	$\frac{75\text{ kW pk.}}{V_{OUT}\text{ MAX.}}$

MAX. OUTPUT CURRENT (Continuous DC Versions)	
203	303
$\frac{30\text{ kW pk.}}{V_{OUT}\text{ MAX.}}$	$\frac{50\text{ kW pk.}}{V_{OUT}\text{ MAX.}}$

INPUT POWER		
	203	303
340 - 460 VAC 50/60 Hz	45A/Phase Cap Charging 74A/Phase Constant DC	—
432 - 528 VAC 50/60 Hz	35A/Phase Cap Charging 58A/Phase Constant DC	53A/Phase Cap Charging 88A/Phase Constant DC

Series 203 is available with 208 VAC, 3 Phase on special order.

CHASSIS CONFIGURATIONS		
VERSION	MODEL	DESCRIPTION
Instrumented	203L 303L	 • Volt, Amp Meters • Voltage Control Pot • Status Indicators • Full Remote Control
System	203S 303S	 • Status Indicators • Full Remote Control

1 YEAR WARRANTY

Dimensions

19" rack x 22" D x 12.25" H (7U)

Weight

Models ≤25 kV 185 lbs (84 kg)
Models ≤50 kV 195 lbs (89 kg)

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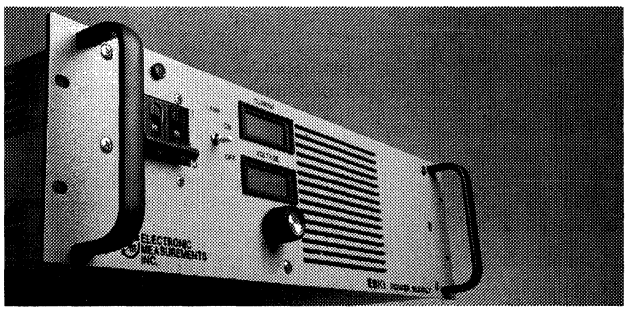
THE ESKI SERIES

- CW Arc Lamp Supplies
- 6, 8 and 10 KiloWatts Output



Features

- Built-in Igniter
- Remote Programmable
- 5 1/4" H x 19" W x 15" D (single phase)
- 0.3% Light Ripple p-p
- Leakage per U/L544/U/L1012
- Single Phase & Three Phase
- *400 VAC and 480 VAC input version*
- *True 4 Wire Configuration*
- *Improved Ignition System*

DESCRIPTION

The ESKI series of power supplies is designed to power solid state Yag lasers. Utilizing a 20 kHz pulse-width-modulation technology the ESKI's provide a regulated current with a continuously variable output. Long lamp life is ensured as the output current is regulated to within 0.1% regardless of line fluctuations. Ripple is a maximum of 0.3% peak-to-peak. With optical feedback, ripple can be further reduced by a factor of 3:1. The use of IGBT's as regulating elements provides high reliability, high efficiency, high packaging density and very light weight.

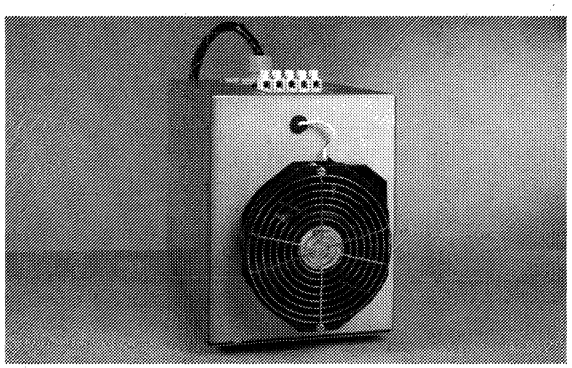
This power supply also provides the boost, or open circuit voltage required for lamp start, and incorporates a built-in, high-voltage igniter assembly which is either pulsed automatically when the power supply is enabled or activated by the customer's control line.

The power supply is of the non-line isolated type which reduces cost and weight but does require both lamp terminals to be insulated from ground. All controls, input programming and readbacks are line isolated. Supply circuitry is highly isolated from chassis so that leakage currents are within medical application limits.

NEW!

THE YD SERIES

- CW Arc Lamp Supplies
- 4 and 6 KiloWatts Output



DESCRIPTION

The YAG Drive Series of switching power supplies are designed for Nd: YAG and other solid-state laser systems. Advanced IGBT technology, combined with high quality construction, yield an exceptionally small and reliable power supply. With integral igniter and boost circuitry, the YAG Drive provides a complete power system for krypton arc lamps. Short circuit, open circuit and arc lamp failures will not damage the power supply. All 6 kiloWatt models are UL and TUV approved.

Active power factor correction available on all models

Specifications

Output Power:	YD4-SC 150 V, 35 A, 4 kW max. YD4-PC 250 V, 35 A, 4 kW max. YD6-SC 150 V, 50 A, 6 kW max. YD6-PC 250 V, 50 A, 6 kW max.
Input Power Requirements Voltage:	1 Phase 180-264 VAC, 50/60 Hz 3 Phase 180-264 VAC, 50/60 Hz
Current:	YD4-SC 1 Phase, 40 A max. 3 Phase, 20 A max. YD4-PC 1 Phase, 30 A max. 3 Phase, 20 A max. YD6-SC 3 Phase, 30 A max. YD6-PC 1 Phase, 40 A max. 3 Phase, 25 A max.
Regulation:	±1.0% over full line and load range
Ripple:	DC to 1 kHz: 750 ma pk-pk max. 1 kHz to 20 MHz: 10% of Iout, pk-pk max.
Igniter:	25 kV
Boost:	1 kV
Efficiency:	SC Models: 87% PC Models: 85% (6 kW); 80% (4 kW)
Inrush Current:	Limited to below full power level
Pulsing:	Up to 1 kHz, 300 µs rise and fall times, 75% modulation

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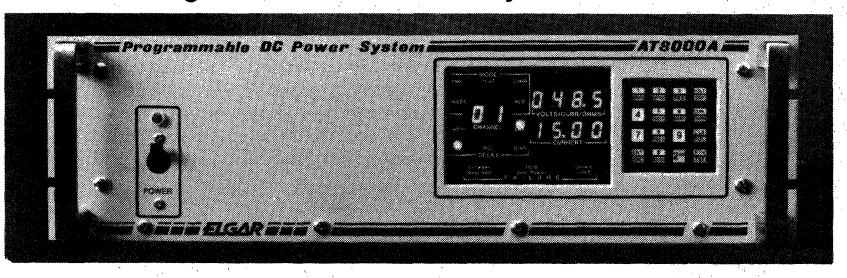
Programmable DC Power Systems

AT8000A Programmable DC Power System



- 16 channels, up to 19,200W at a single bus address
- 6 channels, up to 1200W, in a single 5.25" chassis
- Parallel programming
- Sub-modular construction
- Programmer, keyboard/display
- Confidence test on command
- Fault isolation to replaceable module level
- Qualifiable to MATE guidelines
- Programmable shut-down sequence

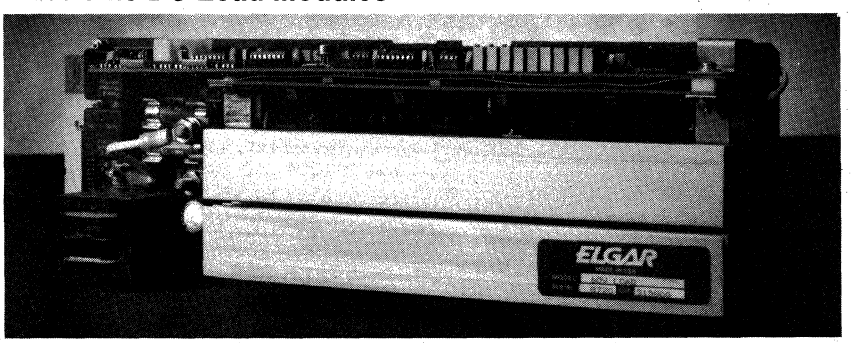
Elgar's AT8000A Programmable DC Power System holds from 1 to 6 totally independent channels of DC power in a 5.25" rack-mount chassis. By using expansion chassis, it can be expanded to 16 output channels controlled by an internal master programmer, either from the front-panel keyboard or remotely via IEEE-488 GPIB using one selectable bus address. It integrates programmer, power and load modules, built-in test equipment and all signal/load interfaces into the most compact and powerful package available.
Using 200W modules, a single-chassis system can deliver up to 1,200W. Adding additional modules and chassis can raise total power to 19,200W at a single bus address. Programmable paralleling can provide any combination of 200W increments up to 1,200W per channel.

Front-panel Keyboard/Display includes a 16 pad, multilevel keyboard with increment/decrement keys plus an LED display to speed and simplify programming. The system can show programmed values or, with the built-in test option, actual measured values, as well as channel number, voltage and current. It allows complete local/ manual control of most functions, alerts the operator to identified system malfunctions and prompts the operator for ease of programming and operation.

Internal Programmer can employ either user-friendly ABLE (Atlas Based Language Extension) or optional CIIL (Control Interface Intermediate Language) for complete voltage, current and general system control.

DC Power Modules employ a high efficiency linear design for fast response and low noise. Eight standard output voltage ranges are available: 0 to 7, 10, 20, 32, 40, 80, 160 and 320 VDC — and the design makes modification to accommodate special voltage application requirements quick and easy. Outputs are completely isolated and all operate in programmable voltage or constant current mode. There's over current sensing and over voltage protection with SCR crowbar shutdown. Load isolation (confidence) relays are standard and polarity switching relays are optional.

Electronic DC Load Modules



Elgar's versatile 300W Electronic DC Load Modules can be installed in the AT8000A Programmable DC Power Systems to simulate all real-world characteristics for testing, evaluation and burn-in of DC power supplies, batteries, capacitors and other power components.
The DC load modes of operation are: constant current, constant voltage, constant resistance, short circuit, and transient operations.
Programmable slew rates automatically duplicate the dynamic behavior of real-world load conditions, while analog modulation with external input accurately duplicates complex load waveforms. Remote sensing capabilities increase flexibility while maximizing programming and readback accuracy.

	60LO1	120LO1
Maximum power	300W continuous	
Voltage range	3-60V	3-120V
Current ranges	0-6A, 0-60A	0-3A, 0-30A
Resistance range	0.1-100 ohm	0.1-1.0kΩ

Modes of operation Constant current, constant voltage, constant resistance, short circuit and transient operations

Auxiliary Drive Module (ADM)

Elgar's Auxiliary Drive Module (ADM) is a digital-to-analog converter which adds two versatile functions to AT8000A Systems. It can act as:
- Two programmable analog signals to drive external AC or DC power sources or other electronic equipment.
- A programmable connect/disconnect relay driver for controlling an external power relay.

With an ADM, a non-Elgar external bulk supply can take on the same personality as an AT8000A DC module — extending the AT8000A's normal power-per-module from 200W. ADM's occupy a single AT8000A slot and are addressed as a single channel from the front panel keyboard or over the IEEE-488 bus. The ADM has 2 separate isolated outputs (one each for programming voltage and current) plus two programmable relays which can serve as contact closures to activate external high-power disconnect/isolation relays or serve as status indicators. Optional Built-In Test (BIT) for readback of voltage and current measurement of the external device is also available.

ELGAR
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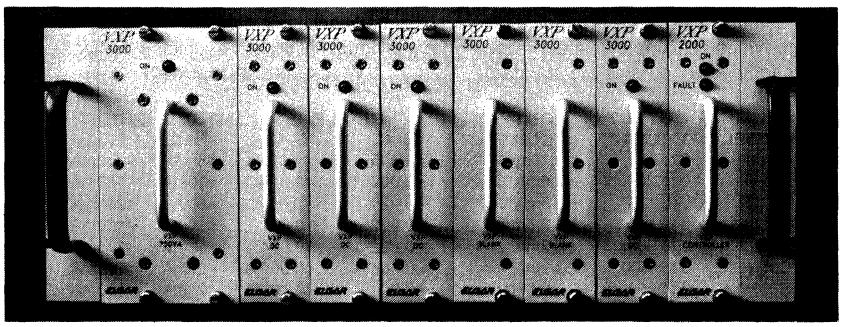
VXP3000 Programmable Power System



Elgar's VXP3000 Programmable Power System is the state-of-the-art solution for test systems where high power density, small size and flexibility are the key priorities.

The unique chassis design employs 1.8 inch wide slots which accept one controller module and up to eight power modules or three 750VA AC modules. The ability to provide both AC and DC power in one chassis and at one GPIB address is further enhanced by an Auxiliary Drive Module (ADM). This module allows the VXP controller to program external bulk or high power DC power supplies as if they were standard VXP power modules.

CONTROLLERS
IEEE-488 controller With ABLE or CIIL (MATE) syntax

DC POWER MODULES
Output voltage range 0-7, 10, 20, 32, 40, 60, 100 and 200 VDC; 1.8" standard width (up to 8 modules per chassis)
Full rated output power 200W for 10, 20, 32, 40, 60, 100 and 200 VDC modules; 140W for 7 VDC module; 1.5 KW, 4-wide module available at 100 VDC
Parallelable For load sharing (available for 140W and 200W modules)
Series connectable Up to 400 VDC

AC POWER MODULES
Full rated output power 750 VA
Output voltage range 0-135 VAC, 3.6" double-wide size
Frequency range 350-999.9 Hz (45-350 Hz with reduced specifications)
Configurable For up to 2250 VAC single-phase or up to 6750 VA three-phase
Parallelable For higher power requirements by using the special plug-in VXP-LSM module
Auxiliary output A 0-26 VAC/2A output proportional to the main output voltages provided. An optional 5 VAC/5A auxiliary output is available.
Fast current limit protection Against short circuits
Efficiency Over 80%

Low Cost Smartwave

APPLICATIONS
- Testing for real world power conditions using different waveforms on all 3 phases (including DC)
- Automatic electronic testing with sequence or event programming
- Testing for European standards
- IEEE-488 Interface

SPECIFICATIONS

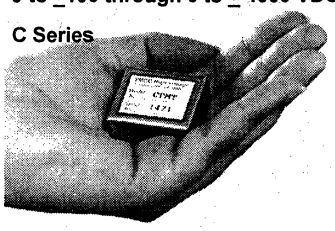
INPUT
Input power Factor: .99 with input PFC option

OUTPUT
Output Frequency Range: 40 Hz to 500 Hz
Output Power: 1750 VA, 3500 VA, 5250 VA

Miniature Precision Regulated HV Supply

0 to ±100 through 0 to ± 4000 VDC @ 1 Watt

C Series



The C Series is a line of ultra-miniature, precision regulated high voltage supplies featuring excellent stability and low ripple. The output voltage is programmable via a 0 to 5 volt control voltage. Temperature stability is less than 50 PPM/°C. These models exhibit very low ripple, noise, and EMI/RFI by utilizing a quasi-sinewave oscillator, excellent filtering techniques and an isolated steel enclosure featuring a separate grounding pin. An externally accessible potentiometer provides adjustable gain trim allowing for individual calibration of units. Positive and negative outputs are standard.

FEATURES

- High Stability, <50 PPM/°C
- 0 to 100% Programmable Output
- Miniature Size
- Low Ripple
- External Gain Adjust
- Steel Case with Isolated Case Ground
- Wide Input Voltage Range, 11.5 to 16 VDC
- Very Low EMI/RFI
- PCB Mountable
- High Performance/Low Cost

PHYSICAL CHARACTERISTICS

C01-C20: SIZE: 1.75 x 1.1" x 0.5" (44 x 27.5 x 12.5 mm)
C01-C20: WEIGHT: 1.4 Ounce (40 Grams)
C25-C40: SIZE: 1.75" x 1.1" x 0.5" (44 x 27.5 x 12.5 mm)
C25-C40: WEIGHT: 1.4 Ounce (40 Grams)
C50-C60: SIZE: 2.6" x 1.1" x 0.5" (66 x 27.5 x 12.5 mm)
C50-C60: WEIGHT: 1.68 Ounce (48 Grams)
PACKAGING: Epoxy Encapsulated
CASE MATERIAL: Zinc Plated Steel
PINS: 0.03" Diameter, 0.2" Long (0.76 x 5 mm)

ELECTRICAL SPECIFICATIONS

INPUT VOLTAGE: 11.5 to 16 Volts
CONTROL VOLTAGE: 0 to 5 Volts, <50 uA
OPERATING TEMP: -10° to +60° C

TYPICAL PERFORMANCE

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT	RIPPLE N. L.	RIPPLE F. L.	INPUT CURRENT N. L.	INPUT CURRENT F. L.
C01	0 to 100	10mA	<0.005%	<0.025%	<8mA	<250mA
C02	0 to 200	5mA	<0.0025%	<0.01%	<10mA	<180mA
C02N	0 to -200	5mA	<0.02%	<0.051%	<8mA	<210mA
C03	0 to 300	3.3mA	<0.0025%	<0.03%	<10mA	<160mA
C05	0 to 500	2mA	<0.002%	<0.004%	<16mA	<135mA
C05N	0 to -500	2mA	<0.005%	<0.005%	<20mA	<160mA
C06	0 to 600	1.67mA	<0.001%	<0.003%	<20mA	<150mA
C06N	0 to -600	1.67mA	<0.005%	<0.006%	<25mA	<130mA
C10	0 to 1,000	1mA	<0.004%	<0.003%	<30mA	<135mA
C10N	0 to -1,000	1mA	<0.001%	<0.002%	<25mA	<160mA
CPMT	0 to 1,250	1mA	<0.002%	<0.004%	<35mA	<170mA
CPMTN	0 to -1,250	1mA	<0.002%	<0.003%	<50mA	<120mA
C15	0 to 1,500	0.67mA	<0.001%	<0.002%	<50mA	<150mA
C15N	0 to -1,500	0.67mA	<0.001%	<0.002%	<40mA	<140mA
C20	0 to 2,000	0.5mA	<0.001%	<0.002%	<50mA	<150mA
C20N	0 to -2,000	0.5mA	<0.001%	<0.002%	<70mA	<190mA
C25	0 to 2,500	0.4mA	<0.02%	<0.08%	<40mA	<150mA
C25N	0 to -2,500	0.4mA	<0.002%	<0.1%	<70mA	<200mA
C30	0 to 3,000	0.33mA	<0.02%	<0.08%	<60mA	<180mA
C30N	0 to -3,000	0.33mA	<0.02%	<0.07%	<75mA	<180mA
C40	0 to 4,000	0.25mA	<0.0025%	<0.06%	<70mA	<150mA
C40N	0 to -4,000	0.25mA	<0.03%	<0.07%	<85mA	<200mA
C50	0 to 5,000	0.200mA	<0.1%	<0.1%	<80mA	<200mA
C50N	0 to -5,000	0.200mA	<0.1%	<0.1%	<80mA	<200mA
C60	0 to 6,000	0.166mA	<0.1%	<0.1%	<90mA	<200mA
C60N	0 to -6,000	0.166mA	<0.1%	<0.1%	<90mA	<200mA

Ultra-Miniature DC to HV DC Converter

0 to ±100 through 0 to ±3,000 VDC @ 0.5 Watts

Q Series

0.5" x 0.5" x 0.5"
(12.7mm x 12.7mm x 12.7mm)

FEATURES

- Ultra-Miniature Case
- Isolated
- Low Ripple
- Low Power Consumption
- 0.7V turn on voltage
- Low EMI/RFI
- Indefinite short circuit protection.

Model	Output Voltage	Output Current	Ripple	Input Current N. L.	Input Current F. L.
Q01	0 to 100	5 mA	<1.00%	<50mA	<175mA
Q02	0 to 200	2.5 mA	<0.25%	<50mA	<175mA
Q03	0 to 300	1.6 mA	<0.25%	<50mA	<175mA
Q04	0 to 400	1.25 mA	<0.05%	<50mA	<175mA
Q05	0 to 500	1 mA	<0.05%	<50mA	<175mA
Q06	0 to 600	0.8 mA	<0.10%	<50mA	<175mA
Q10	0 to 1,000	0.5 mA	<0.125%	<50mA	<175mA
Q12	0 to 1,200	0.4 mA	<0.25%	<50mA	<175mA
Q15	0 to 1,500	0.3 mA	<0.25%	<75mA	<200mA
Q20	0 to 2,000	0.25 m	<0.25%	<100mA	<200mA
Q30	0 to 3,000	0.16mA	<0.25%	<100mA	<200mA
Q30N	0 to -3,000	0.16mA	<0.25%	<100mA	<200mA

PC Board Mount DC to HV DC Converter

0 to ±100 through 0 to ±12,000 VDC up to 3 Watts

E Series

1.5" x 2.5" 0.85
(38.1mm x 63.5mm x 21.59mm)

FEATURES

- Isolated output
- Very low EMI/RFI
- Low ripple
- Proven reliability
- User selectable ouput polarity
- Output center tap option provides Pos. and Neg. H.V. from one compact module.

Model	Input Current N. L.	Input Current F. L.	Input Voltage	Output Voltage	Output Current	Ripple
E01	<150 mA	<400 mA	0 to 12	0 to 100	30 mA	<0.10%
E02	<125 mA	<400 mA	0 to 12	0 to 200	15 mA	<0.01%
E03	<125 mA	<400 mA	0 to 12	0 to 300	10 mA	<0.01%
E05	<125 mA	<400 mA	0 to 12	0 to 500	6 mA	<0.02%
E06	<125 mA	<400 mA	0 to 12	0 to 600	5 mA	<0.02%
E07.5	<125 mA	<400 mA	0 to 12	0 to 750	4 mA	<0.02%
E10	<125 mA	<400 mA	0 to 12	0 to 1,000	3 mA	<0.02%
E12	<125 mA	<400 mA	0 to 12	0 to 1,250	2.5 mA	<0.02%
E15	<125 mA	<400 mA	0 to 12	0 to 1,500	2 mA	<0.02%
E20	<125 mA	<400 mA	0 to 12	0 to 2,000	1.5 mA	<0.25%
E30	<150 mA	<350 mA	0 to 15	0 to 3,000	1 mA	<0.25%
E40	<150 mA	<350 mA	0 to 15	0 to 4,000	0.75 mA	<0.50%
E50	<150 mA	<350 mA	0 to 15	0 to 5,000	0.6 mA	<0.50%
E60	<150 mA	<350 mA	0 to 15	0 to 6,000	0.5 mA	<0.50%
E80	<150 mA	<300 mA	0 to 15	0 to 8,000	0.25 mA	<1.00%
E101	<150 mA	<300 mA	0 to 15	0 to 10,000	0.2 mA	<1.50%
E121	<150 mA	<300 mA	0 to 15	0 to 12,000	0.16 mA	<1.50%

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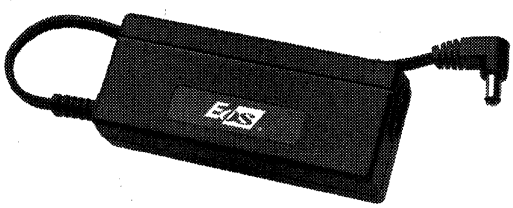
The ZVC series of products are the lightest and most densely packaged power supplies in the world. With a power density up to 6 watts per cubic inch, nothing in their class comes close. Miniature size, high efficiency and light weight make the ZVC series ideal for a wide range of applications, from notebook computers to point of sale equipment to data networking and telecommunications gear. These supplies deliver up to 65 watts of continuous power with convection cooling while maintaining excellent line and load regulation characteristics. Universal input and compliance to international safety and EMI standards allow these adapters to operate worldwide. They are enclosed in a molded plastic case and are available with a number of cord and connector options.

FEATURES

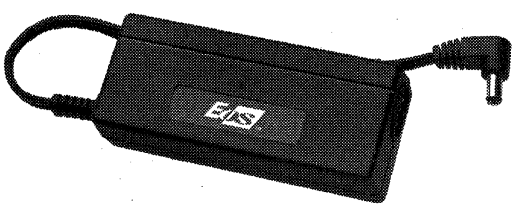
- **High Efficiency, above 90%**
- **Power Density up to 6 Watts/In^3**
- **Ultra Miniature Size**
- **Light Weight**
- **Universal Input, 90 to 264 VAC**
- **FCC & CISPR Level "B" EMI Filter**
- **Tight Regulation**
- **Overcurrent Protection**
- **Meets Worldwide Safety Standards**
- **CE Marked, UL and C-UL approved**
- **Impressive MTBF figures, above 100,000 hours**



ZVC30 SERIES
Output Voltage/Current Rating Chart

Model No.	VDC nom	I max	P max	P peak
ZVC30-12-D	12.0	2.5A	30W	35W
ZVC30-15-D	15.0	2.0A	30W	35W
ZVC30-18-D	18.0	1.7A	30W	35W
ZVC30-24-D	24.0	1.3A	30W	35W

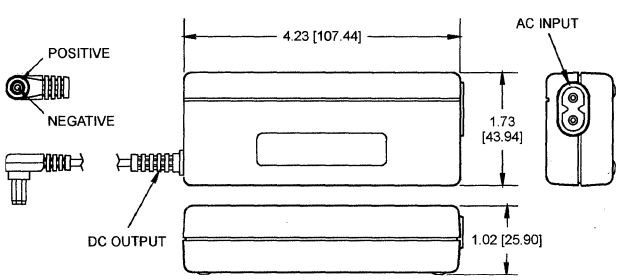
Case Size: 4.2 L x 1.7 W x 1.0 H

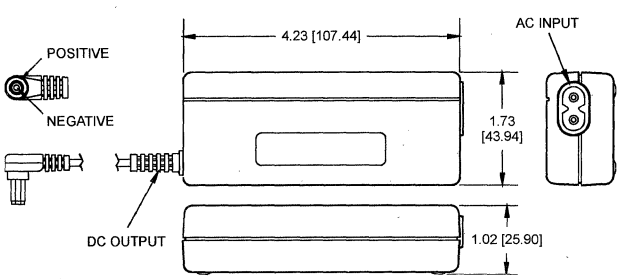


ZVC36 SERIES
Output Voltage/Current Rating Chart

Model No.	VDC nom	I max	P max	P peak
ZVC36-18-D	18.0	2.0A	36W	40W
ZVC36-24-D	24.0	1.5A	36W	40W

Case Size: 4.2 L x 1.7 W x 1.0 H





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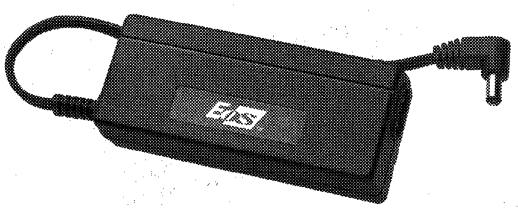
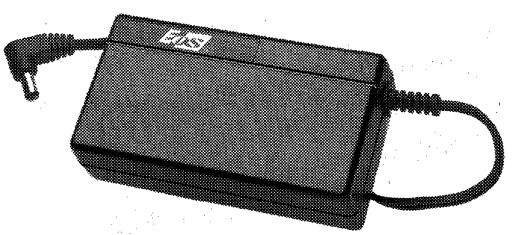
SPECIFICATIONS

INPUT		**Storage Temperature**	-40° to 85° C
Input Voltage	Universal, 90 to 264 VAC	**Cooling**	Free air convection
		EMI AND SAFETY	
Input Frequency	47 to 63 Hz	**Satety Standards**	Class 2, SELV, IEC950, EN60950, (VDE, GS compliant) with the following NORDIC deviations: Semko, SEV, UL 1950 (Listed), C-UL (Canada)
OUTPUT			
Output Power	30 to 65 watts		
Peak Power	35 to 90 watts		
Load Regulation	1.5%		
Line Regulation	1%		
Overcurrent Protection	Yes	**Leakage Current**	250µA maximum
ENVIRONMENTAL		**EMI/RFI**	FCC and EN55022 level "B"
Operating Temperature	0° to 40° C, full rated output power	**Input Transient**	IEC 1000-4-2, IEC 100-4-3, and IEC 1000-4-4





ZVC45LT SERIES
Output Voltage/Current Rating Chart

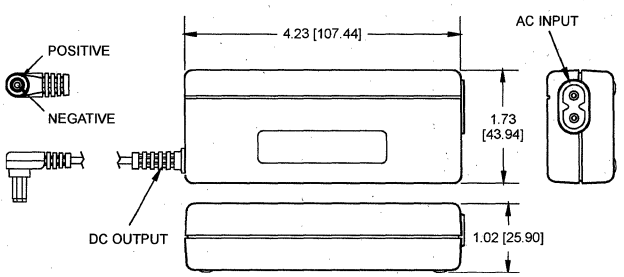
Model No.	VDC nom	I max	P max	P peak
ZVC40LT12E	12.0	3.3A	40W	45W
ZVC45LT15E	15.0	3.0A	45W	50W
ZVC45LT19E	19.0	2.4A	45W	50W
ZVC45LT24E	24.0	1.9A	45W	50W

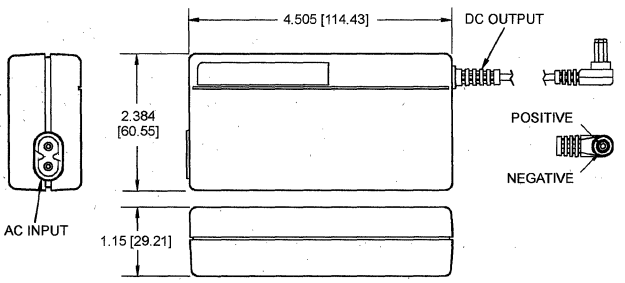
Case Size: 4.2 L x 1.7 W x 1.0 H

ZVC65NT SERIES
Output Voltage/Current Rating Chart

Model No.	VDC nom	I max	P max	P peak
ZVC60NT12E	12.0	5.0A	60W	65W
ZVC60NT15E	15.0	4.0A	60W	65W
ZVC65NT19E	19.0	3.4A	65W	70W
ZVC65NT24E	24.0	2.7A	65W	70W

Case Size: 4.5 L x 2.3 W x 1.1 H





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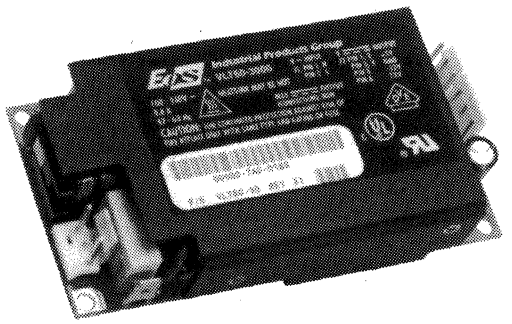
VLT60 and VLT100 SERIES

FEATURES

- **High Efficiency, above 85%**
- **Power Density up to 7.5 Watts/In^3**
- **Ultra Miniature Size**
- **FCC & CISPR Level "B" EMI Filter**
- **Meets Worldwide Safety Standards**
- **CE Marked, UL and C-UL approved**



SPECIFICATIONS

AC Input
Wide range: 90 - 264 VAC, 47-63Hz single phase

DC Outputs
See voltage/current rating charts

Output Power
VLT60: 60W continuous, VLT100:100W continuous

Hold-Up Time
20 msec minimum at full rated load and nominal AC input voltage.

Efficiency
87% measured at full load on main and 230 VAC input voltage.

Line and Load Regulation Characteristics
See voltage/current rating charts for individual model ratings. Line: Measured over a 90-132 VAC or 175-264 VAC line change. Load: Measured over a minimum to maximum load change

Initial Set Tolerance
Measured at 50% of full rated load on all outputs, line voltage at nominal

Overload Protection
Unit is protected against short circuit

Overvoltage Protection
Provided on the main output

Output Noise and Ripple
1% Pk-Pk maximum on any output (20 MHz bandwidth)

Power-Up Initialization Period
5.0 sec maximum turn-on delay

Input Protection
AC input line fuse provided. Internally located

Temperature Rating
Operating: 0°C to 50°C at full rated output power.
Storage: -55°C to +85°C

Cooling
Convection

EMI
CISPR 55022 and CISPR 55014, level "B"; FCC 47 CFR Part 15, level "B"

Leakage Current
Line to ground (max): 500µA

Safety Agency Approvals
The power supply meets Class 2 SELV of the following safety agency requirements: IEC 950, EN60950, with the following deviations: VDE, UL 1950 (Recognized Component) C-UL (Canadian Approval by UL), CE marked

VLT60-3000

Output Voltage/Current Rating Chart

Output	Voltage	Current	Voltage Set Tolerance	Line Reg.	Load Reg.	Cross Reg.
Main	+5V	8.0A	±1%	0.3%	1%	0.5%
Aux 1	+12V	3.0A	±3%	0.3%	5%	1.0%
Aux 2	-12V	0.8A	±5%	0.3%	5%	1.0%

Size: 4.0 L x 2.0 W x 1.0 H

VLT60-3001

Output Voltage/Current Rating Chart

Output	Voltage	Current	Voltage Set Tolerance	Line Reg.	Load Reg.	Cross Reg.
Main	+5V	8.0A	±1%	0.3%	1%	0.5%
Aux 1	+24V	1.5A	±3%	0.3%	5%	1.0%
Aux 2	-12V	0.8A	±5%	0.3%	5%	1.0%

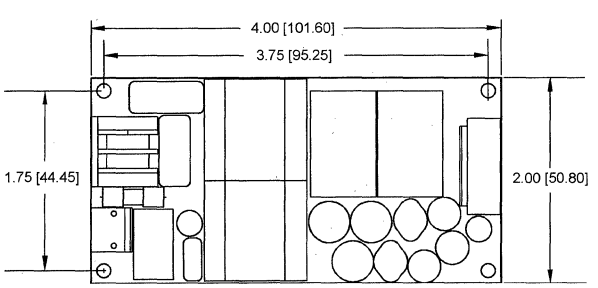
Size: 4.0 L x 2.0 W x 1.0 H

VLT60-3002

Output Voltage/Current Rating Chart

Output	Voltage	Current	Voltage Set Tolerance	Line Reg.	Load Reg.	Cross Reg.
Main	+5V	8.0A	±1%	0.3%	1%	0.5%
Aux 1	+15V	2.5A	±3%	0.3%	5%	1.0%
Aux 2	-15V	0.8A	±5%	0.3%	5%	1.0%

Size: 4.0 L x 2.0 W x 1.0 H



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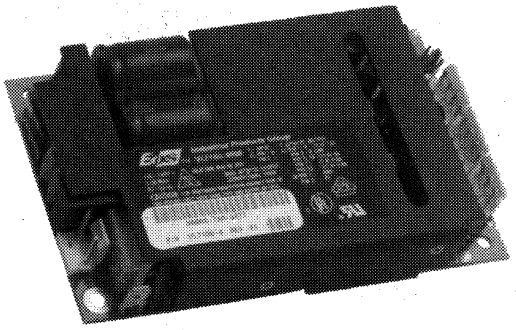

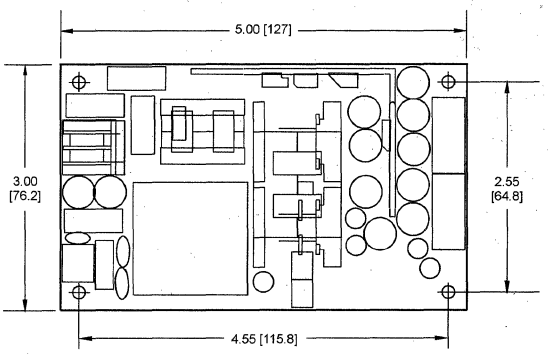

VLT100-4000

Output Voltage/Current Rating Chart

Output	Voltage	Current	Voltage Set Tolerance	Line Regulation	Load Regulation	Cross Regulation
Main	+5V	12.0A	±1%	0.3%	1%	0.5%
Aux 1	+12V	4.0A	±3%	0.3%	5%	1.0%
Aux 2	-12V	0.8A	±5%	0.3%	5%	1.0%
Aux 3	-5V	0.8A	±5%	0.3%	5%	1.0%

Size: 5.0 L x 3.0 W x 1.0 H

VLT100-4001

Output Voltage/Current Rating Chart

Output	Voltage	Current	Voltage Set Tolerance	Line Regulation	Load Regulation	Cross Regulation
Main	+5V	12.0A	±1%	0.3%	1%	0.5%
Aux 1	+24V	2.0A	±3%	0.3%	5%	1.0%
Aux 2	-12V	0.8A	±5%	0.3%	5%	1.0%
Aux 3	-12V	0.8A	±5%	0.3%	5%	1.0%

Size: 5.0 L x 3.0 W x 1.0 H

VLT100-4002

Output Voltage/Current Rating Chart

Output	Voltage	Current	Voltage Set Tolerance	Line Regulation	Load Regulation	Cross Regulation
Main	+5V	12.0A	±1%	0.3%	1%	0.5%
Aux 1	+15V	3.0A	±3%	0.3%	5%	1.0%
Aux 2	-15V	0.8A	±5%	0.3%	5%	1.0%
Aux 3	-5V	0.8A	±5%	0.3%	5%	1.0%

Size: 5.0 L x 3.0 W x 1.0 H

VLT100-4003

Output Voltage/Current Rating Chart

Output	Voltage	Current	Voltage Set Tolerance	Line Regulation	Load Regulation	Cross Regulation
Main	+5V	12.0A	±1%	0.3%	1%	0.5%
Aux 1	+12V	4.0A	±3%	0.3%	5%	1.0%
Aux 2	-12V	0.8A	±5%	0.3%	5%	1.0%
Aux 3	+24V	0.8A	±5%	0.3%	5%	1.0%

Size: 5.0 L x 3.0 W x 1.0 H

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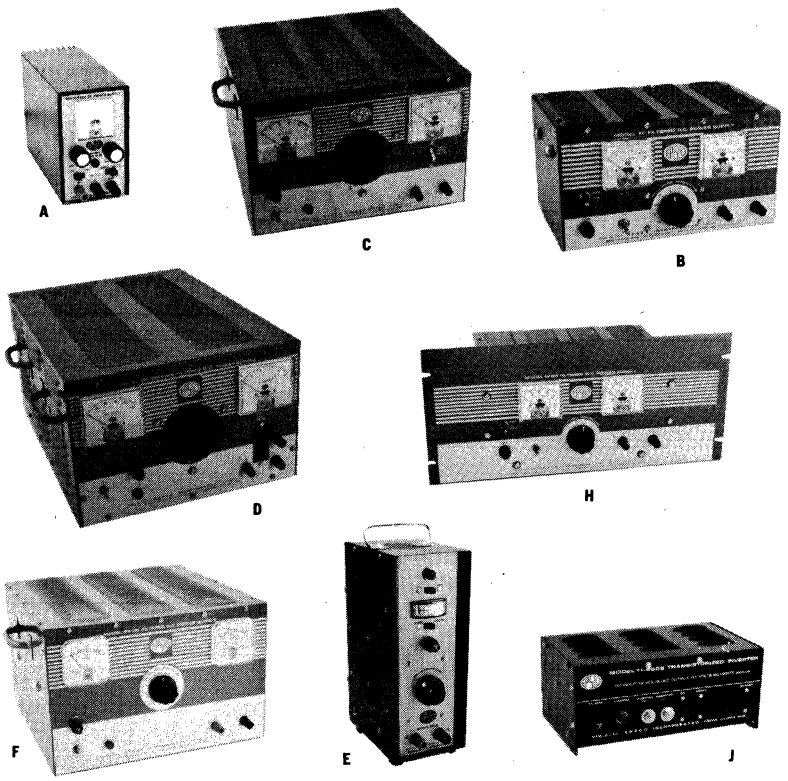

REGULATED

Model	Figure	Output DC Volts	Output Current	Line Reg.**	Load Reg.**	Max. Ripple, RMS	Meters††	DC Temp. Ohms*	Size (H x W x C)	Wt. Lbs.	Net Price
PSR-12-25	A	0-25	0-500mA	0.01% + 2mV	0.01%	100μV	0-30V/600mA	.006	5¼ x 3⅛ x 9⅛	6	$282.50
PSR-12-50	A	0-50	0-250mA	0.01% + 2mV	0.01%	100μV	0-60V/300mA	.02	5¼ x 3⅛ x 9⅛	6	282.50

INDUSTRIAL

Model	Figure	Output DC Volts	Output Current	Load Regulation* (V/A)†	Max. Ripple %	Meters††	DC Impedance Ohms*	Size (H x W x C)	Wt. Lbs.	Net Price
EF	B	0-28 0-14	0-5 0-5	0.9 (1-5A) 0.6 (1-5A)	1.0 1.0	0.50V, 0-6A	0.9 (1-5A) 0.6 (1-5A)	7 x 12 x 8½	21	$353.50
EFB	B	0-32 0-16	0-4 0-8	1.25 1.0	0.1 0.1	0-40/20V, 0-10A	1.25 1.0	7 x 12 x 8½	26	399.50
EFBR		0-32 0-16	0-4 0-8	1.25 1.0	0.1 0.1	0-40/20V, 0-10A	1.25 1.0	8¾ x 19 x 8½	34	463.50
GFL	C	0-125	0-5	1.5	0.5	0-150V, 0-5A	1.5	9¾ x 14¼ x 14¼	88	861.50
GFLR ‡	H	0-125	0-5	1.5	0.5	0-150V, 0-5A	1.5	10½ x 19 x 14¼	100	936.50
NFB	C	0-32	0-15	0.4	0.75	0-50V, 0-25A	0.4	9¾ x 14¼ x 14¼	84	805.50
NFBR ‡	H	0-32	0-15	0.4	0.75	0-50V, 0-25A	0.4	10½ x 19 x 14¼	97	861.50
PS-5	C	0-55	0-10	0.8	0.5	0-75V, 0-15A	0.7	9¾ x 14¼ x 14¼	70	766.50
PS-5R ‡	H	0-55	0-10	0.8	0.5	0-75V, 0-15A	0.7	10½ x 19 x 14¼	89	826.50
PS-1000-32	D	0-32	0-30	0.2	0.75	0-50V, 0-30A	0.2	9¾ x 14¼ x 19¼	113	1147.50
PS-1000-55	D	0-55	0-20	0.5	0.5	0-75V, 0-30A	0.5	9¾ x 14¼ x 19¼	113	1168.50
PS-1000-125	D	0-125	0-8A	1.0	Less than 1%	0-150V, 0-10A	1.0	9¾ x 14¼ x 19¼	113	1335.50

GENERAL PURPOSE

Model	Figure	Output DC Volts	Output Current	Load Regulation* (V/A)†	Max. Ripple %	Meters††	DC Impedance Ohms*	Size (H x W x C)	Wt. Lbs.	Net Price
D-612T	B	0-16 0-8	0-10 0-10	0.44 (3-10A) 0.3 (3-10A)	0.5 @ 5A 2 @ 10A	0-20V, 0-10A	0.44 (3-10A) 0.3 (3-10A)	7 x 12 x 8½	22	269.50
H	B	12 (adj.) 6 (adj.)	0-10 0-20	0.23 (3-10A) 0.15 (3-20A)	5 5	0-20V, 0-30A	0.23 (3-10A) 0.15 (3-20A)	7 x 12 x 8½	30	299.50
EC-1	E	12 (adj.)	0-5	1.4	0.5	None	1.4	10¾ x 4⅜ x 6½	11	129.50
EC-2	E	0-16	0-5	1.8	0.5	0-20V, 10A	1.8	10¾ x 4⅜ x 6½	11	199.50
PS-30	F	12 (adj.)	0-30	0.12 (6-30A)	1	0-20V, 0-50A	0.27	9¾ x 14¼ x 14¼	68	652.50
PS-50	F	12 (adj.)	0-50	0.17	0.5	0-20V, 0-50A	0.17	9¾ x 14¼ x 19¼	106	815.50

INVERTER

TI250B	J	**Input:** 12 vdc. **Output:** 117 vac, 60 Hz, 250 **VA** max. **Voltage Regulation:** 15% max. no load to full load constant battery voltage. **Frequency Regulation:** 4 Hz max. no load to full load.						4½ x 10 x 7½	13	229.50

‡ Rack mounted version.
* No-load to full-load unless otherwise specified.
† Output voltage change for each ampere of output current change, except on regulated units, % applies for either line or load.
†† All 2% accuracy except 5% for general purpose units. Rectifiers: Selenium and Silicon ("avalanche" characteristics on industrial units).
** From 105-125 VAC.

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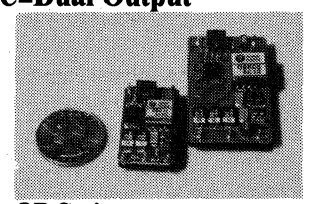
DC/DC Converters

OB Series-SINGLE & DUAL Output, (ab)=Vout, (cd)=Vin, SC=Single Output, WC=Dual Output

Power	Model	5V	12V	15V	24V	(ab)=22	(ab)=23	DIM. (in.)
3W	OBQ(ab)SC(cd)	0.5A	0.25A	0.2A	0.13A			.79x1.26x39
6W	OBR(ab)SC(cd)	1A	0.5A	0.4A	0.26A			1.14x1.8x39
10W	OBS(ab)SC(cd)	2A	0.85A	0.67A	0.42A			1.54x1.8x.43
10W	OHS(ab)SC(cd)	2A	.9A	.7A	.45A			1x2x.44
3W	OBQ(ab)WC(cd)					+/-12V @0.12A	+/-15V @0.1A	.79x1.26x39
6W	OBR(ab)WC(cd)					+/-12V @0.25A	+/-15V @0.2A	1.14x1.26x39
10W	OBS(ab)WC(cd)					+/-12V @0.42A	+/-15V @0.33A	1.54x1.8x.43



OB Series

VT & SV Series-SINGLE Output, (ab)=Vout, (cd)=12Vdc, 24Vdc, 48Vdc or SD=110Vdc

Power	Model	5V	12V	15V	24V	48V	DIM. (in.)
15W	VTM(ab)SC(cd)	3A	1.2A	1A	0.62A		3.15x4.6x0.98
25W	VTA(ab)SC(cd)	5A	2.1A	1.7A	1.1A	0.5A	3.34x5.3x1.22
50W	VTB(ab)SC(cd)	10A	4.3A	3.4A	2.5A	1A	3.8x6.3x1.3
100W	VTD(ab)SC-12	18A	9A	7A	4.5A	2.2A	1.89x7.48x3.82
100W	VTD(ab)SC(cd)	20A	9A	7A	5A	2A	1.89x7.48x3.82
150W	VTE(ab)SC-12	27A	13A	10A	6.5A	3.3A	2.76x7.87x3.82
150W	VTE(ab)SC(cd)	30A	14A	11A	7A	3.5A	2.76x7.87x3.82
15W	SVM(ab)SC(cd)	3A	1.3A	1A	0.7A	0.35A	2.36x3.27x0.79
25W	SVA(ab)SC(cd)	5A	2.1A	1.7A	1.1A	0.8A	2.87x3.7x0.05
50W	SVB(ab)SC-12	8A	3.3A	2.7A	1.7A	0.8A	3.27x4.4x1.3
50W	SVB(ab)SC(cd)	10A	4.3A	3.4A	2.5A	1.1A	3.27x4.4x1.3

VT Series-DC/DC, "cd"=12, 24, 48 or 110V("D")

DUAL Output

Power	Model	V1	V2)
15W	VTM22FWC(cd)	+12V @.75A	-12V @.5A
15W	VTM23FWC(cd)	+15V @.5A	-15V @.5A
15W	VTM24FWC(cd)	+12V @.8A	-5V @.8A
25W	VTA21FWC(cd)	5V @2.8A	24V @.45A
25W	VTA21FWC(cd)B	24V @.9A	5V @.1A
25W	VTA22FWC(cd)	12V @1.2A	12V @.9A
25W	VTA23FWC(cd)	15V @1A	15V @.7A
25W	VTA24FWC(cd)	5V @2.8A	12V @.9A
25W	VTA24FWC(cd)B	12V @1.6A	5V @1.2A
45W	VTB21FWC12	5V @5A	24V @.75A
45W	VTB21FWC(cd)	5V @5A	24C @.85A
45W	VTB21FWC(cd)B	24V @1.5A	5V @1.5A
45W	VTB22FWC(cd)	12V @2A	12V @1.7A
45W	VTB22FWC(cd)B	12V @3A	12V @.8A
45W	VTB23FWC(cd)	15V @1.7A	15V @1.3A
45W	VTB24FWC(cd)	5V @5A	12V @1.7A
45W	VTB24FWC(cd)B	12V @3A	5V @1.5A

TRIPLE Output

Power	Model	V1	V2)	V3	DIM (IN.)
12.5W	VTM01C(cd)	5V @1.8A	-12V @.5A	-12V @.15A	3.1X4.6X.98
12.5W	VTM03(cd)	5V @1.8A	-12V @.5A	-5V @.15A	3.1X4.6X.98
12.5W	VTM04C(cd)	5V @1.8A	-12V @.5A	-15V @.12A	3.1X4.6X.98
25W	VTA01C(cd)	5V @2.8A	12V @.5A	-12V @.4A	3.1X4.6X.98
25W	VTA01C(cd)B	12V @1.5A	5V @.7A	-12V @.25A	3.1X4.6X.98
25W	VTA03C(cd)	5V @2.8A	12V @.5A	-5V @.5A	3.1X4.6X.98
25W	VTA04C(cd)	5V @2.8A	+15V @.6A	-15V @.6A	3.1X4.6X.98
45W	VTB01C12	5V @2.7A	12V @.73A	-12V @.73A	3.1X4.6X.98
45W	VTB01C12B	12V @2.7A	+5V @1A	-12V @.4A	3.1X4.6X.98
45W	VTB03C12	5V @5A	12V @.73A	-5V @.73A	3.1X4.6X.98
45W	VTB04C12	5V @5A	+15V @.6	-15V @.6A	3.1X4.6X.98
45W	VTB01C(cd)	5V @5A	12V @.83A	-12V @.83A	3.1X4.6X.98
45W	VTB01C(cd)B	12V @3A	5V @1A	-12V @.43A	3.1X4.6X.98
45W	VTB03C(cd)	5V @5A	12V @.83A	-5V @.83A	3.1X4.6X.98
45W	VTB04C(cd)	5V @5A	+5V @.65A	-5V @.65A	3.1X4.6X.98

EPK Series-DC/DC, High Density Modules

Power	Input	Model	5V	12V	15V	24V	28V	Size (in.)
200W	22V~32V	EPKSC28	40A	20A	16A	10A	9A	2.4x3.6x.5
200W	36V~72V	EPKSC48	40A	20A	16A	10A	9A	2.4x3.6x.5
200W	220V~400V	EPKSC30	40A	20A	16A	10A	9A	2.4x3.6x.5
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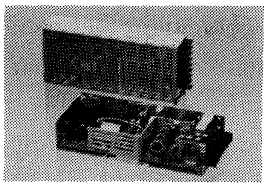
DC POWER SUPPLIES

AC/DC Switching Power Supplies

WR Series-AC Input, SINGLE Output (UL, cUL, VDE, CE)

Power	Model	Vin (ac)	Output Voltage @ (a) 5V	6V	12V	15V	24V	30V	36V	48V	Size, in.
15W	WRM- -SX-U	85 V	3	–	1.3	1	0.7	–	–	0.35	3.82x3.88x1.3
25W	WRA- -SX-U	to 264V	5	–	2.1	1.7	1.1	–	–	0.55	3.82x4.58x1.3
30W	WRT- -SX-U		6	–	2.5	2	1.4	–	–	0.7	3.82x4.88x1.4
50W	WRB- -SX-U		10	–	4.2	3.4	2.1	–	–	1	3.82x6.26x1.4
75W	WRC- -SX-U		15	12.5	6.3	5	3.2	2.5	2.1	1.6	3.7x6.92x1.49
100W	WRD- -SX-U		20	–	9	7	4.5	–	–	2.2	3.66x7.52x1.8
150W	WRE- -SX-U		30	–	14	11	7	–	–	3.5	2.56x8.15x3.6
300W	WRF- -SX-U		60	50	27	22	14	11	9	7	4.72x6.69x3.6
450W	WRP- -SX-U		90	75	40	32	20	16	13	10	4.72x7.48x3.6
600W	WRG- -SX		120	95	53	42	28	22	16	14	6.69x7.87x3.6

Also available in open board, molex type connectors including 3.3V output



WR Series

WR Series-Universal or Auto-Ranging AC Input, MULTIPLE Output (UL, cUL, VDE, CE)

Power	Model	Output Voltage @ (a) V1	V2	Size, (mm) Size, in.
15W	WRM21FWX-U	5V @ 1.2A	24V @ 0.4A	(97x98.5x33.5)
	WRM22FWX-U	12V @ 0.8A	12V @ 0.5A	3.82x3.88x1.32
	WRM23FWX-U	15V @ 0.5A	15V @ 0.5A	
	WRM24FWX-U	5V @ 1.8A	12V @ 0.5A	
25W	WRA21FWX	5V @ 2.6A	24V @ 0.5A	(97x116.5x33)
	WRA21FWX-U	24V @ 0.85A	5V @ 0.9A	3.82x4.6x1.5
	WRA22FWX-U	12V @ 1.2A	12V @ 0.9A	
	WRA23FWX-U	15V @ 0.85A	15V @ 0.85A	
	WRA24FWX-U	5V @ 2.6A	12V @ 0.9A	
	WRA24FWX-U-B	12V @ 1.7A	5V @ 0.9A	
30W	WRT21FWX-B	24V @ 1A	5V @ 1.5A	(97x124x36.5)
	WRT22FWX-B	12V @ 2A	12V @ 0.8A	3.82x4.88x1.43
	WRT23FWX-U	15V @ 1A	15V @ 1A	
	WRT24FWX-B	12V @ 2A	5V @ 1.5A	
50W	WRB21FWX-U	24V @ 1.7A	5V @ 1.8A	(97x159x39.5)
	WRB22FWX-U	12V @ 3A	12V @ 1.2A	3.82x6.26x1.56
	WRB23FWX-U	15V @ 1.8A	15V @ 1.5A	
	WRB24FWX-B	12V @ 3.7A	5V @ 1.8A	
	WRB24FWX	5V @ 5A	12V @ 1.8A	
65W	WRBJ21FWX-U	5V @ 7.5A	24V @ 1.8A 15Apk.	(97x174x42.5)
	WRBJ21FWX-B-U	24V @ 1.8A ,2.3Apk	5V @ 4.5A	3.82x6.85x1.67
	WRBJ22FWX-B-U	12V @ 3.5A, 4.5Apk	12V @ 2A	
	WRBJ23FWX-U	15V @ 2.5A	15V @ 2.0A	
	WRBJ24FWX-U	5V @ 7.5A	12V @ 2.3A, 2.8Apk	
	WRBJ24FWX-B-U	12V @ 3.5A, 4.4Apk	5V @ 4.5A	
80W	WRCJ21FWX	5V @ 0.5 - 10A	24V @ 2A, 3Apk	(98x208x42)
	WRCJ21FWX-B	5V @ 0.2 - 6A	24V @ 3A, 3.5Apk	3.86x8.12x1.65
	WRCJ22FWX	12V @ 0.2 - 5A	12V @ 4A, 5Apk	
	WRCJ23FWX	15V @ 0.2 - 4A	15V @ 3.2A	
	WRCJ24FWX	5V @ .5-10A	12V @ 4.2A, 5Apk	
	WRCJ24FWX-B	5V @ 0.5 - 6A	12V @ 6A, 7Apk	
110W	WRDJ21FWX	5V @ 0.5 - 15A	24V @ 3A, 4Apk	(98x222x48)
	WRDJ22FWX	12V @ 0.2 - 7A	24V @ 0-4.2,5Apk	3.86x8.74x1.9
	WRDJ23FWX	15V @ 0.2 - 5.6A	15V @ 3.6A	
	WRDJ24FWX	5V @ 0.5 - 15A	12V @ 6A, 7Apk	
	WRDJ21FWX-B	24V @ 4.3A, 5Apk	5V @ 0-1.5A	

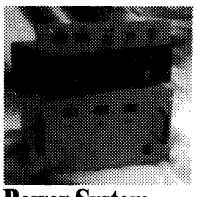
Power	Model	Output Voltage @ (a) V1	V2	V3	V4	Size, (mm) Size, in.
15W	WRM01X-U	5V @ 2A	12V @ .3A	Neg 12V @ .2A		(97x98.5x33.5)
	WRM03X-U	to 264Vac	5V @ 2A	Neg 5V @ .2A		3.82x3.88x1.32
	WRM04X-U	5V @ 2A	15V @ .2A	-15V @ .2A		
25W	WRA01X-U	5V @ 3A	12V @ 0.5A	Neg 12V @ .35A		(97x116.5x33)
	WRA03X-U	5V @ 3A	12V @ 0.5A	Neg 5V @. 35A		3.82x4.6x1.5
	WRA04X-U	5V @ 3A	15V @ .35A	Neg 15V@ 3.5A		
30W	WRT01X	5V @ 3A	12V @ 1.2A	Neg 12V @ .3A		(97x124x36.5)
	WRT03X	5V @ 3A	12V @ 1.2A	Neg 5V @ .3A		3.82x4.88x1.43
	WRT04X	5V @ 3A	15V @ .5A	Neg 15V @ .5A		
50W	WRB01X	5V @ 5A	12V @ 1.5A	Neg 12V @ .5A		(97x159x39.5)
	WRB03X	5V @ 5A	12V @ 1.5A	Neg 5V @ .5		3.82x6.26x1.56
	WRB04X	5V @ 5A	15V @ 1.2A	Neg 15V @ .5		
80W	WRCJ01X	5V @ 1 - 10A	12V @ 4A, 5Apk	Neg 12V @ .1A		(98x208x42)
	WRCJ03X	5V @ 1 - 10A	12V @ 4A, 5Apk	Neg 5V @ 1.5A		3.86x8.12x1.65
	WRCJ04X	5V @ 1 - 10A	15V @ 3.2A	Neg 15V @ 1A		
	WRCJ06X	5V @ 1 - 10A	12V @ 2A, 3Apk	12V @ 1A		
110W	WRDJ01X	5V @ 1 - 15A	24V @ 4.2A, 5Apk	Neg 12V @ 1.2A		(98x222x48)
	WRDJ03X	5V @ 1 - 15A	24V @ 4.2A, 5Apk	Neg 15V @ 1.5A		3.86x8.74x1.9
	WRDJ04X	5V @ 1 - 15A	15V @ 3.6A	Neg 15V @ 1A		
	WRDJ06X	5V @ 1 - 15A	24V @ 2.1A, 3Apk	12V @ 1.2 A		
110W	WRDQ41X	5V @ 1-12A	5V @ 6A	12V @ 1.2	Neg 12V @ 1.2A	(115x230x48)
	WRDQ42X	5V @ 1-12A	12V @ 4.2A	12V @ 1.2	Neg 12V @ 1.2A	4.52x9.06x1.89
	WRDQ43X	5V @ 1-12A	24V @ 2.1A	12V @ 1.2	Neg 12V @ 1.2A	
	WRDQ44X	5V @ 1-12A	5V @ 6A	15V @ 1A	Neg 15V @ 1A	
	WRDQ45X	5V @ 1-12A	12V @ 4.2A	15V @ 1A	Neg 15V @ 1A	
	WRDQ46X	5V @ 1-12A	24V @ 2.1A	15V @ 1A	Neg 15V @ 1A	

FH Series-AC Input, SINGLE Output, Power Factor Corrected

Power	Model	Input	Output Voltage at (A) 3.3V	5V	6V	12V	15V	24V	30V	36V	48V
100W	FHD- -SX	85 to 264Vac	–	20A	–	9A	7A	4.5A	–	–	2.2A
150W	FHE- -SX		30A	30A	–	14A	11A	7A	–	–	3.5A
300W	FHF- -SX		60A	60A	50A	27A	22A	14A	11A	9A	7A
450W	FHP- -SX		90A	90A	75A	40A	32A	20A	16A	13A	10A
600W	FHG-SX	85 to 265Vac	120A	120A	100A	53A	42A	27A	21.6A	18A	13.5
1000W	FHH-SX	85 to 264Vac	200A	200A	167A	88A	70A	44A	35A	29A	48V

Also available in Multi-Output

Please call us at **1-800-ETA-POWR** for products not shown here, and to discuss your individual needs.



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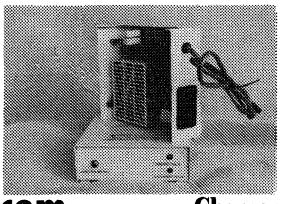

Charger

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POWER SYSTEM SOLUTIONS

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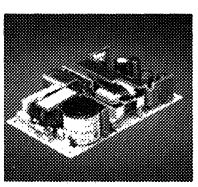
Foresight Electronics has built a reputation as one of the most dependable and responsible power sources in the nation. From its inception, Foresight has been dedicated to marketing power products *only*. Moreover, this marketing strategy centers on providing power solutions, rather than just selling power products. Early on, we planned to provide design and application support to our customers' design engineering departments. We know our customers are locked into hectic product development schedules. Our staff of 6 Application Engineers; in conjunction with our technically trained sales people, bring design expertise and experience to bear when providing customers with the right power supplies to meet their needs.

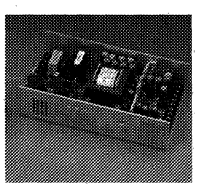
Foresight functions very much like a Consulting Engineering firm that specializes in power supplies. During the design phase, our technical staff assists with solving EMI/RFI problems, certification of all agency standards (UL, CSA, TUV and VDE) and trouble shooting — all of which uniquely support customer engineering requirements. Our full range of standard power sources include Switching power supplies, Desk Top power supplies and DC/DC Converters.

Foresight maintains an inventory of $4.5 million from 20 manufacturers; covering all types of OEM power requirements— the most complete and diversified offering of power supplies and DC/DC converters in the market today. Please call for our 625 page Power Supply Source Book, featured on the following page, or you can find us on the internet; http://www.fse-power.com.

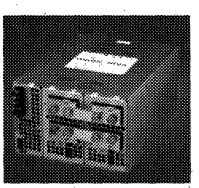
SWITCHING POWER SUPPLIES



LOW POWER
10 TO 225 WATTS

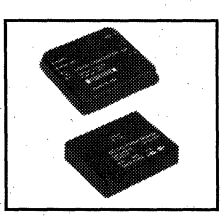


MEDIUM POWER
230 TO 500 WATTS



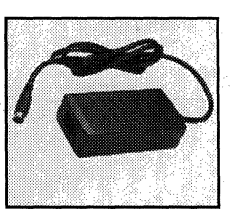
HIGH POWER
500 TO 3,000 WATTS

DC/DC CONVERTERS



1.5 TO 500 WATTS

DESK TOP POWER SUPPLIES



10 TO 100 WATTS

FSE

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On the Internet: http://www.fse-power.com

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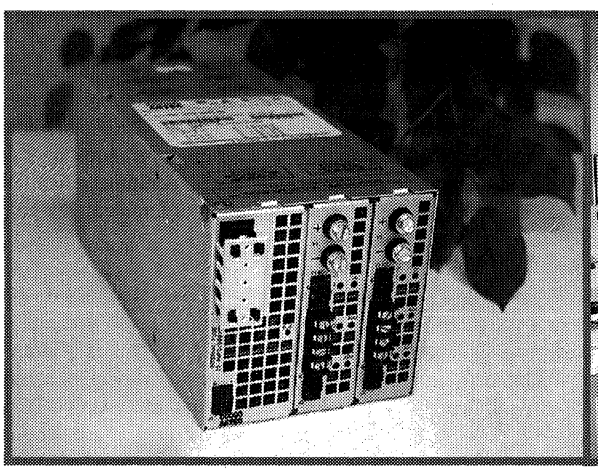
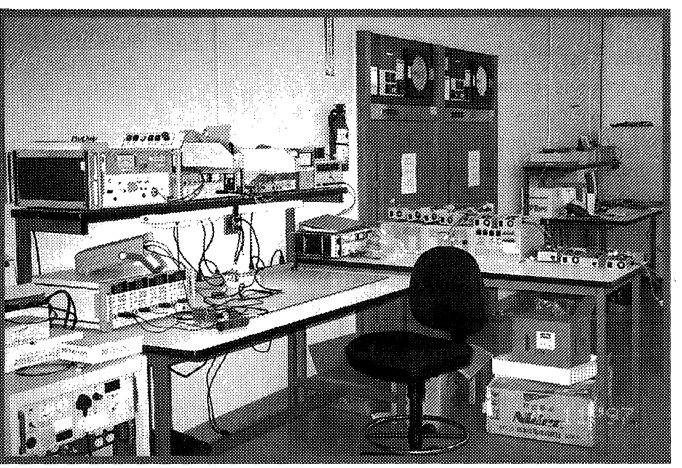
Alacrity— *the newest member of the Foresight Group*—delivers an exciting new concept in Power Integration for all levels of power supply design and manufacturing.

Using industry standard power supplies, Alacrity can build any combination of power supplies into a custom system. We can work with you to design the power system you need or turnkey the design you have created. By using available standard products, costs and delivery time are reduced; while quality and reliability are increased.

Alacrity's design engineers can work with you to build a product that will support your needs, while maintaining all agency certifications. We are capable of assisting you in the certification of your system to all agency standards including, UL, CSA, TUV and VDE standards.





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- DC/DC Converters - 1 to 500 watts
- Distributed Power - to 2,000 watts
- Desktop/Wall Mount - 1 to 70 watts
- Medical Power - 6 to 288 watts
- Hot Plug Systems - to 5,000 watts

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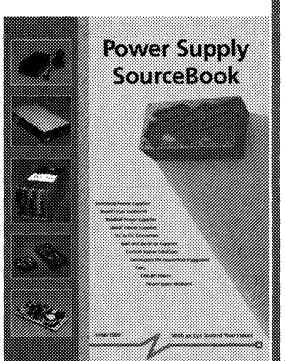

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CAM

MINIGLOSSARY CAPACITORS

Anode: One of two plates or conductors. In polarized capacitors, the anode should be connected to the positive conductor in the circuit.

Capacitive Reactance: The opposition (in ohms) of capacitance to the flow of alternating current, equal to the reciprocal of the product of the angular frequency (2π times frequency in Hertz) of the current times the capacitance in farads.

Cathode: One of two plates or conductors. In electrostatic capacitors the cathode is metallic. In electrolytic capacitors the cathode is a liquid, gel or other conductive material which is in intimate contact with a metallic cathodic connection.

Dielectric Constant: The ratio of the capacitance of a capacitor with some material other than air between the capacitor plates to the capacitance of the same capacitor with air between the plates. For example, the dielectric constants of air, Teflon®, polystyrene and ruby mica are 1, 2.1, 2.6 and 5.4, respectively.

Electrolytic: A capacitor with one metallic conductor (generally the anode) and with a liquid or semiconductor cathode. Nonpolarized electrolytic capacitors generally have two equal anodes as well as the liquid cathode. These anodes operate alternately as anode and cathodic connection as alternating current is applied.

Electrostatic: One of two general classes of capacitors in which two or more discrete metallic conductors are present and separated by an insulating dielectric material. Examples include: mica, ceramic, film, and paper types.

Farad: The basic unit of measure in capacitors. A capacitor charged to one volt with a charge of one coulomb (one ampere flowing for one second) has a capacitance of one farad. Capacitors are generally rated at portions of a farad (microfarads or picofarads).

1 farad (F) = 1,000,000 microfarads (μF) 1 microfarad (μF) = 1,000,000 picofarads (pF)

Impedance: All capacitors exhibit impedance. It is a function of capacitor type and internal construction. This can be particularly important in certain applications such as filters for switching power supplies. Capacitors used in these applications often have special multiple tab construction to shorten current paths and to reduce internal resistance.

Leakage Current: Expressed as dcl for electrolytic capacitors, a measure of the intrinsic losses in a charged capacitor. Generally speaking, the lower the dcl, the higher quality the capacitor.

Power Factor: A measure of the overall efficiency of a capacitor. Power factor ratings take all internal losses into consideration in a complex formula. This parameter of certain capacitors is often very important in AC applications such as motor-start and/or motor-run capacitors

Rated Voltage: The rated working voltage of a capacitor. Generally expressed in DC Volts (Vdcw). This is the voltage at which a capacitor may be safely operated at 25°C continuously within its overall parameters.

Ripple Current: The total amount of alternating and direct current that may be applied to an electrolytic capacitor under stated conditions. In general, the higher the ripple current applied, the shorter the operating life of the capacitor will be. Application of significantly higher than rated ripple currents can shorten the capacitor life dramatically and may even cause catastrophic failure (explosion).

Surge Voltage: The momentary surge voltage which may be applied for a stated length of time without doing permanent damage to the unit.

Temperature: Capacitors are generally rated at 25°C at sea level under specific humidity conditions. Operating temperature ranges are also given, along with derating (reliability) curves for operation at temperatures other than 25°C.

Temperature Coefficient: Expressed as TC in ppm (parts per million) or in percent (%) from the norm of 25°C. This is seldom a straight line and may vary widely for certain types. Most capacitors have positive TC in that the capacitance increases as temperature increases. Some types, however, have negative TC in that the capacitance decreases as temperature increases.

Ceramic Capacitor Codes
(Capacitance Given In pF)

Color	Digit	Multiplier	Tolerance			Temperature Coefficient ppm°C	Significant Figure	Multiplier
			Class 1		Class 2			
			10pF or less	Over 10pF				
Black	0	1	±2.0pF	±20%	±20%	0	0.0	–1
Brown	1	10	±0.1pF	±1%		–33		–10
Red	2	100		±2%		–75	1.0	–100
Orange	3	1000		±3%		–150	1.5	–1000
Yellow	4	10000			+100% –0%	–220	2.0	–10000
Green	5		±0.5pF	±5%	±5%	–330	3.3	+1
Blue	6					–470	4.7	+10
Violet	7					–750	7.5	+100
Gray	8	0.01	±0.25pF		+80% –20%	+150 to –1500		+1000
White	9	0.1	±1.0pF	±10%	±10%	+100 to –750		+10000
Silver								
Gold								

GAMMA HIGH VOLTAGE RESEARCH INC.

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HIGH VOLTAGE POWER SUPPLIES
REGULATED CONSTANT VOLTAGE CONSTANT CURRENT

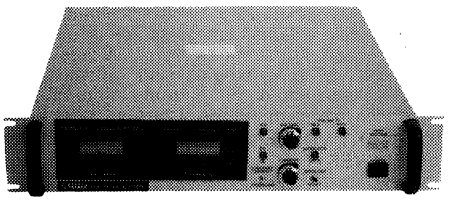
1KV to 125KV
20 WATTS to 600 WATTS

NEW

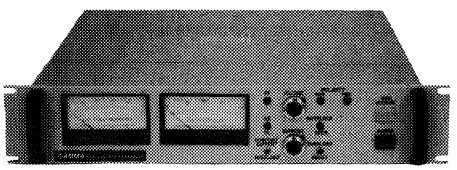
SERIES TR
SPECIFICATIONS

ALL MODELS 3 1/2" HIGH

INPUT VOLTAGE:	115 or 220 VAC ±10% 50/60 Hz
OUTPUT VOLTAGE:	Models available from 1KV to 125KV, adjustable from 0 to maximum output rating. Positive, Negative or Reversible polarity.
OUTPUT CURRENT:	Models available from 20 watts to 600 watts.
FRONT PANEL CONTROLS:	Metering: Voltage and current continuously available via 10-turn potentiometers. Kilovolt and current meters - digital or analog available. Constant Current or Constant Voltage mode of operation indicator, LEDs. Constant Current or Overload Trip selector switch. Overload reset switch. Interlock status indicator. Polarity indicator. High Voltage On Switch/Indicator. Power On Switch/Indicator.
VOLTAGE REGULATION:	Line: Better than ±0.005% over specified input range. Load: 0.005% for full load change.
CURRENT REGULATION:	Line: Better than ±0.005% over specified input range. Load: 0.05% of maximum current.
RIPPLE:	0.05%
TEMP. COEFFICIENT:	100ppm/°C
STABILITY:	0.01%/hour, 0.03%/8 hours.
CONNECTORS:	1. High Voltage: All models are provided with 10 feet of shielded high voltage cable. The cable is fitted with bushings to mate with a re-entrant receptacle. 2. Input: 3-wire line cord. 3. Low Voltage: Rear mounted barrier terminal block for: a) External interlock b) Voltage Programming c) Current Programming d) V/I monitors e) TTL Enable
SIZE:	3 1/2" high x 19" deep x 19" wide.



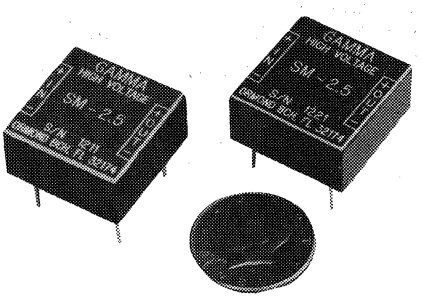
.5" LED DISPLAY



HIGH VOLTAGE POWER SUPPLIES
MODULAR

SUB-MINIATURE HIGH VOLTAGE POWER SUPPLIES

SERIES SM
6 MODELS: 0-250 VDC to 0-3000 VDC



PHYSICAL CHARACTERISTICS:

DIMENSIONS:	1.25" x 1.25" x .63" (H)
VOLUME:	.98 cubic inch
WEIGHT:	Approximately 1.5 oz.
PACKAGING:	Solid Encapsulation
TERMINATIONS:	4pc pins (.043 dia. holes)

ENVIRONMENTAL CHARACTERISTICS:

TEMPERATURE RANGE:	–20° to +70°C

ELECTRICAL CHARACTERISTICS:

INPUT VOLTAGE:	0 to 12 VDC
INPUT CURRENT:	85 mA (F.L.) Nominal
OUTPUT VOLTAGE:	Proportional to Input (See Table)
OUTPUT CURRENT:	See Table
LOAD REGULATION:	5% (1/2 load to full load)
RIPPLE:	< 0.5% P-P
INSULATION STRENGTH:	> 3500 VDC Input/Output

ELECTRICAL SPECIFICATIONS:

MODEL	OUTPUT VOLTAGE*	OUTPUT CURRENT
SM-2.5	0 to 250VDC	2 mA
SM-5	0 to 500VDC	1 mA
SM-10	0 to 1000VDC	250 uA
SM-15	0 to 1500VDC	200 uA
SM-25	0 to 2500VDC	200 uA
SM-30	0 to 3000VDC	100 uA

* output linear from approximately 10% to maximum output voltage
INPUT/OUTPUT FLOATING.

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HIGH VOLTAGE POWER SUPPLIES

REGULATED CONSTANT VOLTAGE CONSTANT CURRENT

1KV to 400KV
30 WATTS to 3000 WATTS

SERIES RR

FEATURES

LOW STORED ENERGY: The use of high frequency (>20KHz), high voltage power supply techniques allows stored energy to be minimized thus insuring maximum safety to operating personnel and sensitive loads.

PROGRAMMING OUTPUT VOLTAGE & OUTPUT CURRENT: This feature allows output voltage or output current to be remotely programmed from either an external voltage source or with external potentiometers from the internal reference voltage. A zero to +5V voltage source is required for full scale programming. Internal circuitry insures that the output voltage and output current cannot be externally programmed beyond the maximum settings of the front panel controls.

CONSTANT VOLTAGE/CONSTANT CURRENT WITH AUTOMATIC CROSSOVER: Dual control loops allow either voltage or current to be precisely regulated. Each parameter is controlled and limited by a ten-turn potentiometer on the front panel. The constant voltage/constant current automatic crossover feature allows the power supply to be used as a voltage regulated current limited system or as a current regulated system. Thus, both output voltage and output current are totally under operator control under all load conditions, including overload and arc-over conditions.

OVERLOAD, ARC-OVER & SHORT CIRCUIT PROTECTION: Full protection against any overload condition is inherent in the constant voltage/constant current design concept. This is augmented by the liberal use of surge limiting resistors and reactive limiting. On 600W, 1KW and 3KW units customer may select either constant current or a variable overload trip by means of a front panel mounted switch.

VOLTAGE REGULATION: Line and load regulation is better than 0.005%. Note: On 1000 watt and 3000 watt units load regulation is better than 0.01%

CURRENT REGULATION: Current regulation is better than 75uA.

RIPPLE: At 150 watts ripple of 0.02%. At 300, 600 and 1000 watts ripple of 0.05%. At 3000 watts ripple of 0.1%.

EFFICIENCY: Efficiency is typically greater than 75% at full load.

EXTERNAL POLARITY REVERSAL (Reversible Units Only): A reversing switch mechanism located at the rear of the power supply facilitates polarity reversal.

EXTERNAL INTERLOCK/OUTPUT INHIBIT: Circuitry is provided so that the user can, if desired, inhibit, output voltage. External contact closure located on the rear terminal strip will enable the power supply. Open contacts will inhibit the power supply.

FLOATING GROUND: This feature allows the low end return of the power supply to be isolated with respect to chassis ground. Consult factory.

REMOTE OUTPUT VOLTAGE & CURRENT MONITORING: Voltage monitoring and true output current monitoring signals are provided at the rear terminal strip.

MODULAR CONSTRUCTION: Modular construction techniques are used throughout this design thus reducing downtime in critical applications.

OPTIONS

ZERO VOLTAGE START INTERLOCK (ZVS): To prevent accidental damage to loads, the output voltage control must be set to zero before the high voltage can be applied.

VARIABLE OVERVOLTAGE PROTECTION (VOV): This option causes the power supply to shut down when the output voltage exceeds the setting of the overvoltage control potentiometer located at the rear of the power supply (adjustable from 20% to 110% of maximum rated output voltage.)

VARIABLE OVERLOAD TRIPOUT (VOL): This option causes the power supply to shut down when the output current equals the setting of the front panel control (adjustable from 20% to 110% of maximum output current of the power supply.) Standard feature on 600W, 1000W and 3000W units. Front panel control allows user to activate this feature when desired.

DIGITAL PANEL METER: SINGLE METER (SDPM)—TWO METERS (DDPM): A Single 3 1/2 digit meter reading both voltage and current is available. This meter replaces the two analog meters normally provided. Two 3 1/2 digit meters can also be provided in place of the two analog meters normally provided.

SLOW START (SS): The slow start option enables the output voltage of the power supply to ramp to its maximum output voltage setting at a linear rate. This rate can be factory set from one to fifteen seconds.

SLAVED BI-POLAR OPERATION (SBP): Any two power supplies of the same voltage rating may be operated as a Bi-Polar pair. One power supply acting as the master controller will control both power supplies from zero to maximum rated output voltage. The output voltages of both supplies will track each other within 2% from 10% to maximum rated output voltage. Each power supply is also capable of operating independently.

TTL (TTL): Compatible "enable" line.

AUXILIARY OUTPUT/FOCUS TAP (FT): This option provides an independent auxiliary output which is variable from zero to maximum rated voltage up to 15KV at 300uA maximum. Control is achieved via front panel mounted potentiometer. For other voltages and power levels consult factory. Multiple auxiliary outputs are also available. Consult factory.

REMOTE CONTROL PANEL (RCP): Any standard model can be supplied with a control panel remote from the basic power supply. 20 feet of appropriately shielded interconnection is provided. This remote control panel replaces the front panel normally provided on standard units.

220 VOLT INPUT—50/60 HZ (220): 220 volt, 50/60 Hz input is available.

BENCH CABINET (BC): A deluxe style cabinet is available for all models.

ORDERING INFORMATION: *ADD LETTERS IN PARENTHESIS AS SUFFIX TO MODEL NUMBER.*

SIZE/WEIGHT: 60, 150 & 300 WATT UNITS: 16" DEEP X 19" WIDE
600, 1000 & 3000 WATT UNITS: 17" DEEP X 19" DEEP

	60 WATT UNITS			150 AND 300 WATT UNITS		
HEIGHT	FIXED	REVERSIBLE	WEIGHT	FIXED	REVERSIBLE	WEIGHT
5 1/4"	Up to 125kV	Up to 40kV	35 lbs. max.	Up to 125kV	Up to 40kV	35 lbs. max.
10 1/2"	—	50 to 100kV	70 lbs. max.	—	50 to 100kV	70 lbs. max.
5 1/4" OPEN STACK	—	—	—	150 to 400kV	N/A	25 lbs. max. (Plus H.V. Assembly)

	60 and 1000 WATT UNITS			3000 WATT UNITS		
HEIGHT	FIXED	REVERSIBLE	WEIGHT	FIXED	REVERSIBLE	WEIGHT
5 1/4"	Up to 125kV	Up to 20kV	35 lbs. max.	—	—	—
10 1/2"	—	30 to 100kV	85 lbs. max.	—	—	—
5 1/4" OPEN STACK	150 to 400kV	N/A	25 lbs. max. (Plus H.V. Assembly)	—	—	—
15 3/4"	—	—	—	Up to 125kV	Up to 100kV	100 lbs. max.
10 1/2" OPEN STACK	—	—	—	150 to 400kV	N/A	70 lbs. max. (Plus H.V. Assembly)

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HIGH VOLTAGE POWER SUPPLIES

1KV to 400KV
30 WATTS to 3000 WATTS

REGULATED CONSTANT VOLTAGE CONSTANT CURRENT

SERIES RR TO 300 WATTS

SPECIFICATIONS

INPUT VOLTAGE: 105-125V RMS at 5 Amps maximum (50-60 Hz)

OUTPUT VOLTAGE: Continuously adjustable from zero to maximum output voltage ratings of power supply. See Model selection guide.

***VOLTAGE REGULATION:** Line: Better than ±0.005% over specified input range. Load: 0.005% for full load change.

***CURRENT REGULATION:** Line: Better than ±0.005% over specified input range. Load: Better than 75uA for a 75% change in compliance voltage.

‡RIPPLE: 60 and 50 Watt units: 0.02% 300 Watt units: 0.05%

***TEMPERATURE COEFFICIENT:** 100ppm/°C over the range of 0 to 60°C.

***STABILITY:** 0.01%/hour. 0.03%/8 hours.

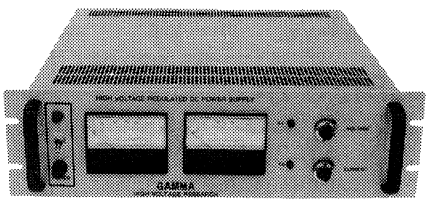
CONTROLS:
1. Power (HV ON)
2. Output Voltage (10-turn potentiometer)
3. Output Current (10-turn potentiometer)

INDICATORS:
1. Power (HV ON)
2. Output Voltage (meter ±2% of full scale)
3. Output Current (meter ±2% of full scale)

CONNECTORS:
1. High Voltage: All models are provided with 6 feet of shielded high voltage cable. The cables are fitted with bushings to mate with a re-entrant receptacle.
2. Input: 3-wire line cord.
3. Low Voltage. Rear mounted barrier terminal block for:
   a) External Interlock
   b) Voltage Programming
   c) Current Programming
   d) V/I Monitors

MODEL SELECTOR GUIDE†

OUTPUT VOLTAGE (kV)	60 WATT MODELS		150 WATT MODELS		300 WATT MODELS	
	Model	(mA) Rating	Model	(mA) Rating	Model	(mA) Rating
0-1.5	RR1.5-40	40	RR1.5-100	100	—	—
0-3	RR3-20	20	RR3-50	50	RR3-100	100
0-5	RR5-12	12	RR5-30	30	RR5-60	60
0-10	RR10-6	6	RR10-15	15	RR10-30	30
0-15	RR15-4	4	RR15-10	10	RR15-20	20
0-20	RR20-3	3	RR20-7.5	7.5	RR20-15	15
0-30	RR30-2	2	RR30-5	5	RR30-10	10
0-40	RR40-1.5	1.5	RR40-3.75	3.75	RR40-7.5	7.5
0-50	RR50-1.25	1.25	RR50-3	3	RR50-6	6
0-60	RR60-1	1	RR60-2.5	2.5	RR60-5	5
0-80	RR80-.75	0.75	RR80-1.8	1.8	RR80-3.75	3.75
0-100	RR100-.6	0.6	RR100-1.5	1.5	RR100-3	3
0-125	RR125-.5	0.5	RR125-1.2	1.2	RR125-2.5	2.5
0-150	N/A		RR150-1	1	RR150-2	2
0-200	N/A		RR200-.75	0.75	RR200-1.5	1.5
0-300	N/A		RR300-.5	0.5	RR300-1	1
0-400	N/A		RR400-3.75	0.375	RR400-.75	0.75



SERIES RR TO 300 WATTS

* For voltage range from 10% to 100% of rated output. ‡For voltages 150KV and above consult factory. †Lower and higher power models are available. Consult factory.
All units are available in positive or negative polarity. Units up to 100kV are also available in reversible polarity. Add P, N or R as suffix to Model Number to indicate polarity desired.

SERIES RR 600 WATTS, 1000 WATTS, 3000 WATTS

SPECIFICATIONS

INPUT VOLTAGE: 600W: 105-125 RMS at 7 Amps maximum (50-60 Hz)
1000W: 220V RMS at 7 Amps maximum (50-60 Hz)
3000W: 220V RMS at 17 Amps maximum (50-60 Hz)
Also available with 3 ∅ input.

OUTPUT VOLTAGE: Continuously adjustable from zero to maximum output voltage rating of power supply. See Model selection guide.

***VOLTAGE REGULATION:** Line: Better than ±0.005% over specified input range. Load: 600W: 0.005% for full load change. IKW & 3KW: 0.01% for full load change.

***CURRENT REGULATION:** Line: Better than ±0.005% over specified input range. Load: Better than 75uA for a 75% change of compliance voltage.

‡RIPPLE: 600, 1KW units:0.05% 3000 Watt units: 0.1%

***TEMPERATURE COEFFICIENT:** 100ppm/°C over the range of 0 to 60°C.

***STABILITY:** 0.01%/hour. 0.03%/8 hours.

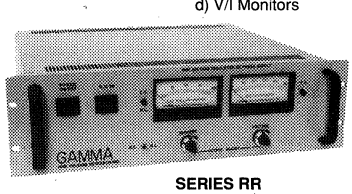
CONTROLS:
1. Power (HV ON)
2. Output Voltage (10-turn potentiometer)
3. Output Current (10-turn potentiometer)

INDICATORS:
1. Power (HV ON)
2. Output Voltage (meter ±2% of full scale)
3. Output Current (meter ±2% of full scale)
4. Mode of operation

CONNECTORS:
1. High Voltage: All models are provided with 6 feet of shielded high voltage cable. The cables are fitted with bushings to mate with a re-entrant receptacle.
2. Input: 3-wire line cord.
3. Low Voltage. Rear mounted barrier terminal block for:
   a) External Interlock
   b) Voltage Programming
   c) Current Programming
   d) V/I Monitors

MODEL SELECTOR GUIDE†

OUTPUT VOLTAGE (kV)	600 WATT MODELS		1000 WATT MODELS		3000 WATT MODELS	
	Model	(mA) Rating	Model	(mA) Rating	Model	(mA) Rating
0-1.5	—	—	—	—	—	—
0-3	RR3-200	200	RR3-333	333	RR3-1000	1000
0-5	RR5-120	120	RR5-200	200	RR5-600	600
0-10	RR10-60	60	RR10-100	100	RR10-300	300
0-15	RR15-40	40	RR15-65	65	RR15-200	200
0-20	RR20-30	30	RR20-50	50	RR20-150	150
0-30	RR30-20	20	RR30-33	33	RR30-100	100
0-40	RR40-15	15	RR40-25	25	RR40-75	75
0-50	RR50-12	12	RR50-20	20	RR50-60	60
0-60	RR60-10	10	RR60-17	17	RR60-50	50
0-80	RR80-7.5	7.5	RR80-12.5	12.5	RR80-37.5	37.5
0-100	RR100-6	6	RR100-10	10	RR100-30	30
0-125	RR125-4.8	4.8	RR125-8	8	RR125-24	24
0-150	RR150-4	4	RR150-6.6	6.6	RR150-20	20
0-200	RR200-3	3	RR200-5	5	RR200-15	15
0-300	RR300-2	2	RR300-3.3	3.3	RR300-10	10
0-400	RR400-1.5	1.5	RR400-2.5	2.5	RR400-7.5	7.5



SERIES RR
600 WATTS/1000 WATTS/3000 WATTS
MODEL RR50-20P

* For voltage range from 10% to 100% of rated output. ‡For voltages 150KV and above consult factory. †Lower and higher power models are available. Consult factory.
All units are available in positive or negative polarity. Units up to 100kV are also available in reversible polarity. Add P, N or R as suffix to Model Number to indicate polarity desired.

GAMMA HIGH VOLTAGE RESEARCH INC.

Designers/Manufacturers—High Voltage Power Supplies

1096 North US Hwy. #1, Ormond Beach, FL 32174 • TEL. 904-677-7070 • FAX. 904-677-3039

HIGH VOLTAGE POWER SUPPLIES
MODULAR

SERIES MC
9 Models Covering the Range of 50VDC to 15,000VDC

ELECTRICAL CHARACTERISTICS:

Input Voltage: 1.75 to 12VDC
Input Current: 400 mA
Output Voltage: Proportional to Input (See Table)
Output Current: 3 Watts maximum (See Table)
Load Regulation: 5% (1/2 load to full load)
Ripple: 1% p-p (typical)
Insulation Strength: 5000V Input/Output

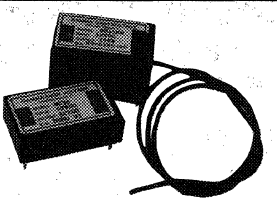
PHYSICAL CHARACTERISTICS:

Dimensions: 1.5" x 2.5" x 0.75" (up to 5KV)
1.5" x 2.5" x 1.5" (10KV & 15KV)
Volume: 2.8 cu. in. (up to 5KV)
5.6 cu. in. (10KV & 15KV)
Weight: 4 oz.
Packaging: Solid Encapsulation
Terminations: 4 PC pins (.043 dia. holes) (up to 5KV)
3 PC pins (.043 dia. holes) (10KV & 15KV)

ENVIRONMENTAL CHARACTERISTICS:

Temperature Range: –20° to +60°C

MINIATURE HIGH VOLTAGE POWER SUPPLIES



ELECTRICAL SPECIFICATIONS:

OUTPUT MODEL	OUTPUT VOLTAGE RANGE	OUTPUT POLARITY	CURRENT
MC-5	50VDC to 500VDC	Reversible	6mA
MC-15	150VDC to 1500VDC	Reversible	2mA
MC-30	300VDC to 3000VDC	Reversible	1mA
MC-50R	500VDC to 5000VDC	Reversible	200µA
MC-100P	1000VDC to 10,000VDC	Positive	100µA
MC-100N	1000VDC to 10,000VDC	Negative	100µA
* MC-100R	1000VDC to 10,000VDC	Reversible	100µA
† MC-150-P	1500VDC to 15,000VDC	Positive	100µA
† MC-150N	1500VDC to 15,000VDC	Negative	100µA

*: SIZE: 4.5 X 1.437 X 1.375
†: INPUT: 15VDC

SERIES RC
7 Models Covering the Range of 0-3KV to 0-30KV at 10 Watts

ELECTRICAL CHARACTERISTICS:

Input Voltage: +28VDC ±10%
Output Voltage: Programmable from zero to maximum rated voltage from either an external 5K ohm potentiometer or a zero to +10 volt low voltage ground reference source
Output Current: 10 Watts maximum
Line Regulation: 0.01% maximum
Load Regulation: 0.01% maximum
Ripple: 0.05% maximum
Temp. Coefficient: 0.01%°C
Stability: 0.01%/8 hours
Monitor Outputs: 1) Voltage Monitor (Optional)
2) Current Monitor (Optional)
Programming:
Method 1. Resistance: External 5K ohm potentiometer
Method 2. Voltage: Zero to +10 Volts

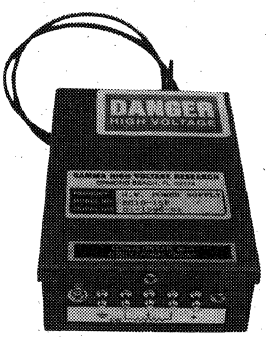
PHYSICAL CHARACTERISTICS:

Dimensions: 3 1/2" x 5 1/8" x 1 9/16" (up to 15KV)
3 3/4" x 6" x 2 3/4" (20 & 30KV)
Weight: 2 1/2 lbs (up to 15KV)
3 1/2 lbs (20 & 30KV)
Packaging: Solid Encapsulation, metal case with metal inserts in base
Input Connector: Terminal strip
Output Termination: 12" flying lead

ENVIRONMENTAL CHARACTERISTICS:

Temperature Range: 0 to +50°C

REGULATED DC/DC HIGH VOLTAGE POWER SUPPLIES



MODEL GUIDE:

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT
RC10-3	0-3KV	3.3mA
RC10-5	0-5KV	2.0mA
RC10-10	0-10KV	1.0mA
RC10-15	0-15KV	0.66mA
RC10-20	0-20KV	0.5mA
RC10-25	0-25KV	0.4mA
RC10-30	0-30KV	0.33mA

All units are available in positive or negative polarity. Add P or N as suffix to Model Number to indicate polarity desired.

SERIES UC
7 Models Covering the Range of 0-3KV to 0-30KV at 5 Watts

ELECTRICAL CHARACTERISTICS:

Input Voltage: +24VDC ±10%
Input Current: 400 mA maximum
Output Voltage: Adjustable from zero to rated voltage by adjustment of DC input voltage
Output Current: 5 Watts maximum (See Table)
Load Regulation: 20% maximum (1/2 load to full load)
Ripple: 0.1% per watt

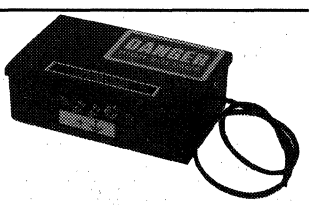
PHYSICAL CHARACTERISTICS:

Dimensions: 2 3/4" x 4 1/2" x 1 9/16" (up to 15KV)
3 1/2" x 5 1/8" x 1 9/16" (20, 25 & 30KV)
Weight: 1 1/2 lbs. (up to 15KV)
2 1/2 lbs. (20, 25 & 30KV)
Packaging: Solid encapsulation, metal case with metal inserts in base
Terminations: Two terminals for DC input.
12" flying lead for H.V. output

ENVIRONMENTAL CHARACTERISTICS:

Temperature Range: 0° to +50°C

PROPORTIONAL DC/DC HIGH VOLTAGE POWER SUPPLIES



MODEL GUIDE:

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT
UC5-3	0-3KV*	1.6mA
UC5-5	0-5KV*	1.0mA
UC5-10	0-10KV*	0.5mA
UC5-15	0-15KV	0.33mA
UC5-20	0-20KV	0.25mA
UC5-25	0-25KV	0.2mA
UC5-30	0-30KV	0.166mA

All Models available in positive or negative polarity. Add P or N as suffix to Model Number to indicate polarity desired. *3KV, 5KV and 10KV Models can be provided with reversible polarity (consult factory).

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HIGH VOLTAGE POWER SUPPLIES
MODULAR

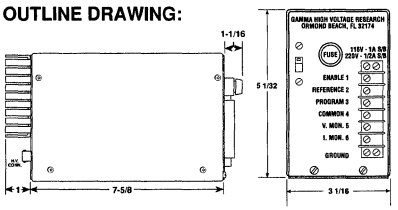
SERIES PMT
10 Models Covering the range of 0-1.5KV to 0-10KV

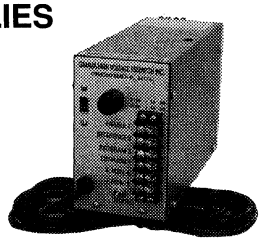
ELECTRICAL CHARACTERISTICS:

Input Voltage:	115/230 VAC±10% 50 to 400 Hz
Output Voltage:	Continuously adjustable from zero to maximum output rating
Output Current:	See ratings of individual models
Regulation:	0.001% for ±10% line change 0.002% for NL-FL or FL-NL
Ripple:	0.001% peak-to-peak
Stability:	0.01%/hour, 0.02%/8 hours
Temp. Coefficient:	50ppm/°C over, the range of 0 to 50°C
Monitor Output:	0 to 5V/100μA for zero to maximum output voltage
Control:	Local: 20 turn potentiometer for zero to maximum output voltage Remote: Voltage (0 to –5V) or resistance for full range
Connections:	Input line, programming and metering via Terminal Block. Alternate connectors available
Output Connector:	Up to 5KV: MHV type connector 10KV: Alden type
Size:	5-1/32" H x 3-1/16" W x 8-5/8" L

PHOTOMULTIPLIER TUBE HIGH VOLTAGE POWER SUPPLIES

OUTLINE DRAWING:





MODEL GUIDE:

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT
PMT 1.5-10	0-1.5KV	10mA
PMT 2-5	0-2KV	5mA
PMT 3-5	0-3KV	5mA
PMT 5-2	0-5KV	2mA
PMT 10-1	0-10KV	1mA

All units are available in Positive or Negative polarity. Add P or N as suffix to Model number to indicate polarity desired.

SERIES XRM 10 Models covering the range of 0-1.5KV to 0-60KV up to 60 Watts

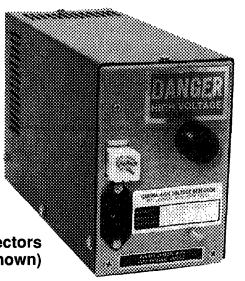
ELECTRICAL CHARACTERISTICS:

Input Voltage:	105-125 VAC 50 to 400 Hz
Output Voltage:	Continuously adjustable from zero to max output volt
Output Current:	See ratings of individual models
Voltage Regulation:	Line: ±0.005% over specified input range Load: ±0.01% for full load change
Current Regulation:	Better than ±0.005% over specified range
Load Regulation:	Better than 50μA for a 75% change in compliance volt
Ripple:	0.05%
Temp. Coefficient:	100ppm/°C over, the range of 0 to 60°C
Stability:	0.01%/hour, 0.03%/8 hours
Programming Output Voltage and Output Current:	The output voltage or output current can be remotely programmed from either an external volt source or external potentiometers from the internal reference volt. A zero to +10 source is required to full scale programming.

PHYSICAL CHARACTERISTIC:

Dimensions:	6″ H x 4″ x W x 10″ L
Weight:	10 lbs.
Packaging:	Modular construction with high voltage section encapsulated in a silicone elastomer
Input Connector:	D-Subminiature 25 pin connector
Output Termination:	Re-entrant type bushing is standard, with mating output cable provided Customer specified output connectors can be provided

REGULATED, LINE OPERATED MODULAR HIGH VOLTAGE POWER SUPPLIES



(Non-Standard Connectors on Unit shown)

MODEL GUIDE:

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT
XRM1.5	0-1.5KV	33.0mA
XRM3	0-3KV	15.0mA
XRM5	0.5KV	10.0mA
XRM10	0-10KV	5.0mA
XRM15	0-15KV	3.5mA
XRM20	0-20KV	2.5mA
XRM30	0-30KV	2.0mA
XRM40	0-40KV	1.5mA
XRM50	0-50KV	1.0mA
XRM60	0-60KV	1.0mA

All units are available in positive or negative polarity. Add P or N as suffix to Model number to indicate polarity desired.

HIGH VOLTAGE DIVIDER

SERIES HVD

MODEL HVD-100 SPECIFICATIONS:

Input Voltage:	100KVDC maximum
Input Impedance:	2,000 megohms
Output Impedance:	20,000 ohms
Output Taps:	1 volt/100KV
Temp. Coefficient:	75 ppm
Accuracy:	0.2%
Size:	17 1/2" high (maximum). Termination 10" toroid
Output Connector:	BNC

MODEL HVD-100-S SPECIFICATIONS:

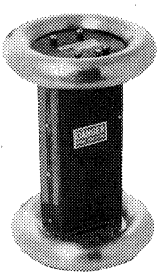
Model HVD-100-S is identical to Model HVD-100 with the exception of accuracy which is 0.1% and temperature coefficient which is 25ppm.

MODEL HVD-200 SPECIFICATIONS:

Input Voltage:	200KVDC maximum
Input Impedance:	4000 megohms
Output Impedance:	40,000 ohms
Output Taps:	2V 1 (volt/100KV)
Temp. Coefficient:	75 ppm
Accuracy:	0.2%
Size:	30" high (maximum). Termination 12" toroid
Output Connector:	BNC

MODEL HVD-200-S SPECIFICATIONS:

Model HVD-200-S is identical to Model HVD-200 with the exception of accuracy which is 0.1% and temperature coefficient which is 25ppm.



HVD-100

HIGH FREQUENCY DIVIDER NEW

MODEL HFD-60

Capability of measuring pulses with rise time of less than 20nS at voltages to 60KV.

Glassman High Voltage DC Power Supplies...

Since its inception in 1977, Glassman High Voltage has been committed to producing superior DC high voltage power supplies at an affordable price. That goal has been met by a careful choice of innovative design technology and manufacturing flexibility. Glassman pioneered in the use of air as the primary dielectric medium, avoiding the weight and serviceability problems associated with other dielectrics. Pulse-width modulation using off-the-line switching techniques and full-wave/symmetrical cascade high voltage multipliers, with surge limiting resistors, contribute to high efficiency and reliability. Extensive use of interchangeable modules reduces production costs and allows the rapid assembly and shipment of a wide range of models.

Glassman High Voltage supplies find applications across many different fields of interest. A few examples include analytical, biochemical, CRT displays, E-beam, electro-optical, medical, power generation and transmission, semiconductor, and X-ray applications.

Here we detail 17 different series of regulated high voltage power supplies, with many models within each series covering various voltage ranges. In total, voltage ranges extend from 0 to 1 kV through 0 to 500 kV with available output power from 15 W to 15 kW. All supplies have a number of common features ... lowest possible stored energy for safety and automatic crossover from constant-voltage regulation to constant-current regulation for overload protection. All, except the EL Series, offer local and remote operation, external voltage/current monitoring, TTL enable/disable, and safety interlock terminals. Many are available with a choice of front panels ... dual analog voltage and current meters, dual digital meters, or blank panels for OEM/system applications. Most Glassman supplies provide significant size and weight advantages over competing units.

In addition to this broad base of standard models, we welcome the opportunity to discuss your requirements for special OEM designs or modifications of standard models to meet specific applications.

... better by design!

The proper selection of a high voltage power supply for a particular application is a more difficult task than the selection of a low voltage supply. For one thing, today's high voltage regulated power supplies are often more complex than their low voltage counterparts. The selection of high voltage supplies also requires extra attention to the design features and construction techniques that contribute to safety and protection against failures. And, finally, the manner of specifying high voltage supplies sometimes differs from one manufacturer to another, making meaningful comparisons difficult.

Any high voltage DC power supply must fulfill certain basic requirements. It must meet maximum output voltage and current needs, provide ripple suppression, static line regulation, and static load regulation that is adequate for the application, and it must operate with the available AC input line voltage and frequency. Other considerations, however, may be even more important in certain applications.

Two Basic Circuit Designs

Any line powered power supply can use one of two basic circuit designs. The first design operates at the frequency of the AC line and consists of an input transformer, to alter the AC line voltage either up or down in magnitude, a rectifier to convert the transformer output to DC, and a filter capacitor to store the resulting DC and smooth the AC ripple voltage. This is the most straightforward, efficient, and lowest cost power supply because of its simplicity. If regulation is required, however, this simple design becomes more complicated and its efficiency is reduced by about half because of losses in the series regulator. If used for the design of a high voltage supply, this basic line frequency power supply also requires a relatively large and heavy transformer and filter capacitor. On the subject of the filter capacitor, we will have more to say after discussing the second basic power supply circuit design.

The second design operates at frequencies many orders of magnitude higher than the line frequency. Popularly called a "switching power supply," this is now the design of choice for most applications, whether low or high voltage, because of a desirable combination of high efficiency, small size, low weight, and, in the case of a high voltage supply, increased safety.

In a switching power supply, an off-the-line rectifier converts the AC input voltage to a DC level. This DC is then modulated or "chopped" into a series of high frequency pulses. The resulting AC signal can then be transformed in level and rectified to produce the desired DC output. In a typical Glassman high voltage power supply, the chopped signal is produced by a pulse-width modulator, then increased in level by a step-up transformer, and fed to a series string of voltage doublers to produce the high voltage output. Low level samples of the output voltage and current are used to control the operation of the pulse-width modulator to achieve the desired regulation, avoiding the losses associated with a series regulator. Notice that in a switching power supply the transformer operates on a high frequency signal. This means that the transformer can use a ferrite core rather than an iron core, resulting in lower transformer losses and reduced size and weight.

GLASSMAN HIGH VOLTAGE . . . *Innovations in high voltage power supply technology.*
Route 22, Salem Industrial Park, PO Box 551, Whitehouse Station, NJ 08889 • (908) 534-9007 • FAX (908) 534-5672
http://www.glassmanhv.com

Stored Energy

Stored energy is the one characteristic that most distinguishes line frequency and high frequency power supplies. Stored energy is particularly important in high voltage power supplies because large energy levels can be dangerous under worse-case conditions.

The capacitance required to attain a given reduction in output voltage ripple is inversely proportional to the frequency of the signal being rectified. The higher the frequency, the lower the output capacitance. Because stored energy, E, in Joules is determined from the equation $E = 1/2 CV^2$, the smaller this capacitance is, the smaller will be the stored energy. Because output voltage, V, enters into this calculation as a squared term, any reduction in capacitance becomes very important in a high voltage supply.

Power Factor

Power factor is another characteristic that distinguishes line frequency and most high frequency power supplies. Power factor (PF) is the ratio of real power to a load, as measured in watts, to the apparent power measured in volt-amperes. For sinusoidal voltages and currents, PF equals the cosine of the phase angle between the voltage applied to a load and the current passing through the load. In an ideal case, when the voltage and current are exactly in phase, the power factor is unity.

Switching power supplies, however, do not draw sinusoidal currents. The off-the-line rectifier draws sharp pulses of current only at the peak of each half cycle of AC line voltage, resulting in a severely distorted AC current containing multiple harmonics. It is these harmonics that cause a reduction in power factor. The harmonics, because they do not deliver any power to the load, serve no useful purpose. They do, however, contribute to the total AC line loss, generate unwanted and possibly dangerous currents in the unprotected "neutral" wire of a 3-phase, 4-wire wye-connected system, and add to the current drain from the line, which, in turn, dictates the need for additional line capacity. With the proliferation of switching power supplies in both consumer and industrial equipment, international pressure is mounting to improve these power factors in order to reduce the load demands on electric utilities.

The new Glassman EQ and KL Series meet this power factor problem head-on. A pre-regulator circuit is introduced between the output of the off-the-line rectifier and its load capacitor. All active circuits in this pre-regulator are contained in a single IC. This IC, through its own pulse-width modulator, which is operated at a frequency many orders of magnitude higher than the line frequency, drives a MOSFET power switch which controls the current through a series inductor. This inductor serves as an energy transfer device, storing energy when it is not needed by the power supply and releasing it when it is needed. By the use of both voltage and current control loops, this pre-regulator forces its input current to follow the shape and phase of the voltage across the rectifier. This, in turn, forces the input line current to have very nearly the shape and phase of the line voltage for a resulting power factor correction to better than 0.99.

Other Safety Considerations

Loads that are connected to a high voltage power supply often exhibit unstable behavior. Sometimes this is intentional, such as in a sputtering operation. Often it is unintentional, such as when it is caused by the momentary or catastrophic breakdown of an insulator. Sometimes it is because of changing environmental conditions, resulting, for example, in a corona discharge. Glassman high voltage power supplies provide protection against such conditions by including circuitry that automatically switches operation from a constant-voltage regulation mode to a constant-current mode for all overload conditions, including arcs and shorts. When an overload does occur, this circuitry limits the current that can be drawn from the supply to a level which can be adjusted anywhere from zero to full rated current. On some Glassman supplies, a current-trip type of control can be specified which will completely turn off the DC output voltage in the event of an overload.

Glassman supplies also incorporate external interlock circuits, which prohibit the application of high voltage unless the interlock is intentionally closed, and full panel status annunciators.

Dynamic Voltage Regulation

Static voltage regulation expresses the ability of a power supply to maintain a constant output voltage under a constant load which can be anywhere from no-load, with zero output current, to a full load drawing rated current. Dynamic voltage regulation, in contrast, expresses the ability of a power supply to maintain a constant output voltage under a changing load.

Static voltage regulation is the specification most usually quoted for both low and high voltage supplies. For high voltage supplies, however, because of the often erratic behavior of some loads under the stress of high voltage, dynamic voltage regulation may be a more useful specification.

Fast-acting dynamic voltage regulation is difficult with a line frequency type of power supply because the time interval between successive rectifications of the AC line, whose level must be monitored to sense an output voltage change, is tied to the relatively slow line frequency (at 60 Hz, 1/ (2f) = 8 ms.) In a high frequency switching power supply, however, high speed control circuitry can sense the rapid changes in the output voltage rectification level, caused by the load change, and typically make corrections in less than 1 ms.

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Air Insulation

Glassman supplies are unique in that they use air as the primary dielectric medium. Many competitive supplies use oil or solid encapsulation. The use of air insulation has considerable advantages. Reduced weight is one. More importantly, air insulation leads to improved serviceability. Individual components can be replaced, if necessary, without the need to scrap an entire assembly. Air insulation also avoids the danger of delamination of the encapsulation which can lead to unseen creepage paths and sudden catastrophic failure.

For output voltages up to approximately 150 kV, most high voltage components are enclosure-mounted for maximum protection against contamination. For higher voltages, open-stack components are used. Some consideration of atmospheric contamination is then required. However, our experience since 1977 with air insulation and from tens of thousands of units in operation from deserts to coastal plains and at altitudes up to 10,000 feet demonstrate the reliability of air insulation.

Specials

The applications for high voltage power supplies cover such a broad and diverse range that it is virtually impossible, even with such a wide range of standard models and options, to meet all user requirements. As a result, a significant portion of our business is in the design and production of "special" supplies.

Here our modular construction approach is of considerable advantage. Many times it is only necessary to modify one or a few of our standard modules in order to create a new and special supply. Or standard modules can be repackaged to fit a required mechanical configuration. This approach allows us to quote special supplies that can be delivered within tight time constraints and at a cost that is not prohibitive.

And each Glassman supply, whether standard or special, comes with the added security and protection of an all-encompassing warranty, a back-up team of application experts, and factory-level service, available worldwide.

Manufacturing

We manufacture many different series of regulated high voltage power supplies and within each series there are many standard models. Such a large array of models would be a manufacturing nightmare without the use of modular construction. Many standard or modified modules are common to different models and series. This commonality provides the cost and time savings associated with volume production while still allowing the scheduling flexibility of custom assembly. In a sense, we operate a greatly scaled-down version of an automobile assembly plant...many models and options that are custom assembled from a common source consisting mainly of a relatively few interchangeable parts.

Extensive testing to assure total conformance to specifications is an important component of manufacturing at Glassman. Special equipment and facilities have been developed in-house to test power supplies up to 500kV under various load, line, and environmental conditions. Standard tests include voltage and current calibration, voltage and current regulation in the presence of both load and line variations, protection performance against overloads, arcs, shorts, output ripple, response time, and temperature coefficient, and stability as a function of time.

A 300 kV supply is shown being tested. An in-house developed load can be raised or lowered to make contact with the top of the high voltage output stack. The unit at the left is a voltage divider, useful to 500 kV, which is used to both sample a precise portion of the DC output voltage and extract the AC ripple voltage.

In mechanical design, we take full advantage of the time-saving features available from the latest in CAD tools to generate all electrical schematics and mechanical drawings. A large stored library of existing drawings can be accessed for quick modifications to shorten the design cycle of new but related parts. Because of the spatial constraints that high voltage puts on the placement of certain critical components, detailed multilayered assembly drawings are also prepared for use by Manufacturing to assure consistent, safe, and reliable construction of each power supply that we produce. A PC-based CAD workstation with extensive editing, checking, and design automation capabilities is used to create all printed circuit boards. Features such as schematic capture, interactive automatic placement and routing, and electrical continuity and design rule checking speed the board designs and assure accuracy and uniformity. A CAM interface outputs laser-printed masters for board manufacturing, as well as coded data for numerically controlled board drilling.

All manufacturing documentation, for both standard and special products, is stored in a central computer with daily tape backup. Included in this documentation are complete parts lists, electrical schematics, printed circuit board and assembly drawings, and metal parts. In addition, we also store customer documentation, such as specification control drawings and instruction manuals. This assures that each purchasing and manufacturing cycle for a particular product is issued complete and up-to-date information. In addition, the stored documentation allows us to reconstruct a prior history, which can be useful when it becomes necessary to refer to an older piece of equipment.

Warranty

Glassman High Voltage, Inc. warrants standard power supplies to be free from defects in materials and workmanship for three years from date of shipment. OEM and modified standard power supplies are warranted for one year from date of shipment. The Company agrees to replace or repair any power supply that fails to perform as specified within the warranty period. A formal warranty is available.

FEATURES/OPTIONS	MJ	MK	MR	ML	EL	FC	ER	WR	EW	WK	PG	WX	EQ	LX	LT	KL	PK
Remote Voltage Program	S	S	S	S	N/A	S	S	S	S	S	S	S	S	S	S	S	S
Remote Voltage Monitor	S	S	S	S	N/A	S	S	S	S	S	S	S	S	S	S	S	S
Remote Current Program	S	S	S	S	N/A	S	S	S	S	S	S	S	S	S	S	S	S
Remote Current Monitor	S	S	S	S	N/A	S	S	S	S	S	S	S	S	S	S	S	S
Voltage Adjust	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Current Adjust	S	S	S	S	N/A	S	S	S	S	S	S	S	S	S	S	S	S
Shielded Output Cable	S	S	O	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Digital Panel Meters	N/A	N/A	N/A	N/A	O	S	O	O	O	O	O	O	S	O	O	S	S
Analog Panel Meters	N/A	N/A	N/A	N/A	S	N/A	S	S	S	S	S	S	N/A	S	S	O	N/A
External Interlock Terminals	S	S	S	S	N/A	S	S	S	S	S	S	S	S	S	S	S	S
TTL Enable/Disable	S	S	S	S	N/A	S	S	S	S	S	O	S	S	S	S	S	S
Zero Start Interlock	N/A	N/A	N/A	N/A	O	O	O	O	O	O	O	O	O	O	O	O	O
Slow Start	N/A	N/A	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Current Trip	N/A	N/A	S	S	O	O	O	O	O	O	O	O	O	O	O	O	S
Blank Front Panel	N/A	N/A	N/A	N/A	N/A	O	O	O	O	O	N/A	O	O	O	O	O	N/A
48-420 Hz	S	S	O	O	S	S	O	O	O	O	O	N/A	N/A	N/A	N/A	N/A	N/A
90-110 V Input, 48-63 Hz (Single Phase)	O	O	O	O	O	O	O	O	O	O	O	N/A	N/A	O	N/A	N/A	N/A
200-264 V Input, 48-63 Hz (Single Phase)	O	O	O	O	O	O	O	O	O	O	O	S	S	O	S	S	N/A

S = Standard O = Optional N/A = Not Available As Standard Options

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Standard Glassman Power Supplies

The following selection tables summarize the range of standard Glassman supplies. If standard models do not match your requirements, please contact the factory. Most models can be modified to meet particular applications.

Maximum Voltage/Current by Series

Voltage (kV)	Current (mA)																
	MJ pg. 6	MK pg. 7	MR pg. 8	ML pg. 9	EL pg.10	FC pg. 11	ER pg.13	WR pg.14	EW* pg.15	WK* pg.16	PG pg.17	WX pg.18	EQ pg.19	LX** pg.20	LT pg.21	KL pg. 22	PK pg. 23
1		75	300			120	300		600			1000	1200	2000	2000	3000	
1.5		50	200			80	200		400			700	800	1300	1300	2000	
2		37.5	150			60	150		300			500	600	1000	1000	1500	
3	5	25	100		15	40	100		200			350	400	660	660	1000	1300 2600
5	3	15	60		8	24	60		120			200	240	400	400	600	
6						20	50						200	330	330	500	650 1300
7									85								
8				37		15							150	250	250	375	450 900
10	1.5	7.5		30	4	12	30		60			100	120	200	200	300	400 800
12				25		10							100	165	165	250	330 660
15	1	5		20	3	8	20		40			70	80	132	132	200	260 520
20	0.7	3.7		15	2	6	15		30			50	60	100	100	150	200 401
25		3		12		4.8			24								
30	0.4	2.5		10	1.5	4	10		20			35	40	66	66	100	130 260
35		2															
40		1.8		7.5	1	3	7.5		15			25	30	50	50		100 200
50		1.5		6	0.8	2.4	6		12			20	24	40	40		80 160
60		1.2		5	0.6	2	5		10			15	20	33	33		65 130
75							4					12					50 100
80										7.5				25	25		50 100
85								3.5									
100								2.5		6				20	20		40 80
125								2		5				16	16		30 60
150														6	10		

Open Stack Version

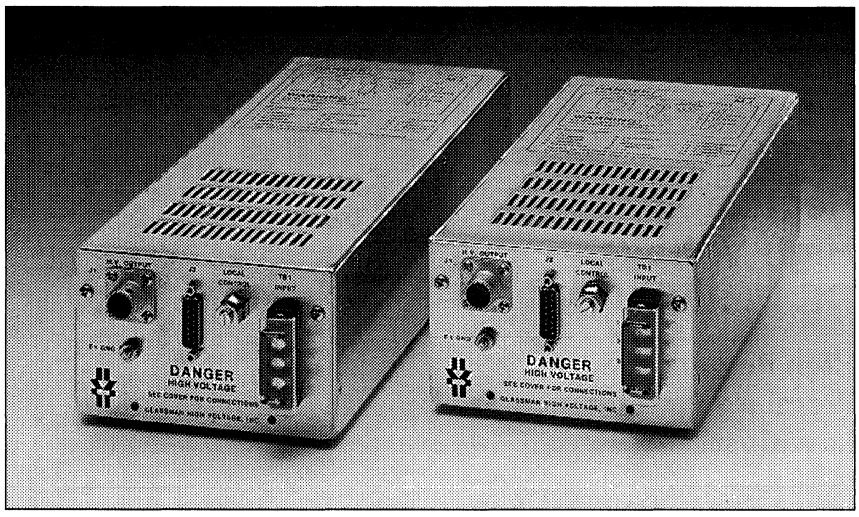
100		5 10		
150		3 6		25 50
200		2.5 5		18 36
250		1 2		14 28
300		1 2		10 20
350				8 16
400		1		6 12
500				4 8

* For EW and WK Series, simultaneous voltage and current limited to 500 W maximum.
** For LX Series, simultaneous voltage and current limited to 1000 W maximum.

CE Check the specs... and compare!

MJ Series 15 Watt Regulated High Voltage DC Modules

Premium Performance... Small Size and Weight... Low Cost



The MJ Series provides premium 15 W performance at low cost in a small and lightweight package. This series, with air insulation for easy serviceability, should not be confused with competitive encapsulated units that must be discarded if faulty. Voltage ranges, depending on model, are from 0 to 3 kV through 0 to 30 kV.

INPUT:
105-125 V RMS standard, single-phase, 48-420 Hz, <0.25 A. 3-position terminal block with cover.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometer, or case-mounted 10-turn potentiometer with 0.05% resolution. Accuracy, 1% rated +1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
<200 millijoules, 15 kV model;
<400 millijoules, 30 kV model.

VOLTAGE REGULATION:
Better than 0.005% from no-load to full load and over specified input range.

RIPPLE:
<0.05% RMS of rated voltage at full load. Ripple proportional to load, decreasing to approximately 0.01% at no load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading +1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical (100 ms max.) with a 50% resistive load using either TTL on/off or remote control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive or negative with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
DB15S D-subminiature with mating plug is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Output Cable	Case Size
MJ3P5000	MJ3N5000	0-3 kV	0-5 mA	RG-8U	A
MJ5P3000	MJ5N3000	0-5 kV	0-3 mA	RG-8U	A
MJ10P1500	MJ10N1500	0-10 kV	0-1.5 mA	RG-8U	A
MJ15P1000	MJ15N1000	0-15 kV	0-1 mA	RG-8U	A
MJ20P700	MJ20N700	0-20 kV	0-0.7 mA	RG-8U	B
MJ30P400	MJ30N400	0-30 kV	0-0.4 mA	RG-8U	B

Case Size: A: 3.25 x 5.25 x 11.5", 6.5 lbs.
B: 3.25 x 5.25 x 13.75", 7.5 lbs.

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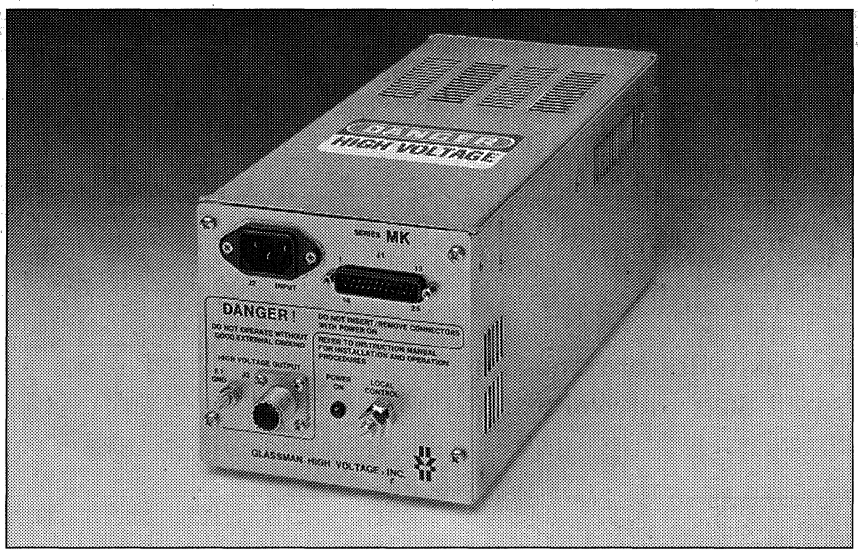
MK Series 75 Watt Regulated High Voltage DC Modules



High Power... Premium Performance... Low Cost

The MK Series offers premium 75 W performance at low cost. Like their lower power brothers, the MJ Series, they are air-insulated and should not be compared with "throw-away" supplies. MK Series feature easy serviceability. Voltage ranges, depending on model, are from 0 to 1 kV through 0 to 60 kV.

Specifications

INPUT:
105-125 V RMS standard, single-phase, 48-420 Hz, <1.5 A. Connector per IEC 320/C14 with mating line cord.

EFFICIENCY:
Better than 75% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometer, or case-mounted 10-turn potentiometer with 0.05% resolution. Accuracy, 1% rated+ 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
200 millijoules, 10 kV model;
1 Joule, 50 kV model.

VOLTAGE REGULATION:
Better than 0.005% RMS +1 mV/mA from no-load to full load and over specified input range.

RIPPLE:
<0.03% RMS of rated voltage + 0.5 V at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical (100 ms max.) with a 75% resistive load using either TTL on/off or remote control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive or negative with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
DB25S D-subminiature with mating plug is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Output Cable	Case Size
MK1P75L	MK1N75L	0-1 kV	0-75 mA	RG-59U	A
MK1.5P50L	MK1.5N50L	0-1.5 kV	0-50 mA	RG-59U	A
MK2P37.5L	MK2N37.5L	0-2 kV	0-37.5 mA	RG-59U	A
MK3P25L	MK3N25L	0-3 kV	0-25 mA	RG-59U	A
MK5P15L	MK5N15L	0-5 kV	0-15 mA	RG-59U	A
MK10P7.5	MK10N7.5	0-10 kV	0-7.5 mA	RG-8U	A
MK15P5	MK15N5	0-15 kV	0-5 mA	RG-8U	A
MK20P3.7	MK20N3.7	0-20 kV	0-3.7 mA	RG-8U	A
MK25P3	MK25N3	0-25 kV	0-3 mA	RG-8U	A
MK30P2.5	MK30N2.5	0-30 kV	0-2.5 mA	RG-8U	A
MK35P2	MK35N2	0-35 kV	0-2 mA	RG-8U	A
MK40P1.8	MK40N1.8	0-40 kV	0-1.8 mA	RG-8U	A
MK50P1.5	MK50N1.5	0-50 kV	0-1.5 mA	RG-8U	A
MK60P1.2	MK60N1.2	0-60 kV	0-1.2 mA	RG-8U	A

Case Size A: 4.75 x 5.19 x 11", 11 lbs.

CE Check the specs... and compare!

MR Series 300 Watt Regulated High Voltage DC Modules

Complies With IEC & CSA 950 And UL 1950 Standards As A Power Supply Component

The MR Series, with outputs from 0 to 1 kV through 0 to 5 kV, is designed to meet international safety approvals. It is packaged as a space-saving module that avoids the cost of expensive panels and displays. However, no compromises in performance and operating features have been made. The result is a power supply that offers outstanding value for a wide range of demanding applications.

Specifications

INPUT:
103 -132 V RMS standard, single-phase, 48-63 Hz, <6 A. Connector per IEC 320/V1 with mating line cord.

EFFICIENCY:
Typically 85% at full load.

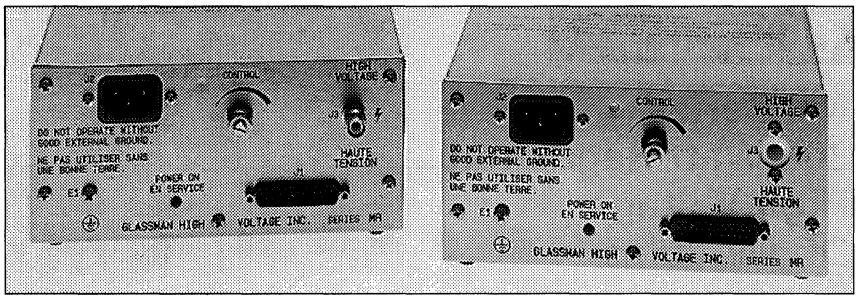
OUTPUT:
Continuous, stable adjustment from 0 to rated voltage and current through a combination of mounted 10-turn potentiometer, external 0 to 10 V, or external potentiometers. Repeatability, <0.1% fs. Accuracy, 0.25% of rated + 1% of setting. Resolution is a function of programming method.

STORED ENERGY:
<0.5 joules.

VOLTAGE REGULATION:
<0.005% for line variations. For load variations, add 1 mV/mA.

RIPPLE:
<0.02% RMS of rated voltage + 300 mV RMS

CURRENT REGULATION:
<0.1% of rated current from short circuit to rated voltage at any set current.



Modules are 3.38" H x 7.25" W x 16" D, weight less than 11 lbs. SHV version shown on left, Alden connector on right

VOLTAGE MONITOR:
0 to 10 V for zero rated voltage. Accuracy, 1% reading + 0.25% of rated voltage.

CURRENT MONITOR:
0 to 10 V for zero to rated current. Accuracy, 1% reading + 0.05% of rated current.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

OUTPUT VOLTAGE TIME CONSTANT:
Typically 50 ms rise or decay time constant using TTL on/off or remote voltage control with a minimum of 15% resistive load.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive or negative with respect to chassis ground.

PROTECTION:
User-selected automatic current regulation or current trip protects against all overloads, including arcs and short circuits. Fuses, surge-limiting resistors, and low-energy components provide ultimate protection.

ACCESSORIES:
Detatchable 8-foot HV cable (see Models chart for choice of output connector and wire type) and 6-foot detachable line cord provided.

REMOTE CONNECTIONS:
Common, +10 V reference, interlock, current program, current monitor, voltage program, voltage monitor, TTL HV enable, current regulation/trip, and chassis ground.

EXTERNAL INTERLOCK:
Open off, closed on.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models (Alden connector)

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Output Cable
MR1P300	MR1N300	0-1 kV	0-300 mA	Silicone wire
MR1.5P200	MR1.5N200	0-1.5 kV	0-200 mA	
MR2P150	MR2N150	0-2 kV	0-150 mA	
MR3P100	MR3N100	0-3 kV	0-100 mA	
MR5P60	MR5N60	0-5 kV	0-60 mA	

Models (SHV connector)

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Output Cable
MR1P300L	MR1N300L	0-1 kV	0-300 mA	RG - 59
MR1.5P200L	MR1.5N200L	0-1.5 kV	0-200 mA	
MR2P150L	MR2N150L	0-2 kV	0-150 mA	
MR3P100L	MR3N100L	0-3 kV	0-100 mA	
MR5P60L	MR5N60L	0-5 kV	0-60 mA	

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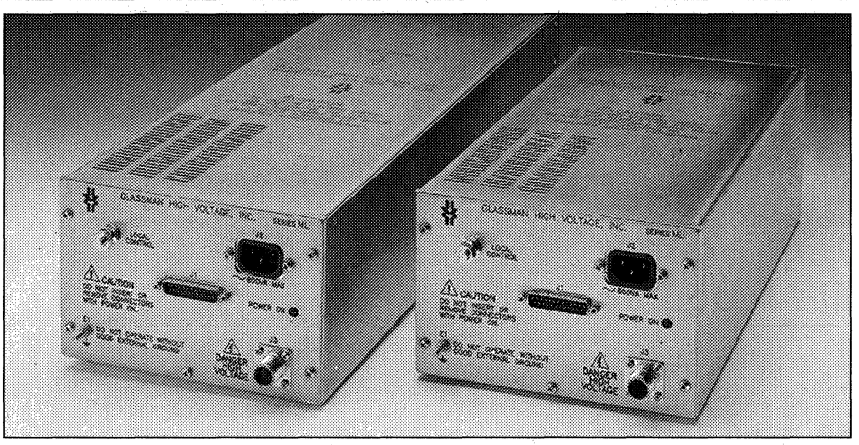
ML Series 300 Watt Regulated High Voltage DC Modules

Medium Power Premium Performance... Low cost



The ML Series is fully compliant with the European Harmonized EMI Directive EN50082-2 including standards EN55011 (Group 1, Class A), EN61000-4-2, EN61000-4-3, ENV 50204, EN 61000-4-4 AND EN61000-4-6. The series also meets all applicable standards of the European Low Voltage Safety Directive, 73/23/EEC, based on IEC 1010-1. And the optional input line active power factor correction reduces harmonic currents below those specified in EN61000-3-2.

Specifications

(Specifications apply from 2% to 100% of rated voltage. Below 2% of rated voltage a slight degradation of ripple, regulation, and stability may occur.)

INPUT:
90-132VAC single-phase, 48-420Hz, 600VA maximum. Connector per IEC 320/V1 with mating line cord terminated with NEMA 5-15 plug.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment, from zero to rated voltage and current by means of an external 0 to +10V signal, external potentiometers, or panel-mounted 10-turn potentiomter (0.05% resolution). Repeatability better than 0.1% of setting. Accuracy, 0.5% of setting + 0.1% of rating. Resolution is a function of programming method used.

CURRENT LIMITING/CURRENT TRIP:
User selectable at interface control connector for either "trip" operation or normal current limiting. If "trip" operation is selected the power supply will latch off in the event the load current exceeds the current "set" point.

STORED ENERGY:
See Models chart. (The stored energy includes the capacitance of the standard 8' output cable (≈300pF)

STATIC VOLTAGE REGULATION:
Better than 0.005% for specified line and load variations.

DYNAMIC VOLTAGE REGULATION:
For load transients from 10% to 99% and 99% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 1ms, and to 0.1% in 2ms.

CURRENT REGULATION:
Better than 0.1% of rated current from short circuit to rated voltage at any load condition.

RIPPLE:
<0.05% rms of rated voltage at full load

VOLTAGE MONITOR:
to +10V equivalent to 0 to rated voltage. Accuracy, 0.5% reading + 0.1% rated 0.

CURRENT MONITOR:
0 to +10V equivalent to 0 to rated current. Accuracy, 1% reading + 0.1% rated.

STABILITY:
0.01% per hour after 1/2 hour warm-up, 0.05% per 8 hours

VOLTAGE RISE/DECAY TIME CONSTANT:
400ms typical with a 5% resistive load using either the HIGH VOLTAGE ENABLE input or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per °C.

AMBIENT TEMPERATURE:
-20 to +50°C, operating; -40 to +85°C, storage.

POLARITY:
Output polarity is available as either positive or negative with respect to chassis ground.

PROTECTION:
User selected automatic current regulation or current trip protects against all overloads, including arcs and short circuits. Fuses, surge-limiting resistors, and low energy components provide ultimate protection

Models

POSITIVE POLARITY	NEGATIVE POLARITY	OUTPUT VOLTAGE(kV)	OUTPUT CURRENT(mA)	STORED ENERGY(J)	OUTPUT CABLE	CASE SIZE
ML08P37.0	ML08N37.0	0 - 8	0 - 37	0.38	RG-8U	A
ML10P30.0	ML10N30.0	0 - 10	0 - 30	0.44	RG-8U	A
ML12P25.0	ML12N25.0	0 - 12	0 - 25	0.52	RG-8U	A
ML15P20.0	ML15N20.0	0 - 15	0 - 20	0.68	RG-8U	A
ML20P15.0	ML20N15.0	0 - 20	0 - 15	0.66	RG-8U	A
ML25P12.0	ML25N12.0	0 - 25	0 - 12	0.72	RG-8U	A
ML30P10.0	ML30N10.0	0 - 30	0 - 10	1.00	RG-8U	A
ML40P07.5	ML40N07.5	0 - 40	0 - 7.5	1.44	RG-8U	A
ML50P06.0	ML50N06.0	0 - 50	0 - 6	1.88	RG-8U	B
ML60P05.0	ML60N05.0	0 - 60	0 - 5	2.34	RG-8U	B

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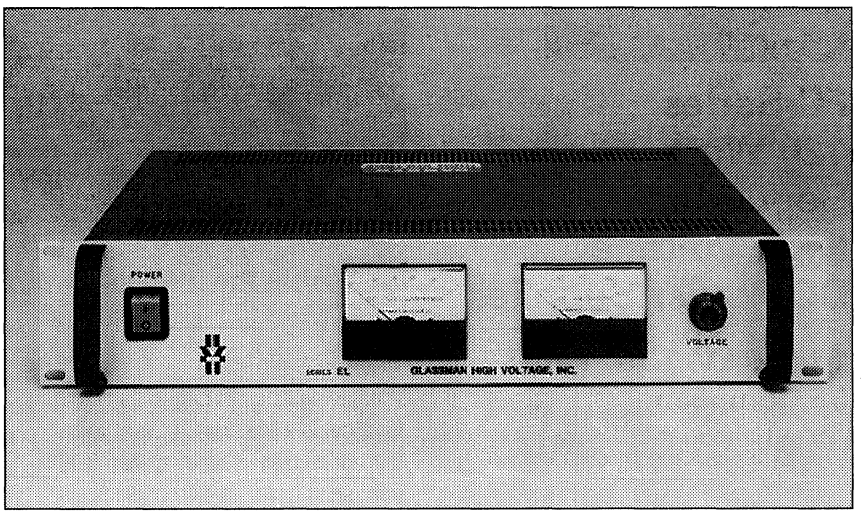
EL Series 40/45 Watt Regulated High Voltage DC Power Supplies

Laboratory Performance... Economical Price

The EL Series provides laboratory performance at the lowest possible price. Voltage ranges are from 0 to 3 kV through 0 to 60 kV. Unlike other Glassman supplies, no remote monitoring or control capability is provided.This series is available with positive, negative, or reversible polarity. Panel height is 3.5 inches and maximum weight is 12 lbs.



Specifications

INPUT:
105-125 V RMS standard, single-phase, 48-420 Hz, <1 A. Connector per IEC 320/C14 with mating line cord.

EFFICIENCY:
Better than 75% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage by a front panel 10-turn potentiometer with locking vernier. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs. Dual analog meters display voltage and current to an accuracy of 2% fs.

STORED ENERGY:
200 millijoules, 10 kV model; 1 Joule, 50 kV model.

VOLTAGE REGULATION:
Better than 0.005% +1 mV/mA from no-load to full load and over specified input range.

RIPPLE:
<0.03% RMS of rated voltage + 0.5 V at full load.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current limiting protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
EL3P15L	EL3N15L	EL3R15L	0-3 kV	0-15 mA	RG-59U	3.5 in.
EL5P8L	EL5N8L	EL5R8L	0-5 kV	0-8 mA	RG-59U	3.5 in.
EL10P4	EL10N4	EL10R4	0-10 kV	0-4 mA	RG-8U	3.5 in.
EL15P3	EL15N3	EL15R3	0-15 kV	0-3 mA	RG-8U	3.5 in.
EL20P2	EL20N2	EL20R2	0-20 kV	0-2 mA	RG-8U	3.5 in.
EL30P1.5	EL30N1.5	EL30R1.5	0-30 kV	0-1.5 mA	RG-8U	3.5 in.
EL40P1	EL40N1	EL40R1	0-40 kV	0-1 mA	RG-8U	3.5 in.
EL50P0.8	EL50N0.8	EL50R0.8	0-50 kV	0-0.8 mA	RG-8U	3.5 in.
EL60P0.6	EL60N0.6	EL60R0.6	0-60 kV	0-0.6 mA	RG-8U	3.5 in.

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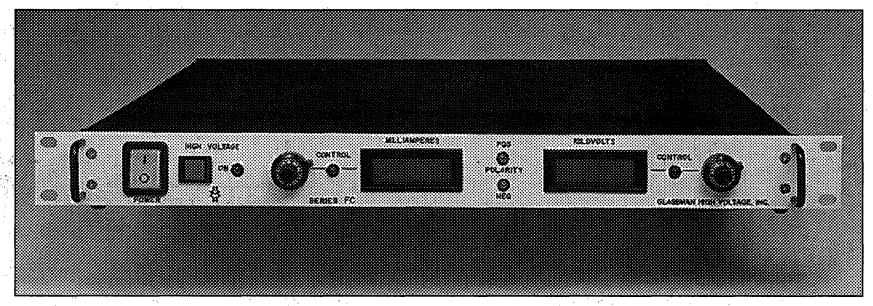
FC Series 120 Watt Regulated High Voltage DC Power Supplies



1 to 60 kV, 1.75" Panel CE Compliant

The FC Series are sophisticated, 120 Watt, high voltage power supplies in a small and lightweight package. They are air insulated, fast response units, with tight regulation.

The FC Series are fully compliant with the European Harmonized EMI Directive EN50082-2 including standards EN55011 (Group 1, Class B), ENV50140, ENV50141, ENV50204, EN61000-4-2, and EN61000-4-4. The series are also designed to meet all applicable standards of the proposed European Low Voltage Safety Directive, 73/23/EEC, based on IEC 1010-1.

Features:

LOW STORED ENERGY:
Most models exhibit less than 1 joule of stored energy.

PULSE-WIDTH MODULATION:
Off-the-line pulse-width modulation provides high efficiency and a reduced parts count for improved reliability.

AIR INSULATED:
The FC Series features "air" as the primary dielectric medium. No oil or encapsulation is used to impede serviceability.

CONSTANT VOLTAGE/CONSTANT CURRENT OPERATION:
Automatic crossover from constant-voltage to constant-current regulation provides protection against overloads, arcs, and short circuits.

LOW RIPPLE:
Ripple is less than 0.02% of rated voltage at full load.

TIGHT REGULATION:
Voltage regulation is better than 0.005% for allowable line and load variations. Current regulation is better than 0.05% from short circuit to rated voltage.

FRONT PANEL CONTROLS:
Separate 10-turn controls with locking verier dials are used to set voltage and current levels. A high voltage enable (on) switch and an AC power on/off switch complete the panel controls. Annunciators indicate when high voltage is on, the output polarity, and whether the supply is operating in a voltage or current regulating mode. For the blank panel version, only a power on/off switch is provided on the panel.

REMOTE CONTROL FACILITIES:
As standard, all FC Series supplies provide output voltage and current program/monitor signals, high voltage enable, safety interlock terminals, and a +10 volt reference source.

SMALL SIZE AND WEIGHT:
FC Series power supplies occupy only 1.75 inches of panel height. Net weight is less than 12 pounds.

Specifications

(Specifications apply from 5 to 100% rated voltage. Operation is guaranteed down to 0% of rated voltage with a slight degradation of ripple, regulation, and stability.)

INPUT:
103-132V RMS standard, single-phase, 48-420 Hz, <2.5A at 105V. Connector per IEC 320/VI with mating line cord terminated with NEMA 5-15 plug.

EFFICIENCY:
Typically 80% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 0.1% rated + 0.5% setting. Repeatability better than 0.1% of setting.

STORED ENERGY:

See Models chart.

STATIC VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 0.5 mV/mA for load variations.

DYNAMIC VOLTAGE REGULATION
For load transients from 10% to 100% and 100% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 500 µs and to 0.1% in 1 ms.

RIPPLE:
<0.02% of rated voltage + 300 mV RMS at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR
0 to +10 V equivalent to 0 to rated current. Accuracy, 0.1% reading + 0.5% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.1% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
400 ms typical with a 10% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +50 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
A five position terminal block and a 15 Pin "D" connector are provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, HV enable, ground, and local control. A rear panel toggle switch selects either local or remote operation.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

REMOTE HV ENABLE:
0-1.5V off, 2.5-15V on.

ACCESSORIES:
Detachable 8 foot shielded high voltage coaxial cable (see models chart for wire type), 6 foot detachable line cord and mating 15 Pin "D" connector and shell are provided.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy	Output Cable
FC1P120	FC1N120	FC1R120	0-1kV	0-120mA	0.2J	RG-59
FC1.5P80	FC1.5N80	FC1.5R80	0-1.5kV	0-80mA	0.45J	RG-59
FC2P60	FC2N60	FC2R60	0-2kV	0-60mA	0.1J	RG-59
FC3P40	FC3N40	FC3R40	0-3kV	0-40mA	0.2J	RG-59
FC5P24	FC5N24	FC5R24	0-5kV	0-24mA	0.3J	RG-59
FC6P20	FC6N20	FC6R20	0-6kV	0-20mA	0.25J	RG-8U
FC8P15	FC8N15	FC8R15	0-8kV	0-15mA	0.3J	RG-8U
FC10P12	FC10N12	FC10R12	0-10kV	0-12mA	0.4J	RG-8U
FC12P10	FC12N10	FC12R10	0-12kV	0-10mA	0.7J	RG-8U
FC15P8	FC15N8	FC15R8	0-15kV	0-8mA	1.1J	RG-8U
FC20P6	FC20N6	FC20R6	0-20kV	0-6mA	0.85J	RG-8U
FC25P4.8	FC25N4.8	FC25R4.8	0-25kV	0-4.8mA	1J	RG-8U
FC30P4	FC30N4	FC30R4	0-30kV	0-4mA	1J	RG-8U
FC40P3	FC40N3	FC40R3	0-40kV	0-3mA	1.5J	RG-8U
FC50P2.4	FC50N2.4	FC50R2.4	0-50kV	0-2.4mA	2J	RG-8U
FC60P2	FC60N2	FC60R2	0-60kV	0-2mA	2.4J	RG-8U

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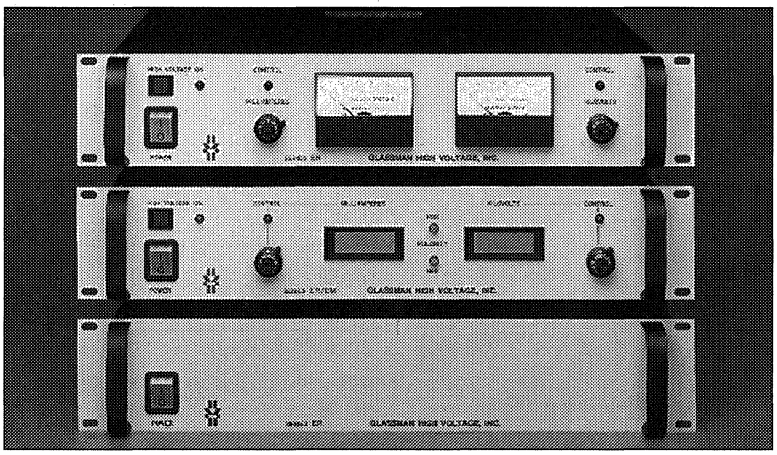
ER Series 300 Watt Regulated High Voltage DC Power Supplies

Laboratory Performance... High Power Density... Enhanced Features



The ER Series is a sophisticated, medium power, high voltage power supply. With a choice of three panel configurations ... dual analog voltage and current meters, dual digital meters, or a blank panel for OEM/system applications ... it is adaptable to most environments. Voltage ranges are 0 to 1 kV through 0 to 75 kV. Panel height is 3.5 inches and maximum weight is 18 pounds.

Specifications

INPUT:
105-125 V RMS standard, single-phase, 48-63 Hz, <6 A. Connector per IEC 320/C14 with mating line cord.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
1.5 Joules, 20 kV model;
<4 Joules, 60 kV model.

VOLTAGE REGULATION:
Better than 0.005% +1 mV/mA from no-load to full load and over specified input range.

RIPPLE:
<0.02% RMS of rated voltage + 0.5 V at full load; models 1.5 kV and lower, 400 mV (500 mV, Japan.)

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
60 ms typical (300 ms for 75 kV model) with a 75% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal block provided for all remote functions, including common, +10 V refer-ence, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		ER1R300	0-1 kV	0-300 mA	RG-59U	3.5 in.
		ER1.5R200	0-1.5 kV	0-200 mA	RG-59U	3.5 in.
		ER2R150	0-2 kV	0-150 mA	RG-59U	3.5 in.
		ER3R100	0-3 kV	0-100 mA	RG-59U	3.5 in.
		ER5R60	0-5 kV	0-60 mA	RG-59U	3.5 in.
		ER6R50	0-6 kV	0-50 mA	RG-58U	3.5 in.
ER10P30	ER10N30	ER10R30	0-10 kV	0-30 mA	RG-8U	3.5 in.
ER15P20	ER15N20	ER15R20	0-15 kV	0-20 mA	RG-8U	3.5 in.
ER20P15	ER20N15	ER20R15	0-20 kV	0-15 mA	RG-8U	3.5 in.
ER30P10	ER30N10	ER30R10	0-30 kV	0-10 mA	RG-8U	3.5 in.
ER40P7.5	ER40N7.5	ER40R7.5	0-40 kV	0-7.5 mA	RG-8U	3.5 in.
ER50P6	ER50N6	ER50R6	0-50 kV	0-6 mA	RG-8U	3.5 in.
ER60P5	ER60N5	ER60R5	0-60 kV	0-5 mA	RG-8U	3.5 in.
ER75P4	ER75N4	ER75R4	0-75 kV	0-4 mA	DS2124	3.5 in.

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WR Series 250 Watt Regulated High Voltage DC Power Supplies

Up to 125 kV, 5.25 Inch Panel Height... Laboratory Performance... Enhanced Features

The WR Series provides voltage ranges from 0 to 85 kV through 0 to 125 kV. It is available with dual analog voltage and current meters, dual digital meters, or with a blank panel for OEM/system applications. Panel height is only 5.25 inches and maximum weight is less than 40 pounds.

Specifications

INPUT:
105-125 V RMS standard, single-phase, 48-63 Hz, <6 A. Connector per IEC 320/C14 with mating line cord.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
11 Joules, maximum.

VOLTAGE REGULATION:
Better than 0.005% from no-load to full load and over specified input range.

RIPPLE:
<0.05% RMS of rated voltage at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
400 ms typical with a 25% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal block provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
WR85P3.5	WR85N3.5	WR85R3.5	0-85 kV	0-3.5 mA	DS2121	5.25 in.
WR100P2.5	WR100N2.5	WR100R2.5	0-100 kV	0-2.5 mA	DS2121	5.25 in.
WR125P2	WR125N2	WR125R2	0-125 kV	0-2 mA	DS212I	5.25 in.

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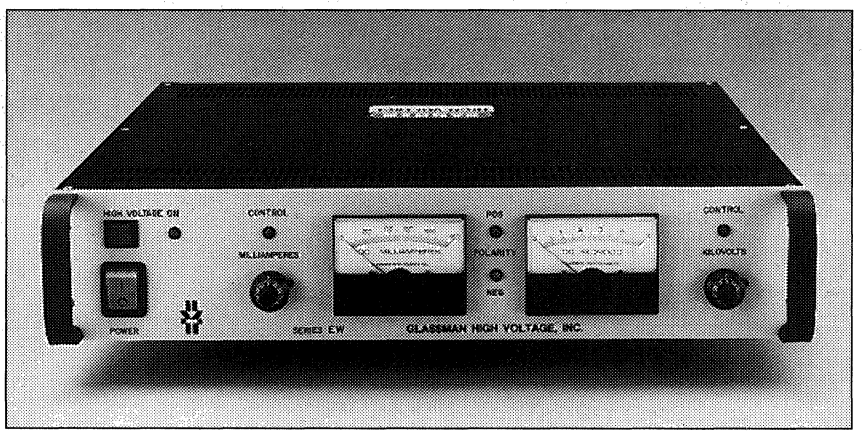
EW Series Extended Current 500 Watt Regulated High Voltage DC Power Supplies



Up to 60 kV, 3.5 Inch Panel Height... Laboratory Performance... Enhanced Features

The EW Series is a 500 watt regulated high voltage DC power supply with an important difference ... maximum current ratings are equivalent to a 600 W supply! This maximum current, which is available for all output voltages up to 84% of rated voltage, should be of significant interest for many applications. Voltage ranges are 0 to 1 kV through 0 to 60 kV. Series EW is offered with dual analog voltage and current meters or, optionally, with dual digital meters or with a blank panel for OEM/systems applications. Maximum weight is 18 lbs.

Specifications

INPUT:
102-132 V RMS standard, single-phase, 48-63 Hz, <10 A. Connector per IEC 320/C14 with mating line cord, terminated with NEMA 5-15 plug.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated +1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
<1.5 Joules, 20 kV; <4 Joules, 60 kV.

VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 1 mV/mA for load variations.

RIPPLE:
<0.02% of rated voltage + 0.5 V RMS at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for single polarity, 1% reading + 0.1% rated for reversible polarity.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical with a 30% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal block provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

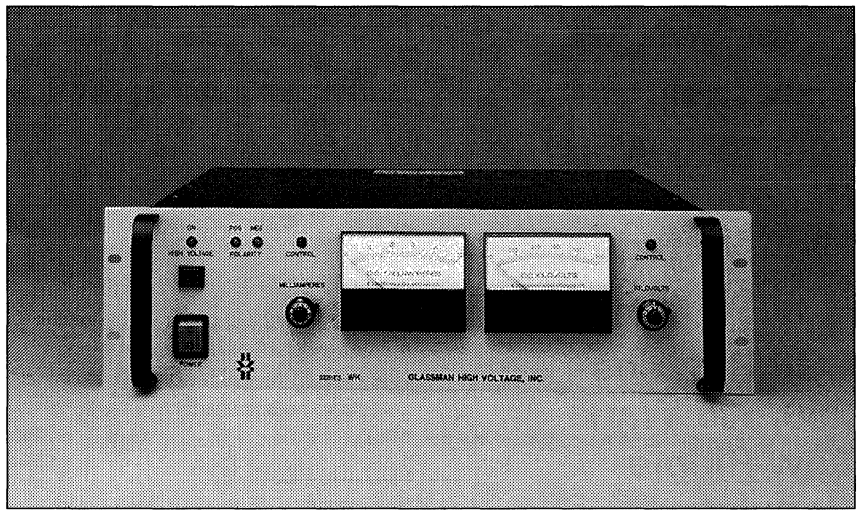
Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		EW1R600	0-1 kV	0-600 mA	RG-59U	3.25 in.
		EW1.5R400	0-1.5 kV	0-400 mA	RG-59U	3.25 in.
		EW2R300	0-2 kV	0-300 mA	RG-59U	3.25 in.
		EW3R200	0-3 kV	0-200 mA	RG-59U	3.25 in.
		EW5R120	0-5 kV	0-120 mA	RG-59U	3.25 in.
EW7P85	EW7N85	EW7R85	0-7 kV	0-85 mA	RG-8U	3.25 in.
EW10P60	EW10N60	EW10R60	0-10 kV	0-60 mA	RG-8U	3.25 in.
EW15P40	EW15N40	EW15R40	0-15 kV	0-40 mA	RG-8U	3.25 in.
EW20P30	EW20N30	EW20R30	0-20 kV	0-30 mA	RG-8U	3.25 in.
EW25P24	EW25N24	EW25R24	0-25 kV	0-24 mA	RG-8U	3.25 in.
EW30P20	EW30N20	EW30R20	0-30 kV	0-20 mA	RG-8U	3.25 in.
EW40P15	EW40N15	EW40R15	0-40 kV	0-15 mA	RG-8U	3.25 in.
EW50P12	EW50N12	EW50R12	0-50 kV	0-12 mA	RG-8U	3.25 in.
EW60P10	EW60N10	EW60R10	0-60 kV	0-10 mA	RG-8U	3.25 in.

Note: Product of voltage and current automatically limited to 500 W maximum.

CE Check the specs... and compare!

WK Series Extended Current 500 Watt Regulated High Voltage DC Power Supplies

Up To 125 kV... 5.25 Inch Panel Height... Laboratory Performance... Enhanced Features



The WK Series is a 500 watt regulated DC power supply offering output voltage ranges from 80 kV to 125 kV and an interesting "plus." Maximum current ratings are equivalent to a 600 W supply up to 84% of rated voltage! Panel height is only 5.25 inches and weight is less than 30 pounds. The WK Series is available with dual analog output meters or, optionally, with digital meters or a blank panel for OEM/ system applications.

Specifications

INPUT:
105-125 V RMS, 48-63 Hz single phase, <10 A. Connector per IEC 320/VI with mating line cord and NEMA 5-15 plug.

EFFICIENCY:
Typically 83% at full load.

OUTPUT:
Continuous, stable adjustment from zero to rated voltage and current via 10-turn potentiometers, external 0 to 10 V, or external potentiometers. Linearity, <1% fs. Repeatability, <0.1% fs. Accuracy, 0.25% of rated + 1% of setting. Resolution is a function of programming method.

STORED ENERGY:
9 J, 80 kV; 11 J, 100 kV; 14.5 J, 125 kV.

VOLTAGE REGULATION:
<0.005%, line or load.

RIPPLE:
<0.1% RMS of rated voltage at full load.

CURRENT REGULATION:
<0.1% of full scale from short circuit to rated voltage.

VOLTAGE MONITOR:
0 to +10 V DC for zero to rated voltage. Accuracy, 1% of reading + 1% of rated voltage.

CURRENT MONITOR:
0 to +10 V DC for zero to rated current. Accuracy, 1% of reading + 0.05% (0.1% for reversible model) of rated current.

STABILITY:
0.01% per hour after 1/2 hour warmup. 0.05% per 8 hours.

OUTPUT VOLTAGE TIME CONSTANT:
Typically 400 ms rise or decay time constant for 125 kV model, using TTL on/off or remote voltage control, with 15% resistive load.

TEMPERATURE COEFFICIENT:
0.01%/degree C.

AMBIENT TEMPERATURE:
-20 to +40 degrees C, operating; -40 to +85 degrees C, storage.

POLARITY:
Positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low-energy components provide ultimate protection.

ACCESSORIES:
Detachable 8-foot shielded HV coaxial cable (see Model Chart for cable type) and 6-foot detachable line cord provided.

REMOTE CONTROLS:
Terminal block provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except on blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable
WK80P7.5	WK80N7.5	WK80R7.5	0-80 kV	0-7.5 mA	DS2121
WK100P6	WK100N6	WK100R6	0-100 kV	0-6 mA	DS2121
WK125P5	WK125N5	WK125R5	0-125 kV	0-5 mA	DS2121

Note: Product of voltage and current automatically limited to 500 W maximum.

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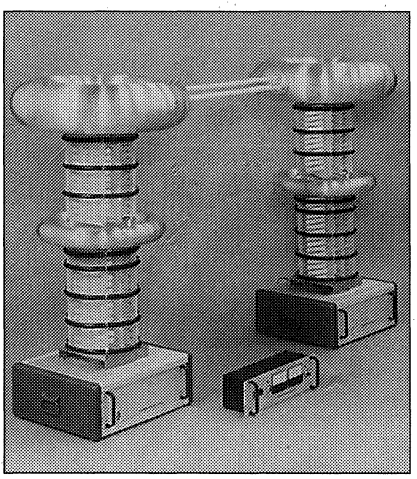
CE Check the specs... and compare!

PG Series 500/1000 Watt Regulated High Voltage DC Power Supplies

PG-LR Series 250/500 Watt Low Ripple Regulated High Voltage DC Power Supplies

100 kV to 400 kV...



The PG Series is available in two configurations ... as a standard PG Series or as an ultra-low ripple PG-LR Series for demanding applications, such as particle accelerators. Shown is the dual-stack PG-LR Series with remote control unit. One stack serves as a high voltage multiplier while the second stack provides an additional lowpass ripple filter. The standard PG Series is supplied with only the multiplier stack and remote control unit.

Specifications

INPUT:
105-125 V RMS, single-phase, 48-63 Hz, <15 A. Series PG-LR: 208 V RMS +/- 10%, 3-phase, 48-63 Hz, <5 A.

EFFICIENCY:
Typically 75% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage and current by means of front panel 10-turn potentiometers, external zero to +10 V signals, or external potentiometers. Linearity to within 1% of full scale.

VOLTAGE REGULATION:
Better than 0.005% + 1 V, line or load.

RIPPLE:
Better than 0.1% of rated voltage at full load. Series PG-LR: See models chart.

CURRENT REGULATION:
Better than 100 µA from short circuit to rated voltage for any load condition; 0.005% + 1 µA for line variations.

VOLTAGE/CURRENT MONITOR:
Zero to +10 V signal for zero to rated voltage/current.

STABILITY:
0.01% + 1 V per hour after 1/2 hour warmup, 0.05% + 2 V per 8 hours.

TEMPERATURE COEFFICIENT:
0.01% per degree C + 1 V.

AMBIENT TEMPERATURE:
-20 to +60 degree C, operating;
-40 to +85 degree C, non-operating.

POLARITY:
Available with either positive, negative, or reversible (PG only) polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects the power supply against all overload conditions, including arcs and short circuits. Fuses, surge-limiting resistors, and low energy components provide the ultimate protection.

EXTERNAL INTERLOCK:
Open off, closed on.

PG Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Panel Height	Stack Height
PG100P5	PG100N5	PG100R5	0-100 kV	0-5 mA	5.25 in	22.75 in
PG100P10	PG100N10	PG100R10	0-100 kV	0-10 mA	5.25 in	22.75 in
PG150P3	PG150N3	PG150R3	0-150 kV	0-3 mA	5.25 in	29.75 in
PG150P6	PG150N6	PG150R6	0-150 kV	0-6 mA	5.25 in	29.75 in
PG200P2.5	PG200N2.5	PG200R2.5	0-200 kV	0-2.5 mA	5.25 in	34.75 in
PG200P5	PG200N5	PG200R5	0-200 kV	0-5 mA	5.25 in	34.75 in
PG250P1	PG250N1	PG250R1	0-250 kV	0-1 mA	5.25 in	40.50 in
PG250P2	PG250N2	PG250R2	0-250 kV	0-2 mA	5.25 in	40.50 in
PG300P1	PG300N1	PG300R1	0-300 kV	0-1 mA	5.25 in	50.88 in
PG300P2	PG300N2	PG300R2	0-300 kV	0-2 mA	5.25 in	50.88 in
PG400P1	PG400N1	PG400R1	0-400 kV	0-1 mA	5.25 in	63.25 in

PG-LR Models (same panel and stack heights as above)

Positive Polarity	Negative Polarity	Output Voltage	Output Current	Ripple (V p-p)	
				Typ.	Max.
PG100P2.5-LR	PG100N2.5-LR	0-100 kV	0-2.5 mA	2	4.5
PG100P5-LR	PG100N5-LR	0-100 kV	0-5 mA	4	7
PG150P2-LR	PG150N2-LR	0-150 kV	0-2 mA	3	5
PG150P3-LR	PG150N3-LR	0-150 kV	0-3 mA	6	9
PG200P1-LR	PG200N1-LR	0-200 kV	0-1 mA	3.5	5
PG200P2-LR	PG200N2-LR	0-200 kV	0-2 mA	7	10
PG250P1-LR	PG250N1-LR	0-250 kV	0-1 mA	4.5	6.5
PG250P2-LR	PG250N2-LR	0-250 kV	0-2 mA	8.5	12.5
PG300P1-LR	PG300N1-LR	0-300 kV	0-1 mA	5	7.5
PG300P2-LR	PG300N2-LR	0-300 kV	0-2 mA	10	15
PG400P1-LR	PG400N1-LR	0-400 kV	0-1 mA	7	10

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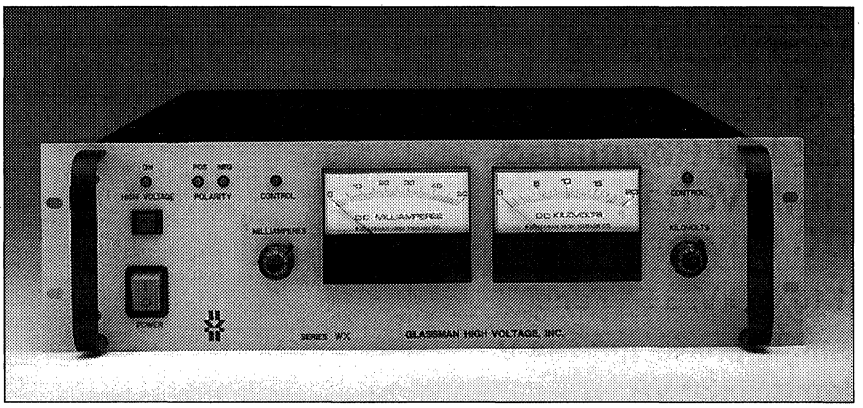
WX Series 1000 Watt Regulated High Voltage DC Power Supplies

Up to 75 kV, 5.25 Inch Panel Height... Laboratory Performance... Enhanced Features



The WX Series provides 1000 watts of output power with voltage ranges from 0 to 1 kV through 0 to 75 kV in a rack-panel height of only 5.25 inches. Standard models have dual analog voltage and current meters. As an option, WX is available with dual digital meters or with a blank panel for OEM/system applications. Local front panel and full remote controls are standard. Maximum weight is 30 lbs.

Specifications

INPUT:
198-242 V RMS standard, single-phase, 48-63 Hz, <9.5 A. Connector per IEC 320/C14 with mating line cord, terminated with NEMA 6-15 plug.

EFFICIENCY:
Typically 83% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
6 Joules, maximum, up to 50 kV;
9 Joules, maximum, 60 and 75 kV.

VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.01% + 1 mV/mA for load variations.

RIPPLE:
<0.05% of rated voltage + 0.5 V RMS at full load.

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hour.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical with a 50% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +50 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available either positive, negative, or reversible with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads. including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal blocks provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		WX1R1000	0-1 kV	0-1000 mA	RG-59U	5.25 in.
		WX1.5R700	0-1.5 kV	0-700 mA	RG-59U	5.25 in.
		WX2R500	0-2 kV	0-500 mA	RG-59U	5.25 in.
		WX3R350	0-3 kV	0-350 mA	RG-59U	5.25 in.
		WX5R200	0-5 kV	0-200 mA	RG-59U	5.25 in.
WX10P100	WX10N100	WX10R100	0-10 kV	0-100 mA	RG-8U	5.25 in.
WX15P70	WX15N70	WX15R70	0-15 kV	0-70 mA	RG-8U	5.25 in.
WX20P50	WX20N50	WX20R50	0-20 kV	0-50 mA	RG-8U	5.25 in.
WX30P35	WX30N35	WX30R35	0-30 kV	0-35 mA	RG-8U	5.25 in.
WX40P25	WX40N25	WX40R25	0-40 kV	0-25 mA	RG-8U	5.25 in.
WX50P20	WX50N20	WX50R20	0-50 kV	0-20 mA	RG-8U	5.25 in.
WX60P15	WX60N15	WX60R15	0-60 kV	0-15 mA	RG-8U	5.25 in.
WX75P12	WX75N12	WX75R12	0-75 kV	0-12 mA	DS2124	5.25 in.

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EQ Series 1.2 kW Regulated High Voltage DC Power Supplies

1 to 60 kV, 3.5" Panel

Single-phase 198-264 V Input, 1420 VA

Power Factor Corrected to >0.995. Harmonics Well Below IEC 555-2 Specs

The EQ Series are sophisticated, 1.2 kW, high voltage power supples in a small and lightweight package. They are designed to meet the growing demands from both users and electric utilities for switching power supplies with excellent input power factors that draw harmonic currents below those specified in IEC 555-2. The EQ Series has odd harmonics well below 555-2 specifications and even harmonics are essentially negligible.

Specifications

(Specifications apply from 5 to 100% rated voltage. Operation is guaranteed down to 0% of rated voltage with a slight degradation of ripple, regulation, and stability.)

INPUT:
198-264 V RMS standard, single-phase, 48-63 Hz, 1420 VA maximum. <7 A at 220 V. Connector per IEC 320/VI with mating line cord terminated with NEMA 6-15 plug.

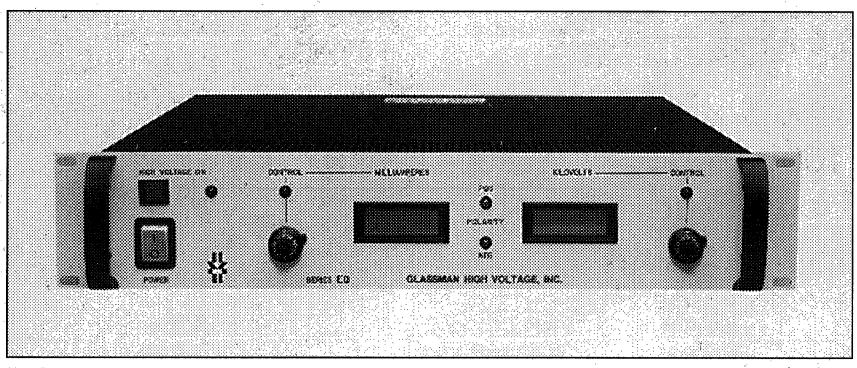
EFFICIENCY:
Typically 85% at full load.
Power factor >0.995.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.5% resolution. Accuracy, 0.25% rated + 0.25% setting. Repeatability better than 0.1% of setting.

STORED ENERGY:
See Models chart.

STATIC VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 0.5 mV/mA for load variations.

DYNAMIC VOLTAGE REGULATION:
For load transients from 10% to 100% and 100% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 500 µs and to 0.1% in 1 ms.



RIPPLE:
<0.02% of rated voltage + 300 mV RMS at full load.

CURRENT REGULATION:
Better than 0.05% + 100 µA from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.25% reading + 0.25% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for single polarity, 1% reading + 0.1% rated for reversible polarity

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical with a 10% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection,.

REMOTE CONTROLS:

Terminal block is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, HV enable, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

REMOTE HV ENABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage (kV)	Output Current (mA)	Stored Energy (J)	Output Cable
Reversible Only		EQ1R1200	0-1	0-1200	1.0	RG-58
		EQ1.5R800	0-1.5	0-800	1.1	RG-58
		EQ2R600	0-2	0-600	1.0	RG-58
		EQ3R400	0-3	0-400	1.1	RG-58
		EQ5R240	0-5	0-240	1.2	RG-58
		EQ6R200	0-6	0-200	1.4	RG-58
EQ8P150	EQ8N150	EQ8R150	0-8	0-150	1.3	RG-8U
EQ10P120	EQ10N120	EQ10R120	0-10	0-120	1.6	RG-8U
EQ12P100	EQ12N100	EQ12R100	0-12	0-100	2.0	RG-8U
EQ15P80	EQ15N80	EQ15R80	0-15	0-80	1.6	RG-8U
EQ20P60	EQ20N60	EQ20R60	0-20	0-60	2.0	RG-8U
EQ30P40	EQ30N40	EQ30R40	0-30	0-40	2.1	RG-8U
EQ40P30	EQ40N30	EQ40R30	0-40	0-30	2.8	RG-8U
EQ50P24	EQ50N24	EQ50R24	0-50	0-24	3.4	RG-8U
EQ60P20	EQ60N20	EQ60R20	0-60	0-20	4.1	RG-8U

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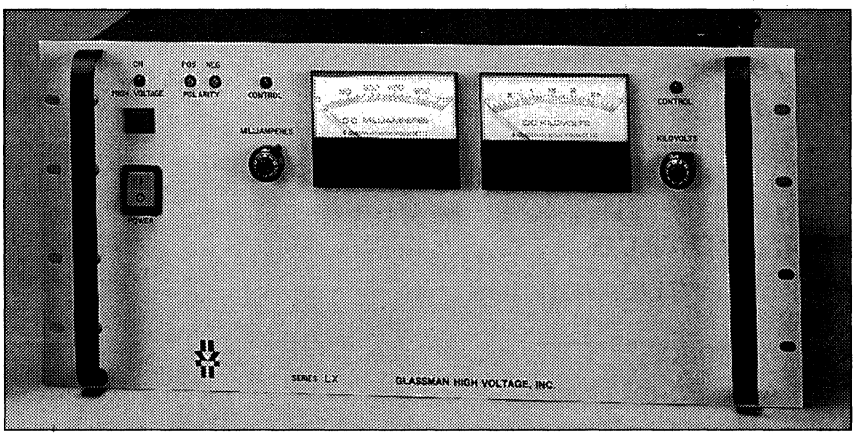
LX Series Extended Currrent 1000 Watt Regulated High Voltage DC Power Supplies

Up To 150 kV... 8.75 Inch Panel Height



The LX Series is a 1000 watt regulated high voltage DC power supply with an important difference ... maximum current ratings are equivalent to a 2000 W supply! This maximum current, which is available for all output voltages up to 50% of rated voltage, should be of significant interest for many applications. Weight is less than 47 pounds.

Specifications (from 5 to 100% of rated voltage)

INPUT:
102-132 V RMS standard, single-phase, 48-63 Hz, <20 A. 3-position terminal block with protective cover.
EFFICIENCY:
Typically 85% at full load.
OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.
STORED ENERGY:
<15 Joules, 60 kV; <30 Joules, 125 kV.
VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 1 mV/mA for load variations.
RIPPLE:
<0.03% of rated voltage + 1 V RMS at full load, 0.1% (150 kV).
CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.
VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.
CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for single polarity, 1% reading + 0.1% rated for reversible polarity.
STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.
VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical to 60 kV (400 ms for higher voltages) with a 30% resistive load using either TTL on/off or remote programming control.
TEMPERATURE COEFFICIENT:
0.01% per degree C.
AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.
POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.
PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.
REMOTE CONTROLS:
Terminal block is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.
EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.
TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		LX1R2000	0-1 kV	0-2000 mA	RG-59	8.75 in.
		LX1.5R1300	0-1.5 kV	0-1300 mA	RG-59	8.75 in.
		LX2R1000	0-2 kV	0-1000 mA	RG-59	8.75 in.
		LX3R660	0-3 kV	0-660 mA	RG-59	8.75 in.
		LX5R400	0-5 kV	0-400 mA	RG-59	8.75 in.
		LX6R330	0-6 kV	0-330 mA	RG-58	8.75 in.
LX8P250	LX8N250	LX8R250	0-8 kV	0-250 mA	RG-8U	8.75 in.
LX10P200	LX10N200	LX10R200	0-10 kV	0-200 mA	RG-8U	8.75 in.
LX12P165	LX12N165	LX12R165	0-12 kV	0-165 mA	RG-8U	8.75 in.
LX15P132	LX15N132	LX15R132	0-15 kV	0-132 mA	RG-8U	8.75 in.
LX20P100	LX20N100	LX20R100	0-20 kV	0-100 mA	RG-8U	8.75 in.
LX30P66	LX30N66	LX30R66	0-30 kV	0-66 mA	RG-8U	8.75 in.
LX40P50	LX40N50	LX40R50	0-40 kV	0-50 mA	RG-8U	8.75 in.
LX50P40	LX50N40	LX50R40	0-50 kV	0-40 mA	RG-8U	8.75 in.
LX60P33	LX60N33	LX60R33	0-60 kV	0-33 mA	RG-8U	8.75 in.
LX80P25	LX80N25	LX80R25	0-80 kV	0-25 mA	DS 2124	8.75 in.
LX100P20	LX100N20	LX100R20	0-100 kV	0-20 mA	DS 2124	8.75 in.
LX125P16	LX125N16	LX125R16	0-125 kV	0-16 mA	DS 2121	8.75 in.
LX150P6	LX150N6	LX150R6	0-150 kV	0-6 mA	DS 2121	8.75 in.

Note: Product of voltage and current automatically limited to 1000 W maximum .

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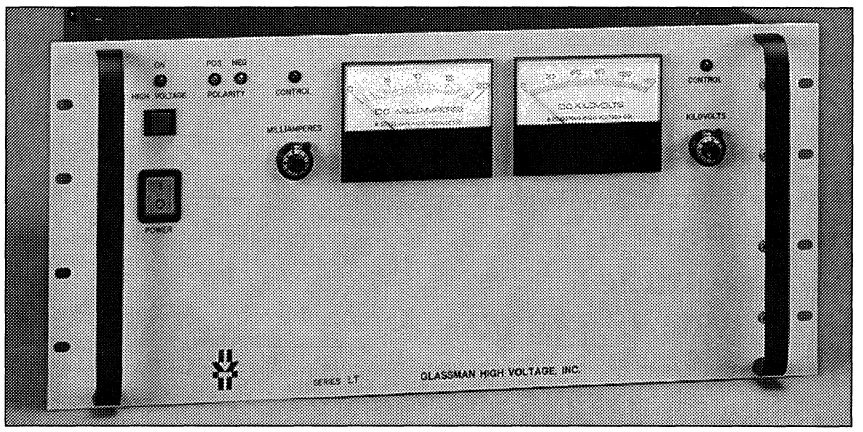
LT Series 2000 Watt Regulated High Voltage DC Power Supplies

Up To 150 kV... 8.75 Inch Panel Height Laboratory Performance Enhanced Features



The LT Series is a 2000 watt regulated high voltage DC power supply with voltage ranges from 0 to 1 kV through 0 to 150 kV. Rack-panel height is only 8.75 inches. The LT is offered with dual analog voltage and current meters or, optionally, with dual digital meters or a blank panel for OEM/systems applications. Weight is less than 47 pounds.

Specifications (from 5 to 100% rated voltage)

INPUT:
198-264 V RMS standard, single-phase, 48-63 Hz, <20 A. 3-position terminal block with protective cover.

EFFICIENCY:
Typically 85% at full load.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signal, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% fs.

STORED ENERGY:
<15 Joules, 60 kV; <30 Joules, 125 kV.

VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.005% + 1 mV/mA for load variations.

RIPPLE:
<0.03% of rated voltage + 1 V RMS at full load, 0.1% (150 kV).

CURRENT REGULATION:
Better than 0.05% from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 1% reading + 1% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for single polarity, 1% reading + 0.1% rated for reversible polarity.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical to 60 kV (400 ms for higher voltages) with a 30% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal block is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		LT1R2000	0-1 kV	0-2000 mA	RG-59	8.75 in.
		LT1.5R1300	0-1.5 kV	0-1300 mA	RG-59	8.75 in.
		LT2R1000	0-2 kV	0-1000 mA	RG-59	8.75 in.
		LT3R660	0-3 kV	0-660 mA	RG-59	8.75 in.
		LT5R400	0-5 kV	0-400 mA	RG-59	8.75 in.
		LT6R330	0-6 kV	0-330 mA	RG-58	8.75 in.
LT8P250	LT8N250	LT8R250	0-8 kV	0-250 mA	RG-8U	8.75 in.
LT10P200	LT10N200	LT10R200	0-10 kV	0-200 mA	RG-8U	8.75 in.
LT12P165	LT12N165	LT12R165	0-12 kV	0-165 mA	RG-8U	8.75 in.
LT15P132	LT15N132	LT15R132	0-15 kV	0-132 mA	RG-8U	8.75 in.
LT20P100	LT20N100	LT20R100	0-20 kV	0-100 mA	RG-8U	8.75 in.
LT30P66	LT30N66	LT30R66	0-30 kV	0-66 mA	RG-8U	8.75 in.
LT40P50	LT40N50	LT40R50	0-40 kV	0-50 mA	RG-8U	8.75 in.
LT50P40	LT50N40	LT50R40	0-50 kV	0-40 mA	RG-8U	8.75 in.
LT60P33	LT60N33	LT60R33	0-60 kV	0-33 mA	RG-8U	8.75 in.
LT80P25	LT80N25	LT80R25	0-80 kV	0-25 mA	DS 2124	8.75 in.
LT100P20	LT100N20	LT100R20	0-100 kV	0-20 mA	DS 2124	8.75 in.
LT125P16	LT125N16	LT125R16	0-125 kV	0-16 mA	DS 2121	8.75 in.
LT150P10	LT150N10	LT150R10	0-150 kV	0-10 mA	DS 2121	8.75 in.

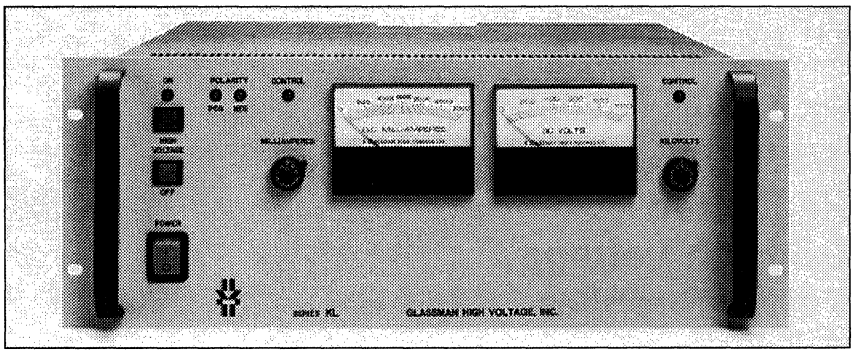
CE Check the specs... and compare!

KL Series 3 kW Regulated High Voltage DC Power Supplies

Power Factor Corrected to >0.99 ... Well within IEC 555-2 Specifications

High Speed Dynamic Voltage Regulation

Single-phase, 198-264 V Input, 3600 VA



The KL Series is designed to meet the growing demands from both users and electric utilities for switching power supplies that exhibit improved input power factors. Power factor is defined as the ratio of real power (measured in watts) to apparent power (measured in volt amperes.) A power factor near unity means that the user's supply can develop the maximum possible DC output power from an AC line of a given current rating. A power factor near unity also means that the supply does not distort the AC line voltage to a point where it could affect other equipment on the same line.

Models are available from 0 to 1 kV through 0 to 30 kV. Panel height is 7 inches and weight is less than 50 lbs.

Specifications (from 5 to 100% rated voltage)

INPUT:
198-264 V RMS standard, single-phase, 48-63Hz, 3600 VA maximum, <17 A at 220 V. 3-position terminal block with protective cover.

EFFICIENCY:
Typically 87% at full load.
Power factor >0.99.

OUTPUT:
Continuous, stable adjustment from 0 to rated voltage/current by external 0 to +10 V signals, external potentiometers, or panel-mounted 10-turn potentiometers with 0.05% resolution. Accuracy, 1% rated + 1% setting. Repeatability better than 0.1% of rating.

STORED ENERGY:
See Models chart.

STATIC VOLTAGE REGULATION:
Better than 0.005% for specified line variations and 0.01% + 0.2 volts per ampere for load variations.

DYNAMIC VOLTAGE REGULATION:
For load transients from 10% to 100% and 100% to 10%, typical deviation is 2% of output voltage with recovery to within 1% in 500 µs and to 0.1% in 1 ms.

RIPPLE:
<0.02% of rated voltage + 500 mV RMS.

CURRENT REGULATION:
Better than 0.05% + 50 µA from short circuit to rated voltage at any load condition.

VOLTAGE MONITOR:
0 to +10 V equivalent to 0 to rated voltage. Accuracy, 0.5% reading + 0.5% rated.

CURRENT MONITOR:
0 to +10 V equivalent to 0 to rated current. Accuracy, 1% reading + 0.05% rated for single polarity, 1% reading + 0.1% rated for reversible polarity.

STABILITY:
0.01% per hour after 1/2 hour warmup, 0.05% per 8 hours.

VOLTAGE RISE/DECAY TIME CONSTANT:
50 ms typical with a 10% resistive load using either TTL on/off or remote programming control.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +40 degree C, operating;
-40 to +85 degree C, storage.

POLARITY:
Available with either positive, negative, or reversible polarity with respect to chassis ground.

PROTECTION:
Automatic current regulation protects against all overloads, including arcs and shorts. Fuses, surge-limiting resistors, and low energy components provide ultimate protection.

REMOTE CONTROLS:
Terminal block is provided for all remote functions, including common, +10 V reference, interlock, voltage and current program/monitor, TTL, ground, and local control.

EXTERNAL INTERLOCK:
Open off, closed on. Normally latching except for blank panel version where it is non-latching.

TTL ENABLE/DISABLE:
0-1.5 V off, 2.5-15 V on.

Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy	Output Cable
Reversible Only		KL1R3000	0-1 kV	0-3000 mA	2.3 J	RG-58
		KL1.5R2000	0-1.5 kV	0-2000 mA	3.4 J	RG-58
		KL2R1500	0-2 kV	0-1500 mA	2.7 J	RG-58
		KL3R1000	0-3 kV	0-1000 mA	2.0 J	RG-58
		KL5R600	0-5 kV	0-600 mA	2.5 J	RG-58
		KL6R500	0-6 kV	0-500 mA	3.6 J	RG-58
KL8P375	KL8N375	KL8R375	0-8 kV	0-375 mA	3.1 J	RG-8U
KL10P300	KL10N300	KL10R300	0-10 kV	0-300 mA	2.9 J	RG-8U
KL12P250	KL12N250	KL12R250	0-12 kV	0-250 mA	4.2 J	RG-8U
KL15P200	KL15N200	KL15R200	0-15 kV	0-200 mA	3.8 J	RG-8U
KL20P150	KL20N150	KL20R150	0-20 kV	0-150 mA	4.2 J	RG-8U
KL30P100	KL30N100	KL30R100	0-30 kV	0-100 mA	4.9 J	RG-8U

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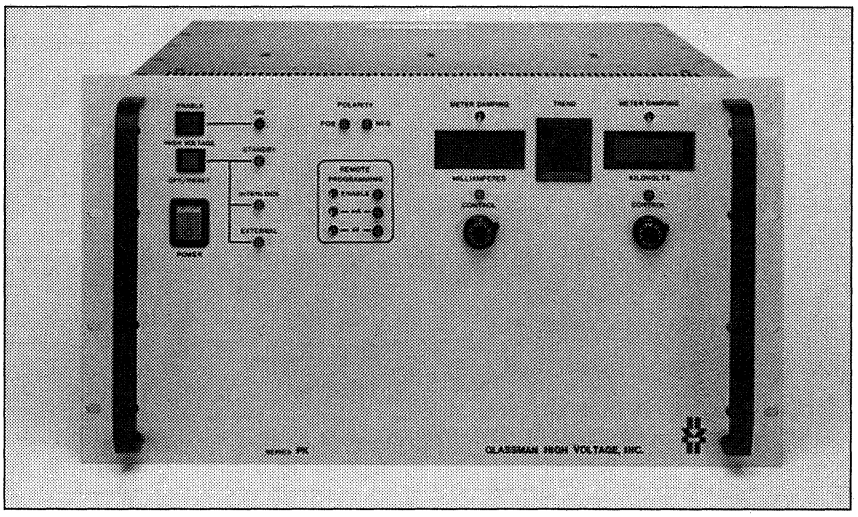
CE Check the specs... and compare!

PK Series 4/8/12/15 kW Regulated DC High Voltage Power Supplies

Models 8 kW and higher are obtained by paralleling 4 kW models in a "master/slave" configuration. Slave panels have separate AC power inputs and switches, and annunciators for power on, tracking, overvoltage, and bias. Models from 0 to 3 kV through 0 to 500 kV.



Specifications.

AC INPUT:
4, 8, and 12 kW models; 3-phase, 208 V RMS +/- 10%, 48-63 Hz. Output power derated for line unbalance > 2%. 5-position terminal block (1 position not used) with protective cover. Fused for 20 A, phase or line. 8 kW and higher models have an additional terminal block for each slave unit.

DC OUTPUT:
Continuous, stable adjustment from zero to rated voltage and current by means of separate 10-turn front panel controls, with locking vernier dials, or external (switch selected) 0 to +10 V signals. Panel controls have resolution and readability better than 500 ppm, linear to 1%, repeatable to 0.1% fs. Accuracy, 1% of rated + 1% of setting.

VOLTAGE/CURRENT OUTPUT METERS:
Dual 3-1/2 digit LCDs with on/off damping, accuracy 1% fs + 1% rdg.; dual 10-segment bar-graphs.

VOLTAGE REGULATION:
Load, better than +/- 0.01% + 0.5 mV/mA for full load variation; line, better than +/- 0.01% over specified input range.

RIPPLE:
Better than 0.1% RMS of rated voltage at full load for models to 125 kV, better than 0.05% for models 150 kV and higher.

CURRENT REGULATION:
Load, better than +/- 0.1% + 100 µA from short circuit to rated voltage at any rated load condition; line, better than +/- 0.01% over specified input range.

STABILITY:
0.01% per hour after 1/2 hour warmup; 0.05% per 8 hours.

TEMPERATURE COEFFICIENT:
0.01% per degree C.

AMBIENT TEMPERATURE:
-20 to +50 degrees C, operating;
-40 to +85 degrees C, storage.

PROTECTION:
Automatic current regulation protection reduces output voltage as required for all arc, overload, and short circuit conditions. Fuses, surge-limiting resistors, and low stored energy provide the ultimate protection.

ACCESSORIES:
Detachable 8-foot shielded high voltage coaxial cable provided for models up to 125 kV (See models chart for cable type.) 8 kW and higher models, up to 125 kV, are provided with an additional coaxial cable for each slave unit. Harness and/or interconnection cables supplied for multi-chassis supplies. 25-pin D-subminiature connector provided for customer interface.

ANALOG MONITORS:
Current and voltage, 0 to 10 V, directly proportional, 10 k ohms +/-1% source impedance.

DIGITAL MONITOR SIGNALS:
4 functions; Milliampere Control, Kilovolt Control, High Voltage Enable, and No Fault. High active, TTL or 5 V CMOS compatible. Source, 1.0 mA at 2.5 V; sink, 2.6 mA at 0.4 V.

continued on next page

Models, 4 kW, Fully Enclosed

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		PK3R1300	0-3 kV	0-1300 mA	RG-59U	10.5 in.
		PK6R650	0-6 kV	0-650 mA	RG-58U	10.5 in.
PK8P450	PK8N450	PK8R450	0-8 kV	0-450 mA	DS2124	10.5 in.
PK10P400	PK10N400	PK10R400	0-10 kV	0-400 mA	DS2124	10.5 in.
PK12P330	PK12N330	PK12R330	0-12 kV	0-330 mA	DS2124	10.5 in.
PK15P260	PK15N260	PK15R260	0-15 kV	0-260 mA	DS2124	10.5 in.
PK20P200	PK20N200	PK20R200	0-20 kV	0-200 mA	DS2124	10.5 in.
PK30P130	PK30N130	PK30R130	0-30 kV	0-130 mA	DS2124	10.5 in.
PK40P100	PK40N100	PK40R100	0-40 kV	0-100 mA	DS2124	10.5 in.
PK50P80	PK50N80	PK50R80	0-50 kV	0-80 mA	DS2124	10.5 in.
PK60P65	PK60N65	PK60R65	0-60 kV	0-65 mA	DS2124	10.5 in.
PK75P50	PK75N50	PK75R50	0-75 kV	0-50 mA	DS2124	10.5 in.
PK80P50	PK80N50	PK80R50	0-80 kV	0-50 mA	DS2121	15.75 in.
PK100P40	PK100N40	PK100R40	0-100 kV	0-40 mA	DS2121	15.75 in.
PK125P30	PK125N30	PK125R30	0-125 kV	0-30 mA	DS2121	15.75 in.

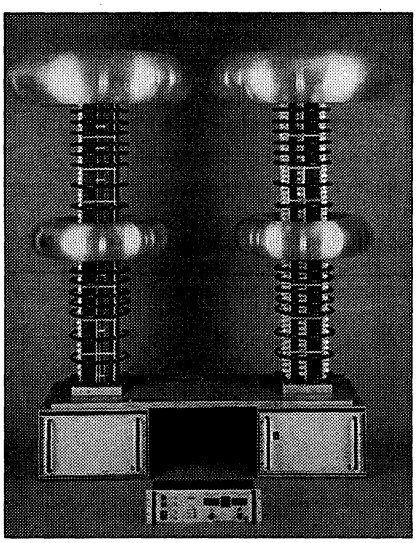
Maximum weight is 62 lbs.to 75 kV, 85 lbs. to 125 kV.

Specifications... *continued*

OPTO-ISOLATED OUTPUT:
Opto-isolated NPN transistor output, controlled by any one of the digital monitor signals. Not to be used for high voltage isolation.

DIGITAL HV ON/OFF CONTROL:
2 inputs; Enable, to activate high voltage, switch selected, high on, low off and External, to disable high voltage, overrides local or remote enable, high for disable. External has 2 programmable modes, level-controlled interrupt or edge-triggered shutdown. Both inputs are TTL or 5 V CMOS compatible. Input active with 2-15 V signal. Impedance, 100 k ohms at 0-5 V, 10 k ohms at 15 V, approximate.

INTERLOCK:
Open off, closed on.



Typical Open Stack Configuration for Series PKCP and Series PK.

Models, 4 kW, Open Stack

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Panel Height	Stack Height
PK150P25	PK150N25	PK150R25	0-150 kV	0-25 mA	5.25 in.	35.1 in.
PK200P18	PK200N18	PK200R18	0-200 kV	0-18 mA	5.25 in.	40.1 in.
PK250P14	PK250N14	PK250R14	0-250 kV	0-14 mA	5.25 in.	45.9 in.
PK300P10	PK300N10	PK300R10	0-300 kV	0-10 mA	5.25 in.	60.2 in.
PK350P8	PK350N8	PK350R8	0-350 kV	0-8 mA	5.25 in.	68.6 in.
PK400P6	PK400N6	PK400R6	0-400 kV	0-6 mA	5.25 in.	68.6 in.
PK500P4	PK500N4	PK500R4	0-500 kV	0-4 mA	5.25 in.	75.9 in.

Maximum weight is 125 lbs.

Models, 8 kW, Fully Enclosed (for models to 15 kW, consult factory)

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Output Cable	Panel Height
Reversible Only		PK3R2600	0-3 kV	0-2600 mA	RG-59U	21 in.
		PK6R1300	0-6 kV	0-1300 mA	RG-58U	21 in.
PK8P900	PK8N900	PK8R900	0-8 kV	0-900 mA	DS2124	21 in.
PK10P800	PK10N800	PK10R800	0-10 kV	0-800 mA	DS2124	21 in.
PK12P660	PK12N660	PK12R660	0-12 kV	0-660 mA	DS2124	21 in.
PK15P520	PK15N520	PK15R520	0-15 kV	0-520 mA	DS2124	21 in.
PK20P400	PK20N400	PK20R400	0-20 kV	0-400 mA	DS2124	21 in.
PK30P260	PK30N260	PK30R260	0-30 kV	0-260 mA	DS2124	21 in.
PK40P200	PK40N200	PK40R200	0-40 kV	0-200 mA	DS2124	21 in.
PK50P160	PK50N160	PK50R160	0-50 kV	0-160 mA	DS2124	21 in.
PK60P130	PK60N130	PK60R130	0-60 kV	0-130 mA	DS2124	21 in.
PK75P100	PK75N100	PK75R100	0-75 kV	0-100 mA	DS2124	21 in.
PK80P100	PK80N100	PK80R100	0-80 kV	0-100 mA	DS2121	31.5 in.
PK100P80	PK100N80	PK100R80	0-100 kV	0-80 mA	DS2121	31.5 in.
PK125P60	PK125N60	PK125R60	0-125 kV	0-60 mA	DS2121	31.5 in.

Maximum weight is 125 lbs. to 75 kV, 170 lbs. to 125 kV.

Models, 8 kW, Open Stack

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Panel Height	Stack Height
PK150P50	PK150N50	PK150R50	0-150 kV	0-50 mA	5.25 in.	35.1 in.
PK200P36	PK200N36	PK200R36	0-200 kV	0-36 mA	5.25 in.	40.1 in.
PK250P28	PK250N28	PK250R28	0-250 kV	0-28 mA	5.25 in.	45.9 in.
PK300P20	PK300N20	PK300R20	0-300 kV	0-20 mA	5.25 in.	60.2 in.
PK350P16	PK350N16	PK350R16	0-350 kV	0-16 mA	5.25 in.	68.6 in.
PK400P12	PK400N12	PK400R12	0-400 kV	0-12 mA	5.25 in.	68.6 in.
PK500P8	PK500N8	PK500R8	0-500 kV	0-8 mA	5.25 in.	75.9 in.

Maximum weight is 200 lbs.

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POWER SUPPLIES

INPUT CONNECTORS

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AUSTRALIA/NEW ZEALAND

SWITZERLAND 220VAC/50 HZ

ACC.POWER 120VAC/220/240VAC

PX0575/10 PX0580

Fused Inlet S.P. Rocker Switch Inlet S.P. Rocker Switch

USA/CANADA 120VAC/60 HZ
JAPAN 100VAC/50 HZ

SVT SJT 18AWG 3 Cond
SPT-1 SPT-2 SVT SJT 18AWG 2 Cond

EUROPEAN "SCHUKO" 220VAC/50 HZ

AUSTRALIA 240VAC/50 HZ

GREAT BRITAIN 240VAC/50 HZ

DENMARK 220VAC/50 HZ

INDIAN/S.AFRICA 220VAC/50

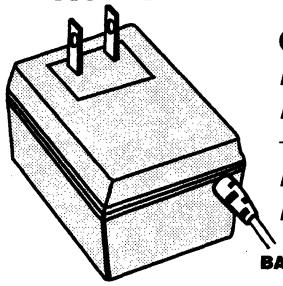
ISRAEL 220VAC/50 HZ

ITALY 220VAC/50 HZ

Note: Other input cords available.

TYPE

WALL PLUG-IN
AC-AC TYPE or AC-DC TYPE



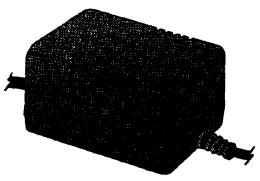
Output:
From 5 VAC to 30 VAC
From 5 VA to 50 VA

From 5 VDC to 24 VDC
From 5 VA to 50 VA

BATTERY CHARGER AVAILABLE

- Single Output, Dual Output, Triple Output
- Universal Types • Medical Application
- Special Designs
- Regulated • Unregulated

TABLE TOP AC-AC TYPE
or TABLE TOP AC-DC TYPE



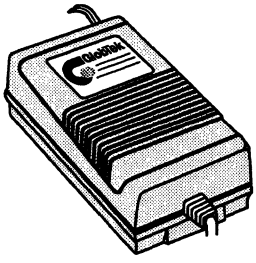
Output:
From 5 VAC to 24 VAC
From 5 VA to 80 VA

From 5 VDC to 24 VDC
From 5 VA to 50 VA

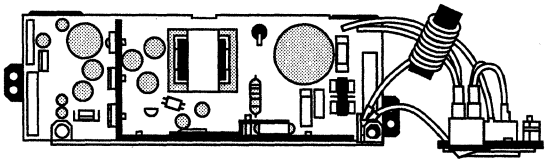
- Single Output
- Dual Output
- Triple Output • Special Designs
- Universal Types • Regulated
- Unregulated • Medical Application
- Switch Selectable Input

BATTERY CHARGER AVAILABLE

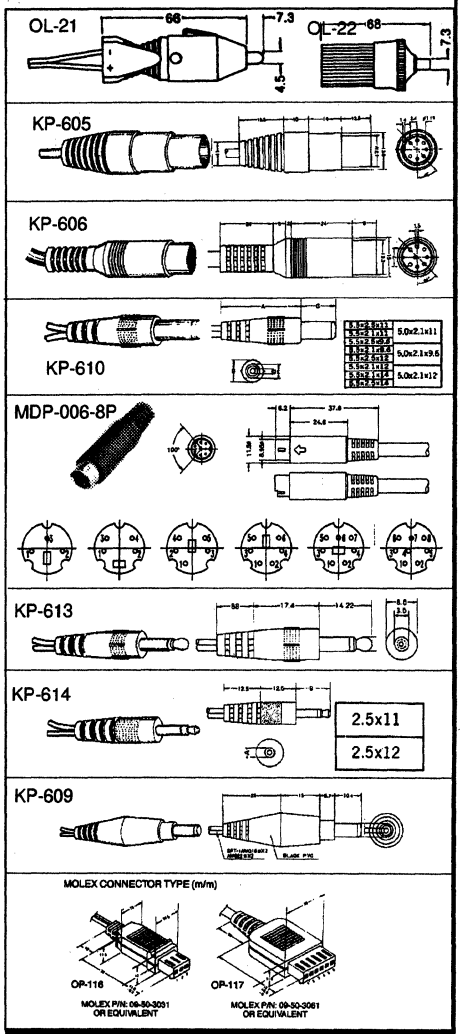
SWITCHING POWER SUPPLY
WALL PLUG-IN AND TABLE TOP



Output:
Up to 80 Watts
- Single Output
- Multiple Outputs
- Triple Output
- Regulated with Low Ripple



OUTPUT CONNECTORS



Additional output connectors available. Please inquire.

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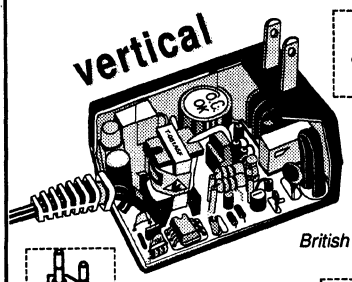
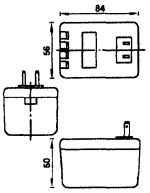
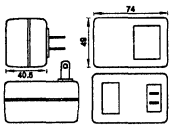


Dim: mm

15 & 24W

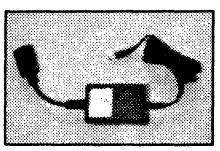


7.5W & 10W



horizontal

Desk-Top *New!*



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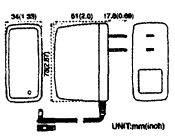

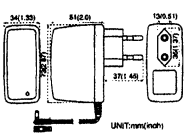

Wall Mount
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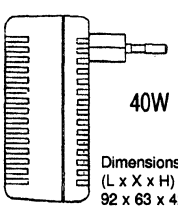
European

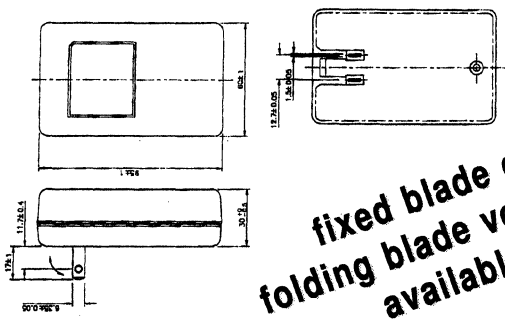


40W

Dimensions
(L x X x H)
92 x 63 x 42mm

	Model	Output Voltage	Output Current	Input Voltage Type
10W Series	WR51A1500LCP WR91A1500LCP	5V	1.5A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51B1500LCP WR91B1500LCP	6V	1.5A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51C1200LCP WR91C1200LCP	7.5V	1.2A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51D1000LCP WR91D1000LCP	9V	1.0A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51E1000LCP WR91E1000LCP	12V	1.0A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51G800LCP WR91G800LCP	15V	0.8A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51I0420LCP WR91I0420LCP	24V	0.4A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
15W Series	WR51A2400LCP WR91A2400LCP	5V	2.4A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51B2000LCP WR91B2000LCP	6V	2.0A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51C2000LCP WR91C2000LCP	7.5V	2.0A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51D1500LCP WR91D1500LCP	9V	1.5A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51E1200LCP WR91E1200LCP	12V	1.5A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51G1000LCP WR91G1000LCP	15V	1.0A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51I0630LCP WR91I0630LCP	24.V	0.6A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
20W Series	WR51E1500LCP WR91E1500LCP	12V	1.5A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51E2000LCP WR91E2000LCP	12V	2.0A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51J2000LCP WR91J2000LCP	13.5V	2.0A	100-125VAC (90-132VAC) 100-250VAC (90-264VAC)
	WR51A4000LCP-U	+5V	4.0A	90-132VAC
	WR51B3500LCP-U	+6V	3.5A	90-132VAC
	WR51C3300LCP-U	+7.5V	3.3A	90-132VAC
	WR51D2500LCP-U	+9V	2.5A	90-132VAC
	WR51E2000LCP-U	+12V	2.0A	90-132VAC
	WR51G1600LCP-U	+15V	1.6A	90-132VAC
	WR51H1300LCP-U	+18V	1.3A	90-132VAC
	WR51I1000LCP-U	+24V	1.0A	90-132VAC
Multi-output	TR9CV1500N00-U	5V 12V -12V	1.5A 0.2A 0.2A	100-250VAC (90-264VAC) * TABLE TOP ONLY *
40W Series	WR51A4000LCP WR53A4000LCP	+5V	4A	90-130VAC 180-260VAC
	WR51B4000LCP WR53B4000LCP	+6V	4A	90-130VAC 180-260VAC
	WR51C4000LCP WR53C4000LCP	+7.5V	4A	90-130VAC 180-260VAC
	WR51D3500LCP WR53D3500LCP	+9V	3.5A	90-130VAC 180-260VAC
	WR51E3000LCP WR53E3000LCP	+12V	3A	90-130VAC 180-260VAC
	WR51F2800LCP WR53F2800LCP	+13.8V	2.8A	90-130VAC 180-260VAC
	WR51G2600LCP WR53G2600LCP	+15V	2.6A	90-130VAC 180-260VAC
	WR51T2500LCP WR53T2500LCP	+16V	2.5A	90-130VAC 180-260VAC
	WR51H2200LCP WR53H2200LCP	+18V	2.2A	90-130VAC 180-260VAC
	WR51I1700LCP WR53I1700LCP	+24V	1.7A	90-130VAC 180-260VAC

OTHER POWER MODEL & RATINGS AVAILABLE



MODEL (folding style)	MODEL (fixed blade)	OUTPUT
TF 05-35	TG 05-35	+5.0VDC/3.5A
TF 09-20	TG 09-20	+9.0VDC/2.0A
TF 12-15	TG 12-15	+12.0VDC/1.5A
TF 15-12	TG 15-12	+15.0VDC/1.2A
TF 24-08	TG 24-08	+24.0VDC/0.8A

fixed blade or folding blade versions available

90VAC TO 132VAC
47HZ TO 63HZ

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SWITCH MODE POWER SUPPLIES

Desktop

Dimensions for Desktop Power Supplies

Case	Dimensions (L x W x H)
J	107 x 65 x 42 mm
K	150 x 65 x 40 mm

Desktop Universal Switchmode Power Supplies

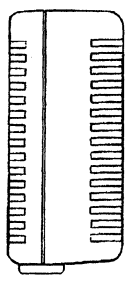
INPUT 90 -260V 50/60Hz

	Part #	Output		Case
40w	TR9CA4000LCP-A	+5V	4A	J
	TR9CB4000LCP-A	+6V	4A	J
	TR9CC4000LCP-A	+7.5V	4A	J
	TR9CD3500LCP-A	+9V	3.5A	J
	TR9CE3000LCP-A	+12V	3A	J
	TR9CF2800LCP-A	+13.8V	2.8A	J
	TR9CG2700LCP-A	+15V	2.7A	J
	TR9CT2500LCP-A	+16V	2.5A	J
	TR9CH2200LCP-A	+18V	2.2A	J
	TR9CI1700LCP-A	+24V	1.7A	J
	TR9CM3000N05-A	+5V	3.0A	J
		+12V	1.5A	J
	TR9CV2500N05-A	+5V	2.5A	J
		+12V	1A	J
		-12V	0.3A	J
45w	TR9CA5000LCP-A	+5V	5A	J
	TR9CB5000LCP-A	+6V	5A	J
	TR9CC4800LCP-A	+7.5V	4.8A	J
	TR9CD4500LCP-A	+9V	4.5A	J
	TR9CE3400LCP-A	+12V	3.4A	J
	TR9CF3000LCP-A	13.8V	3.0A	J
	TR9CG2800LCP-A	15V	2.8A	J
	TR9CT2700LCP-A	16V	2.7A	J
	TR9CH2400LCP-A	18V	2.4A	J
	TR9CI1800LCP-A	24V	1.8	J

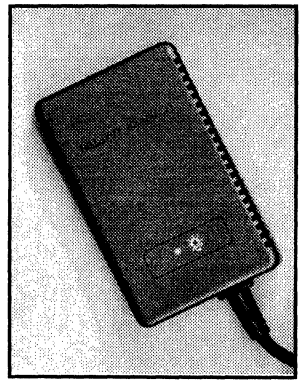
Desktop Universal Switchmode Power Supplies

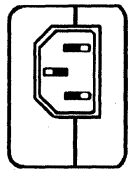
INPUT 90 -260V 50/60Hz

	Part #	Output		Case
50w	TR9CE4100LCP-A	+12V	4.1A	K
	TR9CT3100LCP-A	+16V	3.1A	K
	TR9CI2100LCP-A	+24V	2.1A	K
55w	TR9CA6000LCP-A	+5V	6A	K
	TR9CB6000LCP-A	+6V	6A	K
	TR9CC5500LCP-A	+7.5V	5.5A	K
	TR9CD5000LCP-A	+9V	5A	K
	TR9CE4200LCP-A	+12V	4.2A	K
	TR9CF3800LCP-A	+13.8V	3.8A	K
	TR9CG3600LCP-A	+15V	3.6A	K
	TR9CT34000LCP-A	+16V	3.4A	K
	TR9CH3000LCP-A	+18V	3.0A	K
	TR9CI2300LCP-A	+24V	2.3A	K
	TR9CM4000LCP-A	+5V	4A	K
		+12V	2A	
	TR9CV3000LCP-A	+5V	3A	K
		+12V	1.5A	
		-12V	0.3A	



Case J- Desktop Univeral Switchmode





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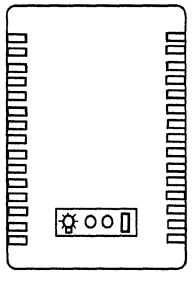

IEC 320/C8

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see insert next page for Case K

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SWITCH MODE POWER SUPPLIES

Desktop

Dimensions for Desktop Power Supplies

Case	Dimensions (L x W x H)
G	74 x 79 x 41mm
H	84 x 56 x 50 mm

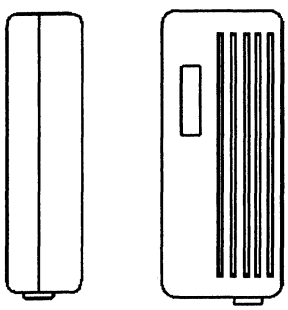
Desktop Universal Switchmode Power Supplies

TUV

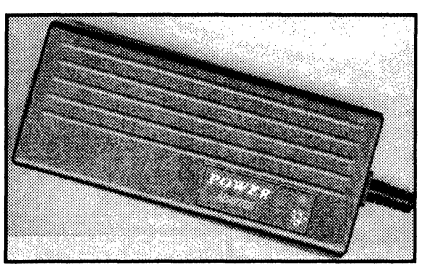
Class 2, IEC 320/C8 Inlet

INPUT 90 -260V 50/60Hz

	Part #	Output		Case
20w	TR9CA3500LCP-U	+5V	3.5A	H
	TR9CB2500LCP-U	+6V	2.5A	H
	TR9CC2500LCP-U	+7.5V	2.5A	H
	TR9CD2000LCP-U	+9V	2.0A	H
	TR9CE1600LCP-U	+12V	1.6A	H
	TR9CG1300LCP-U	+15V	1.3A	H
	TR9CH1000LCP-U	+18V	1.0A	H



Case K - Desktop Universal Switchmode



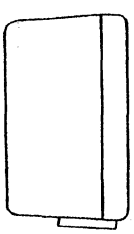
Desktop Universal Switchmode Power Supplies

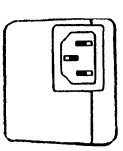
TÜV

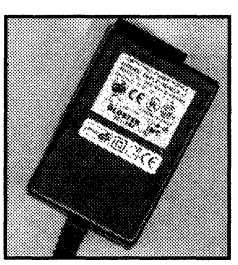
INPUT 90 -260V 50/60Hz

	Part #	Output		Case
10w	TR9CA1500LCP-U	+5V	1.5A	G
	TR9CB1500LCP-U	+6V	1.5A	G
	TR9CC1200LCP-U	+7.5V	1.2A	G
	TR9CD1000LCP-U	+9V	1.0A	G
	TR9CE1000LCP-U	+12V	1.0A	G
	TR9CF1000LCP-U	+13.8V	1.0A	G
	TR9CG800LCP-U	+15V	0.8A	G
	TR9CI400LCP-U	+24V	0.4A	G
15w	TR9CA2400LCP-U	+5V	2.4A	H
	TR9CB2000LCP-U	+6V	2.0A	H
	TR9CC2000LCP-U	+7.5V	2.0A	H
	TR9CD1500LCP-U	+9V	1.5A	H
	TR9CE1200LC-U	+12V	1.2A	H
	TR9CF1200LCP-U	+13.8V	1.2A	H
	TR9CG1000LCP-U	+15V	1.0A	H
	TR9CI625LCP-U	+24V	0.625A	H

Case G & H - Desktop Universal Switchmode







see insert preceeding page for Case K Models

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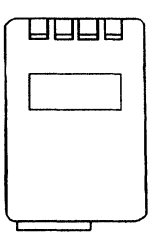

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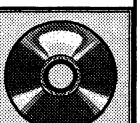

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AC-DC Open Frame Switching Power Supply

Watt	Model	Output V1	Output V2	Output V3
10W	GPS10-10	5V 2A		
	GPS10-11	12V 1A		
	GPS10-12	15V 0.7A		
	GPS10-13	24V 0.5A		
	GPS10-20	5V 1.7A	5V 0.3A	
	GPS10-21	5V 1.0A	15V 0.5A	
	GPS10-22	5V 1.0A	15V 0.4A	
	GPS10-23	5V 1.0A	24V 0.2A	

Fig 1 4.2" x 2.3" x 1.25" (107 x 58 x 32mm)

12W	GPS12-03	3V 2.5A		
	GPS12-05	5V 2.0A		
	GPS12-12	12V 1.0A		
	GPS12-15	15V 0.8A		
	GPS12-24	24V 0.5A		

Fig 2 3.7" x 2" x 0.7" (94 x 49 x 18mm)

17W	GPS17-30	5V 2.2A	12V 0.3A	-12V 0.2A
	GPS17-31	5V 2.2A	12V 0.3A	-12V 0.2A
	GPS17-32	5V 2.2A	12V 0.3A	-12V 0.2A

Fig 3 5" x 2" x1" (127x 50 x 24mm)

19W [24W with L-bracket mount]	GPS19-10	5V 4A		
	GPS19-11	12V 1.5A		
	GPS20-12	15V 1.2A		
	GPS20-13	24V 0.8A		
	GPS19-20	5V 3.0A	-5V 0.2A	
	GPS19-21	5V 2.6A	12V 0.5A	
	GPS19-22	5V 2.6A	15V 0.4A	
	GPS19-23	5V 2.6A	24V 0.25A	
	GPS19-30	5V 2.2A	+12V 0.5A	-12V 0.2A
	GPS19-31	5V 2A	+12V 0.5A	-5V 0.2A
	GPS19-32	5V 2A	+24V 0.3A	-12V 0.2A
	GPS19-33	5V 2A	+15V 0.3A	-15V 0.2A

Fig 4 4.3 x 2.4 x 1.2" (110 x 60 x 30mm)

Watt	Model	Output V1	Output V2	Output V3
30W	GPS29-10	5V 4A		
	GPS29-11	12V 1.5A		
	GPS29-12	15V 1.2A		
	GPS29-13	24V 0.8A		
	GPS29-20	5V 3A	-5V 0.2A	
	GPS29-21	5V 2.6A	12V 0.5A	
	GPS29-22	5V 2.6A	15V 0.4A	
	GPS29-23	5V 2.6A	24V 0.25A	
	GPS29-30	5V 3A	12V 1A	-12V 0.25A
	GPS29-31	5V 3A	12V 1A	-5V 0.5A
	GPS29-32	5V 3A	24V 0.5A	-12V 0.25A
	GPS29-33	5V 3A	15V 1.0A	-15V 0.2A

Fig 5 5.1 x 3.1 x 1.2" (130 x 80 x 30mm)

31W	GPS31-20	5V 5A	5V 1A	
	GPS31-21	5V 3.6A	12V 1A	
	GPS31-22	5V 3A	15V 1A	
	GPS31-23	5V 3.6A	24V 0.5A	
	GPS31-24	12V 1.5A	-12V 1A	
	GPS31-25	15V 1.5A	-15V 1.0A	

Fig 6 5.9 x 2.4 x 1.1" (150 x 60 x 27mm)

32W	GPS32-20	5V 5A	-5V 1A	
	GPS32-21	5V 4A	12V 1A	
	GPS32-22	5V 3.4A	15V 1A	
	GPS32-23	5V 4A	24V 0.5A	
	GPS32-24	12V 1.6A	-12V 1A	
	GPS32-25	15V 1.5A	-15V 0.8A	
	GPS32-30	5V 3A	+12V 1A	12V 0.5A
	GPS32-31	5V 3A	+12V 1A	-5V 0.6A
	GPS32-32	5V 3A	+24V 0.5A	-12V 0.5A
	GPS32-33	5V 3A	+15V 1.0A	-15V 0.3A

Fig 7 4.6 x 3.8 x 1.4" (117 x 97 x 35mm)

Watt	Model	Output V1	Output V2	Output V3
35W	GPS33-10	5V 6A		
	GPS33-11	12V 2.7A		
	GPS33-12	15V 2.2A		
	GPS33-13	24V 1.4A		
	GPS33-20	5V 5.5A	-5V 1A	
	GPS33-21	5V 4A	12V 1A	
	GPS33-22	5V 4A	15V 0.8A	
	GPS33-23	5V 4A	24V 0.5A	
	GPS33-30	5V 3A	+12V 1A	-12V 0.5A
	GPS33-31	5V 3A	+12V 1.2A	-5V 1.0A
	GPS33-32	5V 3A	+24V 0.5A	-12V 0.5A
	GPS33-33	5V 3A	+15V 1A	-15V 0.2A

Fig 8 6" x 3.5" x 1.2" (152 x 89 x 29mm)

40W	GPS40-10	5V 7.5A		
	GPS40-11	12V 3.3A		
	GPS40-12	15V 2.6A		
	GPS40-13	24V 1.6A		
	GPS40-19	3.3V 9A		
	GPS40-21	5V 3A	12V 2A	
	GPS40-22	5V 3A	15V 1.6A	
	GPS40-23	5V 3A	24V 1A	

Fig 9 7" x 2" x 1.2" (178 x 51 x 30mm)

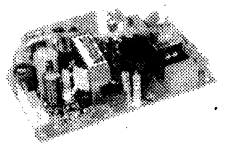

Figure 1 10W GPS-10 Series Single & Dual Output

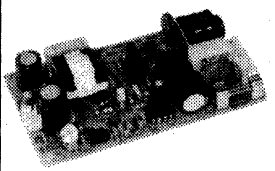

Figure 2 12W GPS-12 Series Ultra Small Size!

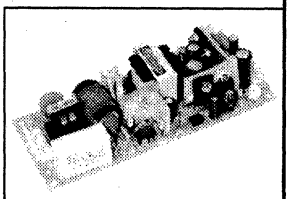

Figure 3 17W GPS-17 Series Triple Output - Slim Footprint!

Figure 4 19W GPS-19 Series Single, Dual & Triple Output

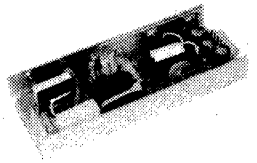

Figure 6 30W GPS-31 Series Dual Out./U Bracket Design

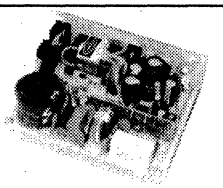

Figure 7 32W GPS-32Series Dual/Triple Output L-Bracket Design

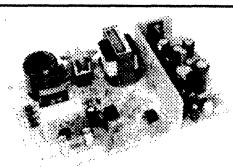

Figure 5 30W GPS-29 Series Single, Dual & Triple Output

All units are universal input 95-264VAC, 47-63hz.

Figure 9 40W GPS-40Series Single and Dual Output Slim Footprint!

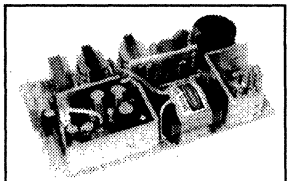

Figure 8 35W GPS-33Series Single, Dual & Triple Output Open Frame

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OPEN FRAME AND ENCLOSED SWITCH MODE POWER SUPPLIES

CASE 905

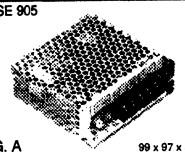



FIG. A 99 x 97 x 35

CASE 903

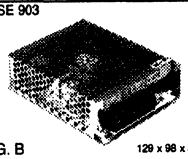



FIG. B 129 x 98 x 38

CASE 901

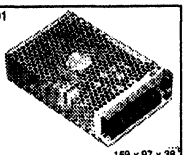



FIG. C 159 x 97 x 38

CASE 902

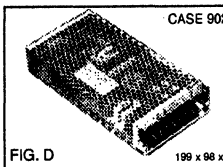



FIG. D 199 x 98 x 38

CASE 906

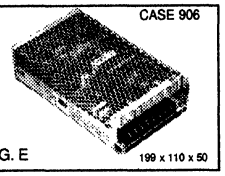



FIG. E 199 x 110 x 50

CASE 911

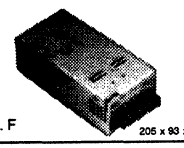



FIG. F 205 x 93 x 65

CASE 912

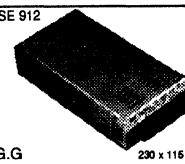



FIG.G 230 x 116 x 50

CASE 907

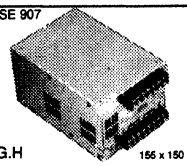



FIG.H 156 x 150 x 86

CASE 910

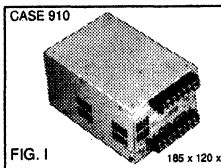
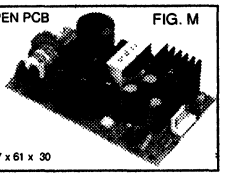



FIG. I 185 x 120 x 92

OPEN PCB FIG. M

107 x 61 x 30

127 x 76 x 29 PS-45 PD-45 PT-45

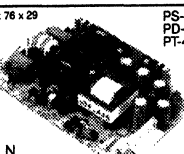



FIG.N

PS-65, PD-65 PT-65

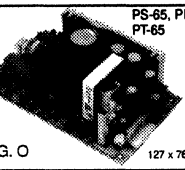
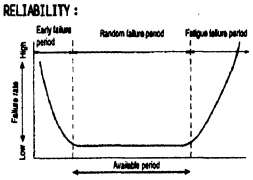
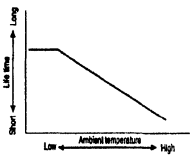



FIG. O 127 x 76 x 40

RELIABILITY :





SINGLE OUTPUT

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) 5V	7.5V	12V	13.5V	15V	24V	27V	48V	CASE NOTE:2	P.C.B. NOTE:3	FUNCTION NOTE:4	SAFETY NOTE:5	W.R.T. NOTE:6	PACKING PCS	KGS	CU/FT	FIG.
S-15-☐	15	S	3		1.3			0.7			B2	P1	A K		12	60	20	1.2	A
S-25-☐	25	F	5		2.1		1.7	1.1			B2	P1	A B H K	U. T. E	24	60	23	1.2	A
S-35-☐	35	S	7		3		2.4	1.5			B2	P1	A H K		12	45	19	1.2	B
S-40-☐	40	F	8		3.5		2.8	1.8			B2	P1	A B H K	U. T. E	24	45	20	1.2	B
S-50-☐	50	S	10		4.2		3.4	2.1			B2	P1	A H K		12	30	16	1	C
S-60-☐	60	F	12		5		4	2.5			B2	P1	A B H K	U. T. E	24	30	17	1	C
S-100-☐	100	S	20	13.5	8.5	7.4	6.7	4.5	3.7	2.2	B2	P1	A		12	30	20	1.2	D
S-100F-☐	100	J	20	13.5	8.5		6.7	4.5		2.2	B2	P1	A B	U. T. E	24	30	20.5	1.2	D
S-150-☐	150	S	30	20	12.5		10	6.5			B2	P1	A B H K	U. T. E	24	20	17.5	1.4	E
S-200-☐	200	S	40		16.5	14.8	13.3	8.3	7.4		B3F	P1	A K		12	8	12	1	H
S-240-☐	216-240	A	40		18		15	10			B2F	P2	A B C D H K	UC. T. E	24	18	20	1.2	F
S-320-☐	250-320	S	50	36	25	22	20	12.5	11	6.5	B2F	P2	A B C D H K	UC	24	12	15	1	G
SP-300-☐	300	F	50	34	24	21	19	12.5	11	6.25	B2F	P2	A B C D H K L	UC. T. E	24	12	15	1	G
PS-280-☐	280	S				20			10		B3F	P1	A B C D G K	UC	18	8	12.5	1	H
PSP-300-☐	300	F			25	22		12.5	11	6.5	B2F	P2	ABCDE FGHKJL	UC. T. E	24	8	14	0.9	I
SP-500-☐	480	F			40	36	32	20	18	10	B2F	P2	ABCDEFHKJL	UC. T. E	24	8	16.5	0.9	I
PS-25-☐	25	F	5	3.3	2.1	1.9	1.7	1	0.9	0.5		P1	AB	UL TÜV CE	12	110	20.8	1.46	M
PS-45-☐	45	F	8	5.3	3.7	3.3	3	1.9	1.7	1		P1	AB	UL TÜV CE	12	48	12	1.15	N
PS-65-☐	65	F	12	8	5.2	4.6	4.2	2.7	2.2	1.4		P1	AB	UL TÜV CE	12	32	8	0.8	O

SINGLE OUTPUT + D/D CONVERTER +5V, 3A

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) +7.5V	+12V	+15V	+24V	CASE NOTE:2	P.C.B. NOTE:3	FUNCTION NOTE:4	SAFETY NOTE:5	W.R.T. NOTE:6	PACKING PCS	KGS	CU/FT	FIG.
SDD-100-☐	100	S	11.5	7.2		3.7	B2	P1	A B		18	30	22	1.2	D
SDD-150-☐	150	S	18	11.5		5.8	B2	P1	A B K		18	20	19.5	1.4	E

DUAL OUTPUT

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) +5V	+12V	+15V	+24V	-5V	-12V	-15V	CASE NOTE:2	P.C.B. NOTE:3	FUNCTION NOTE:4	SAFETY NOTE:5	W.R.T. NOTE:6	PACKING PCS	KGS	CU/FT	FIG.
D-30A	30	S	4	1						B2	P1	A K		12	45	19	1.2	B
D-30B	30	S	2.2			1				B2	P1	A K		12	45	19	1.2	B
D-50A	50	S	6	2						B2	P1	A K		12	30	16	1	C
D-50B	50	S	6			1				B2	P1	A K		12	30	16	1	C
D-60A	60	F	4	3						B2	P1	A B K	U. T. E	24	30	17.5	1	C
D-60B	60	F	3			1.8				B2	P1	A B K	U. T. E	24	30	17	1	C
D-100A	100	S	10	4						B2	P1	A K		12	20	17.5	1.4	E
D-100B	100	S	6			3				B2	P1	A K		12	20	17.5	1.4	E
D-120A	120	S	12	5						B2	P1	A B K	UC. T. E	24	20	18.5	1.4	E
D-120B	120	S	6			4				B2	P1	A B K	UC. T. E	24	20	18.5	1.4	E
PD-25A	25	F	2.1	1.2							P1	A B	UL TÜV CE	12	110	20.8	1.46	M
PD-25B	25	F	1.2			0.8					P1	A B	UL TÜV CE	12	110	20.8	1.46	M
PD-25-5	25	F	2.5				2.5				P1	A B	UL TÜV CE	12	110	20.8	1.46	M
PD-25-12	25	F		1				1			P1	A B	UL TÜV CE	12	110	20.8	1.46	M
PD-25-15	25	F			0.8				0.8		P1	A B	UL TÜV CE	12	110	20.8	1.46	M
PD-45A	45	F	3.2	2							P1	A B	UL TÜV CE	12	48	12	1.15	N
PD-45B	45	F	3.2			1.2					P1	A B	UL TÜV CE	12	48	12	1.15	N
PD-65A	65	F	5.5	2.8							P1	A B	UL TÜV CE	12	32	8	0.8	O
PD-65B	65	F	3.5			2					P1	AB	UL TÜV CE	12	32	8	0.8	O

DUAL OUTPUT + BATTERY CHARGE, BATTERY BACK UP FUNCTION

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) +5V	+13V	+13.5V	+26.5V	27V	CASE NOTE:2	P.C.B. NOTE:3	FUNCTION NOTE:4	SAFETY NOTE:5	W.R.T. NOTE:6	PACKING PCS	KGS	CU/FT	FIG.
ADD-50A	50	F	3		2.5			B2	P2	A		18	30	18	1	C
ADD-50B	50	F	3			1.5		B2	P2	A		18	30	18	1	C
AD-150A	150	S				0.5	5	B2	P1	A B K		18	20	19	1.4	E
AD-150B	150	S		0.5	10			B2	P1	A B K		18	20	19	1.4	E

TRIPLE OUTPUT

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) +5V	+12V	+15V	+24V	-5V	-12V	-15V	CASE NOTE:2	P.C.B. NOTE:3	FUNCTION NOTE:4	SAFETY NOTE:5	W.R.T. NOTE:6	PACKING PCS	KGS	CU/FT	FIG.
T-30A	30	S	3	1			0.5			B2	P1	A K		12	45	19	1.2	B
T-30B	30	S	3	1				0.5		B2	P1	A K		12	45	20	1.2	B
T-40A	40	F	3	2			0.5			B2	P1	A B K	CU. E	24	45	20.5	1.2	B
T-40B	40	F	3	2				0.5		B2	P1	A B K	CU. E	24	45	20.5	1.2	B
T-40C	40	F	3		1.5				0.5	B2	P1	A B K	CU. E	24	45	20.5	1.2	B
T-50A	50	S	7	1			1			B2	P1	A K		12	30	17	1	C
T-50B	50	S	5	1				1		B2	P1	A K		12	30	17	1	C
T-50C	50	S	4		1				1	B2	P1	A K		12	30	17	1	C
T-50D	50	S	3	1		1				B2	P1	A K		12	30	17	1	C
T-60A	60	F	5	2.5			0.5			B2	P1	A B K	U. T. E	24	30	17.5	1	C
T-60B	60	F	5	2.5				0.5		B2	P1	A B K	U. T. E	24	30	17.5	1	C
T-60C	60	F	5		2				0.5	B2	P1	A B K	U. T. E	24	30	17.5	1	C
T-80D	80	A	4	2		1.5				B2	P1	A		18	30	20.5	1.2	D
T-100C	100	S	10		2.5				1	B2	P1	A		12	20	17.5	1.4	E
T-100D	100	S	6	2		2				B2	P1	A		12	20	17.5	1.4	E
PT-45A	45	F	3	2			0.3				P1	A B	UL TÜV CE	12	48	12	1.15	N
PT-45B	45	F	3	2				0.3			P1	A B	UL TÜV CE	12	48	12	1.15	N
PT-45C	45	F	3		1.6				0.3		P1	A B	UL TÜV CE	12	48	12	1.15	N
PT-65A	65	F	5.5	2.5			0.5				P1	A B	UL TÜV CE	12	32	8	0.8	O
PT-65B	65	F	5.5	2.5				0.5			P1	A B	UL TÜV CE	12	32	8	0.8	O
PT-65C	65	F	5.5		2				0.5		P1	A B	UL TÜV CE	12	32	8	0.8	O

QUAD OUTPUT

MODEL	MAX. O/P (WATTS)	AC I/P NOTE:1	DC OUTPUT RATING(A) +5V	+12V	+15V	+24V	-5V	-12V	-15V	CASE NOTE:2	P.C.B. NOTE:3	FUNCTION NOTE:4	SAFETY NOTE:5	W.R.T. NOTE:6	PACKING PCS	KGS	CU/FT	FIG.
Q-55	55	S	7	1			0.5	0.5		B2	P1	A		12	30	16	1	C
Q-60	60	F	5.5	2			0.5	0.5		B2	P1	A B K	UC	18	30	18	1	C
Q-100H	100	S	13	2			1	1		B2	P1	A		12	20	17.5	1.4	E
Q-120B	120	S	11	4			1	1		B2	P1	A B K	UC. T. E	24	20	19	1.4	E
Q-120C	120	S	10		3.5		1		1	B2	P1	A B K	UC. T. E	24	20	19	1.4	E
Q-120D	120	S	8	2		2		1		B2	P1	A B K	UC. T. E	24	20	19	1.4	E
Q-180	180	S	8	2		4		1		B3F	P1	A K		12	8	12	1	H

*** CUSTOM VOLTAGE OUTPUTS ALSO AVAILABLE. ***

NOTE

1.85-132/170-264VAC SELECTION[A] : AUTO CHANGE [E] : FULL RANGE [S] : BY SWITCH [J] : BY JUMPER [X] : FIXED
2.CASE TYPE- [B] : BOXED [L] : L BRACKET [1] : ONE MOUNTING SURFACE [2] : TWO MOUNTING SURFACE [3] : THREE MOUNTING SURFACE [F] : WITH COOLING FAN
3.P.C.B. TYPE- [P] : SINGLE SIDE [P2] : DOUBLE SIDE(HIGH VIBRATION USE)
4.FUNCTION- [A] : OVERLOAD(OVERCURRENT),SHORT CIRCUIT PROTECTION [B] : OVER VOLTAGE PROTECTION [C] : OVER TEMP. PROTECTION [D] : COOLING FAN ON/OFF CONTROL [E] : POWER SIGNAL CONTROL(PF,PG) [F] : ON/OFF REMOTE CONTROL BY TTL SIGNAL [G] : PARALLEL/SERIES USE [H] : SERIES USE [I] : CHARGER PROTECTION [J] : REMOTE SENSORS [K] : OUTPUT LED INDICATION [L] : POWER FACTOR CORRECTOR

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SINGLE OUTPUT

PRODUCT NO.		OUTPUT
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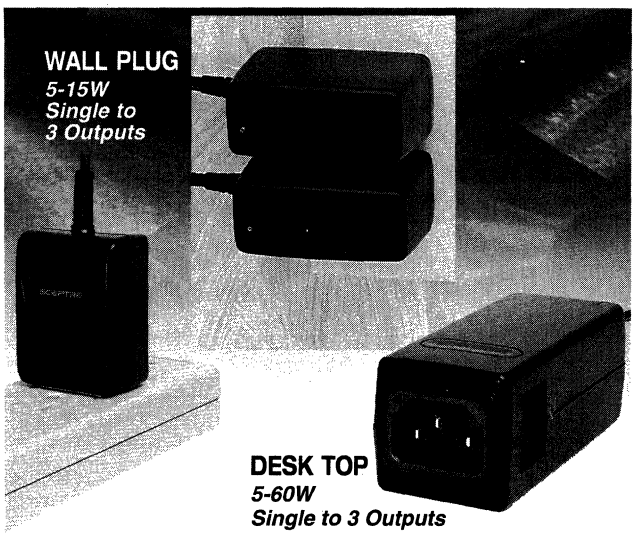
PS-5015A	(15W)	+5.0V @ 1.5A
PS-5024A	(12W)	+5.0V @ 2.4A
PS-5038A	(19W)	+5.0V @ 3.8A
PS-5050A	(25W)	+5.0V @ 5.0A
PS-6525A	(17W)	+6.5V @ 2.5A
PS-6045A	(27W)	+6.0V @ 4.5A
PS-7025A	(18W)	+7.0V @ 2.5A
PS-8037A	(30W)	+8.0V @ 3.7A
PS-9518A	(18W)	+9.5V @ 1.8A
PS-9047A	(43W)	+9.0V @ 4.7A
PS-1030A	(30W)	+10.0V @ 3.0A
PS-1212A	(15W)	+12.0V @ 1.2A
PS-1218A	(22W)	+12.0V @ 1.8A
PS-1225A	(30W)	+12.0V @ 2.5A
PS-1245A	(54W)	+12.0V @ 4.5A
PS-1311A	(15W)	+13.5V @ 1.1A
PS-1328A	(37W)	+13.5V @ 2.8A
PS-1512A	(18W)	+15.0V @ 1.2A
PS-1520A	(30W)	+15.0V @ 2.0A
PS-1527A	(41W)	+15.0V @ 2.7A
PS-1626A	(42W)	+16.7V @ 2.6A
PS-1880A	(15W)	+18.0V @ 0.8A
PS-1817A	(31W)	+18.0V @ 1.7A
PS-1824A	(43W)	+18.0V @ 2.4A
PS-2015A	(30W)	+20.0V @ 1.5A
PS-2214A	(31W)	+22.0V @ 1.4A
PS-2220A	(44W)	+22.0V @ 2.0A
PS-2460A	(15W)	+24.0V @ 0.6A
PS-2415A	(36W)	+24.0V @ 1.5A
PS-2418A	(43W)	+24.0V @ 1.8A
PS-2425A	(60W)	+24.0V @ 2.5A
PS-3290A	(29W)	+32.0V @ 0.9A
PS-3640A	(15W)	+36.0V @ 0.4A
PS-4860	(29W)	+48.0V @ 0.6A
PS-4810A	(48W)	+48.0V @ 1.0A



GENERAL SPECIFICATIONS

Input voltage	100VAC to 250VAC
Input frequency	47 Hz to 63 Hz
Inrush current	15A at 115VAC
	30A at 230VAC
Operating temperature	0°C to 40°C
Storage temperature	-30°C to +75°C
Temp coefficient	±0.02%C
Efficiency	72% min.
Cooling	Free air convection
Output	
Line Regulation	
All output	±3%
Load regulation	
Output #1	±5%
Output #2	±5%
Output #3	±10%
Ripple & Noise, 20 Mhz BW	
All Output	3% max.

Specifications Subject to Change Without Notice.

DUAL OUTPUT

PRODUCT NO.		OUTPUT #1	OUTPUT #2	SIZE (WxLxH)
PS-202	(25W)	+5.0V @ 2.5A	+12.0V @ 1.0A	
PS-203	(23W)	+5.0V @ 1.6A	+15.0V @ 1.0A	
PS-204	(17W)	+5.0V @ 1.0A	+24.0V @ 0.5A	62.4 x 104.4 x 32.0
PS-205	(17W)	+15.0V @ 0.8A	-15.0V @ 0.3A	62.4 x 104.4 x 32.0
PS-206	(15W)	+5.0V @ 2.0A	-5.0V @ 0.5A	
PS-208	(40W)	+12.0V @ 1.5A	-24.0V @ 0.9A	
PS-209	(13W)	+5.0V @ 2.5A	+9.0V @ 1.0A	

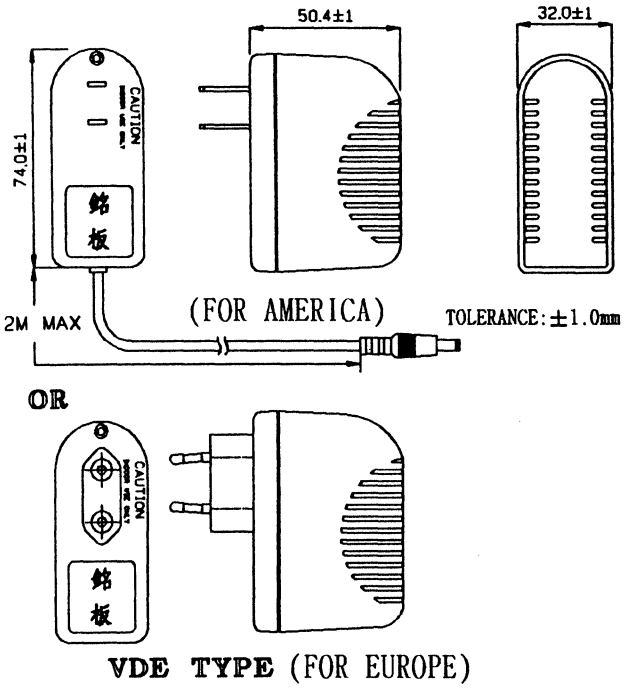
TRIPLE OUTPUT

PRODUCT NO.	OUTPUT VOLTAGE	LOAD MIN.	LOAD RATED	LOAD MAX.*	RIPPLE & NOISE P-P MAX.	REGULATION +/-
PS-303-1	+5.0V		1.5A		50mV	5%
	+12.0V		0.2A		100mV	10%
	-12.0V		0.2A		100mV	10%
PS-303-2	+5.0V	0.6A	3.0A	5.0A	50mV	5%
	+12.0V	0.3A	2.0A	2.0A	100mV	10%
	-12.0V	–	0.3A	0.5A	100MV	10%
PS-303-4	+5.0V	0.5A	5.0A	5.5A	50MV	5%
	+12.0V	0.25A	1.0A	–	100MV	10%
	-12.0V	–	0.2A	0.3A	100MV	10%
PS-304	+5.0V	0.5A	3.0A	6.8A	50mV	5%
	-5.0V	–	0.3A	–	50mV	5%
	+12.0V	0.5A	2.0A	4.0A	120mV	10%
PS-305	+5.0V	0.5A	4.0A	8.0A	50MV	5%
	-5.0V	–	0.3A	–	50MV	5%
	+15.0V	0.4A	1.0A	2.5A	150MV	10%
PS-306	+5.0V	0.5A	3.0A	6.0A	50MV	5%
	+15.0V	0.4A	1.6A	3.0A	150MV	10%
	-15.0V	–	0.3A	–	150MV	10%
PS-307	+5.0V	0.5A	4.0A	8.0A	50MV	5%
	-12.0V	–	0.3A	–	120MV	10%
	+15.0V	0.4A	1.0A	2.5A	150MV	10%
PS-308B	+5.0V	0.3A	2.0A	3.0A	80MV	5%
	+12.0V	0.3A	1.5A	2.0A	120MV	10%
	-12.0V	–	0.3A	0.5A	120MV	10%
PS-309	+5.0V	0.6A	3.0A	–	50mV	5%
	+24.0V	0.2A	1.0A	2.0A	240mV	10%
	12.0V	–	0.3A	–	120mV	10%

Wall Plug-In Switching Power Supply

SINGLE OUTPUT

PRODUCT NO.	OUTPUT
PS3010AW (3W) +	+3.0V @ 1.0A
PS5010AW (5W) +	+5.0V @ 1.0A
PS5015AW (8W) +	+5.0V @ 1.5A
PS5024AW (12W) * +	+5.0V @ 2.4A
PS6020AW (12W) * +	+6.0V @ 2.0A
PS7520AW (15W) * +	+7.5V @ 2.0A
PS9016AW (15W) * +	+9.0V @ 1.6A
PS1010AW (10W) * +	+10.0V @ 1.0A
PS1210AW (12W) * +	+12.0V @ 1.0A
PS1212AW (15W) * +	+12.0V @ 1.2A
PS1310AW (13W) * +	+13.5V @ 1.0A
PS1580W (12W) * +	+15.0V @ 0.8A
PS1510AW (15W) * +	+15.0V @ 1.0A
PS1670W (12W) +	+16.5V @ 0.7A
PS1860W (11W) +	+18.0V @ 0.6A
PS1870W (20W) +	+24.0V @ 0.83A



UL/CSA

* MITI (J-version available)

◇ TUV/CE (E-version by using adaptor prong)

DUAL/TRIPLE OUTPUT

PRODUCT NO.	OUTPUT #1	OUTPUT #2	OUTPUT #3
PS202W (14W) * +	+5.0V @ 1.8A	+12V @ 0.5A	
PS203W (12W) ◇	+5.0V @ 1.5A	+15V @ 0.3A	
PS204W (12W) ◇	+5.0V @ 1.2A	+24V @ 0.2A	
PS205W (12W) ◇	+15.0V @ 0.4A	-15V @ 0.4A	
PS206W (12W) ◇	+5.0V @ 1.0A	-5V @ 0.5A	
PS210W (12W) ◇	+5.0V @ 1.2A	-24V @ 0.2A	
PS211W (12W) ◇	+5.0V @ 1.5A	-12V @ 0.4A	
PS303W (13W)	+5.0V @ 1.5A	+12V @ 0.2A	-12V @ 0.2A

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eem MINIGLOSSARY ENCAPSULATION

MATERIALS/HANDLING

Catalyst: A substance which changes the *rate* of chemical reaction. Very small quantities can cause fast change.

Conformal coating Sprayed or dipped. A thin conformal jacket which protects an assembly from moisture or other degrading environments.

Curing agent: See catalyst.

Hardener: See catalyst.

Hermetic: A permanent gas-tight seal.

RTV: Room Temperature Vulcanizing. Associated with silicone rubber sealants which vulcanize at room temperature.

Thermoplastic: Plastic materials which can be made to flow *repeatedly* with the application of heat.

Thermosetting: Plastics which once cured cannot be made to flow again.

Thixotropy: The property of a coating compound which has low viscosity when agitated, but which thickens when the agitation ceases.

Viscosity: Measured in units of *poise* or *centipoise.* The property of a liquid which resists internal flow. Low viscosity equates with thin and vice-versa.

PROCESSING

Casting: Parts or assemblies are placed in a mold. Encapsulating material is added and cured. Part is then removed from the mold.

Dip coating: Part or assembly is dipped into the encapsulating material. Final thickness is determined by number of dips, viscosity, rate of withdrawal, and temperature.

Embedding: Wherein an encapsulant substantially fills all voids in and about an assembly.

Impregnation: A process of encapsulation involving evacuating all air and then allowing the encapsulating material to flow in and fill all voids.

Molding: Similar to casting except this process usually implies multicavity molds and costly machines.

Potting: Wherein the part or assembly is immersed in an encapsulating material contained in a shell which becomes a permanent outer surface after curing.

DIELECTRIC

Arc resistance: An encapsulant's resistance to the formation of a conductive path or track. Measured in time.

Breakdown voltage: The voltage at which an encapsulant fails electrically.

Capacitance: The property of conductors and dielectrics which allows the storage of an electrical charge when the voltage is applied.

Corona: A luminous discharge of electricity due to air ionization when a certain voltage is reached. Can be internal or external. The formation of ozone can cause rapid deterioration of certain materials.

Dielectric: Insulator (Nonconductor.)

Dielectric constant: The property of a material that determines its ability to store electrostatic energy.

Dielectric strength: The ratio of dielectric breakdown to the thickness of insulating material.

Dissipation factor: The ratio of a dielectric material's energy losses.

Flashover: Point at which an electric discharge occurs around an edge or across a surface. Can result in a carbon track and permanent degradation.

Insulation resistance: (IR) An insulating material's total DC leakage.

Surface resistivity: The resistance of the surface of an insulating material to the flow of direct current.

Voltage endurance: Sometimes called corona resistance. The ability of a material to withstand the application of sustained high voltage.

Volume resistivity: The resistance of a material to direct current flow as a measure of volume. Expressed as ohm-centimeters.

HÜTTINGER

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HÜTTINGER

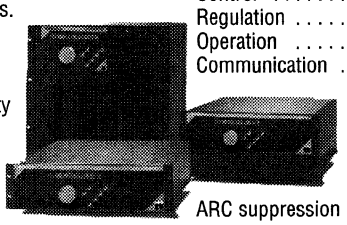
The name HUETTINGER is world renowned in the areas of DC, medium frequency and RF power generation for induction heating, plasma and laser technology. Our products span the range from 300W to 100kW at frequencies up to 13.56MHz. Through our close collaboration with customers in research and industry, we have developed our products to exceed the performance, quality and reliability requirements for even the most demanding applications. With our world-wide sales and service centers, we stand ready to provide you with support wherever you or your equipment are located.

To help insure that our power supplies and generators are easily integrated into your system or OEM equipment, we provide a number of accessories including matchboxes, controllers, multi-output switches, cables and connectors. And, all of our products are CE tested and approved at our ISO 9001 certified manufacturing and engineering facility.

DC Generators — 1500 W to 30k W

PFG - DC Series

- Proven operation in laboratory and production processes.
- Short and open circuit protection
- Special ARC Management system; fast acting with low stored output energy
- Programmable ARC Management system for wide variety of applications
- Precise and accurate output during repetitive switching applications
- Conforms to VDE/DIN/IEC/EN, and CE standards



TYPE / MODEL						
PFG 1500 DC	PFG 2500 DC	PFG 3000 DC	PFG 5000 DC	PFG 7500 DC	PFG 10000 DC	PFG 30000 DC
OUTPUT POWER						
0 - 1500 W	0 - 2500 W	0 - 3000 W	0 - 5000 W	0 - 7500 W	0 - 10000 W	0 - 30000 W

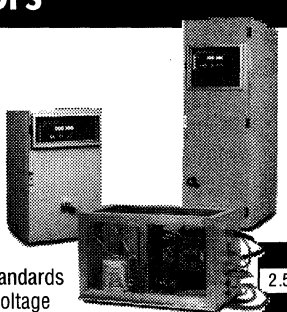
Features

Control . . . . . .Triplex control of voltage, current and power
Regulation . . . . . microprocessor controlled
Operation . . . . . .menu-driven control of Generator and PFS switch
Communication . . . .*external:* • A/D user port
• RS 232 and RS 485 data port
• optional Profibus data port
internal: • fiber optic communication between remote control, DC-switch or additional generators in parallel
ARC suppression . . .fast arc detection programmable arc threshold and off-time
• burn-in and standard mode
Switch-on behavior . .programmable ramp function
Construction . . . . . .compact, rugged construction, 19" rack system
Cooling . . . . . .temperature controlled

MF Generators — 2.5 kW to 100 kW • 20 kHz to 300 kHz

TIG - P Series

- Proven operation in laboratory and production processes.
- Short and open circuit protection
- Special ARC Management system; fast acting with low stored output energy
- Separate Burn-In Mode (for initial target clean)
- Fast switch mode power supply
- Conforms to VDE/DIN/IEC/EN and CE standards
- Strike voltage range with a tapable high-voltage output transformer
- Low power- and cooling consumption due to the high efficiency



Features

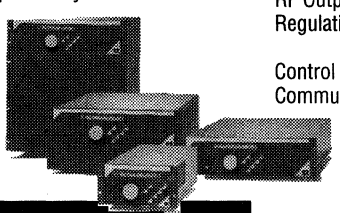
Regulation . . . . . Output power, switchable -current or -voltage
Nominal . . . . . .20 to 100 kHz
Frequency . . . . . .50 to 300 kHz (see Typelist)
Arc - suppression . . .automatically threshold & variable off-time
Output Voltage . . . . .depends on output transformer
Arc - error . . . . . .more than 10 Arcs in 2 seconds
Interface . . . . . .A/D - user port

TYPE / MODEL						
2.5 / 300 P	5 / 300 P	10 / 100 P	20 / 1 00 P	30 / 100 P	50 / 100 P	100 / 100 P
OUTPUT POWER						
0 - 2.5 kW	0 - 5 kW	0 - 10 kW	0 - 20 kW	0 - 30 kW	0 - 50 kW	0 - 100 kW

RF Generators — 300 W to 5000 W • 13.56 MHz

PFG - RF Series

- Proven operation in laboratory and production processes.
- High stability resulting in high accuracy and repeatability
- Optimum process control via integrated microprocessor
- Construction & safety conforming to VDE/DIN/IEC/EN
- 100% mismatch protection
- RFI, EMI and CE tested according to EN 55011, prEN 50082, & IEC 801 -2/ -3/ -4



TYPE / MODEL					
PFG 300 RF	PFG 600 RF	PFG 1000 RF	PFG 1600 RF	PFG 25000 RF	PFG 5000 RF
OUTPUT POWER					
0 - 300 W	0 - 600 W	0 - 1000 W	0 - 1600 W	0 - 2500 W	0 - 5000 W

Features

Nominal Freq . . . . . .13.56 MHz ± 0.05%, quartz stabilized
RF Input . . . . . .50 ohm coaxial (Type BNC)
RF Output . . . . . .50 ohm coaxial
Regulation . . . . . .RF output power
RF or DC volt. at the load w/PFM-series matchbox
Control . . . . . .microprocessor
Communication . . . .*external:* • A/D user port
• RS 232 and RS 485 data port
• Optional Profibus data port
internal: • Fiber optic communication between generator, PFM matchbox(s), and PFS switch(s)
Operation . . . . . .menu-driven control of Generator as well as PFM matchbox(s) & PFS switch(s)
Construction . . . . . .compact, sturdy construction, 19" rack system

CARDFLEX LINEAR REGULATED AC-DC MODULES

25 WATT FEATURES:

- SINGLE & DUAL OUTPUTS
- LOW COST
- LOW NOISE AND RIPPLE
- EXCELLENT REGULATION
- OVER CURRENT & TEMP PROTECTION
- REVERSE POLARITY PROTECTION
- INPUT SURGE PROTECTION
- OUTPUT TRIM OR SHARED COMMON (DUALS)
- NO HEAT SINK REQUIRED
- CAN BE SERIES/PARALLEL CONNECTED
- SCREW TERMINAL CONNECTIONS
- VARIOUS MOUNTING OPTIONS

Hyberlab's 25W *CARDFLEX CF800* Series features extremely low output ripple and excellent line/load regulation. The encapsulated modular power supplies offer the advantages of ultra-compact size, ruggedness, and high reliability. The *CF800* series provides a low cost alternative for powering DC logic circuits, digital converters, op amps, RF circuits, and other instrumentation from an AC source. Since the modules are a linear design they do not interfere with sensitive circuits as switchers do. The easy to use terminal strip connections eliminate the need for sockets or soldering. The floating output means either "+" or "-" terminal may be grounded for single output versions. Dual output versions have +/- outputs independently regulated with a shared common. Each module contains a slowblow fuse on the input to protect against faults.

SPECIFICATIONS:

All specifications apply @ +25°C ambient unless otherwise noted.

INPUT SPECIFICATIONS

Input voltages.....115VAC nom.....104-127VAC
(H option).....230VAC nom.....208-254VAC
Input frequency.....47-63Hz
(contact factory for 400Hz operation)
Input VA.....52VA max

OUTPUT SPECIFICATIONS

Output Current.....See table
Output Voltage.....See table
Output Voltage Tolerance (factory set).....+/- 2%
Output Trim (external, see diagram*).....1.25V to +5%
(single output versions) @ F.L. +/- 5%
Line regulation.....See table
Load Regulation.....See table
Short Circuit Protection.....Power, Current Limiting
TempCo.....+/- 0.02% per°C
Ripple/Noise (20MHz BW).....<2mVrms, 5mVpp
Transient Response (0-100% Load).....100uSec

GENERAL SPECIFICATIONS

Efficiency.....60% (typical)
Isolation Voltage (input to output).....1500Vrms
Isolation Resistance (input to output).....50Mohms
UL, CSA approvals pending

Environmental Specifications

Operating Temp. (no derating).....-25 to 100°C (case)
.....-25 to 70°C (ambient)
Storage Temp.....-55 to 100°C
Humidity (non-condensing).....90% R.H. max

Physical Specifications

Dimensions.....3.50W x 4.50L x 2.00H inches
Weight.....20oz
Case Material.....Anodized Aluminum

STOCK

* Modules may be trimmed down to 1.25V with reduced current by connecting trim to -out.

See our other products in section 1400 (page C•1052) and section 2900 (page D•1217)

HYBERLAB CORP. 330 MILLWAY AV., CONCORD, ONTARIO, CANADA, L4K 3W2 PHONE (905)761-0055 FAX(905)761-6203

HYBERLAB 25W STOCK MODULE TABLE

OUTPUT	OUTPUT VOLTAGE VDC	OUTPUT CURRENT mA	MODEL Vin = 115VAC *	REGULATION LINE/LOAD LL-HL %	REGULATION LINE/LOAD NL-FL %	RIPPLE mVrms
SINGLE	1.5	7000	CF839	0.02	0.3	1.0
SINGLE	1.8	7000	CF840	0.02	0.3	1.0
SINGLE	2.1	7000	CF841	0.02	0.3	1.0
SINGLE	2.5	7000	CF842	0.02	0.3	1.0
SINGLE	3.3	7000	CF843	0.02	0.2	1.0
SINGLE	5	5000	CF844	0.02	0.2	1.0
SINGLE	6	4160	CF845	0.02	0.2	1.0
SINGLE	8	3120	CF846	0.02	0.2	1.0
SINGLE	9	2770	CF847	0.02	0.2	1.0
SINGLE	10	2500	CF848	0.02	0.2	1.0
SINGLE	12	2080	CF849	0.02	0.2	1.0
SINGLE	15	1660	CF850	0.02	0.2	1.0
SINGLE	18	1380	CF851	0.02	0.2	1.0
SINGLE	24	1040	CF852	0.02	0.2	1.0
SINGLE	26	960	CF853	0.02	0.2	1.0
SINGLE	28	890	CF854	0.02	0.2	2.0
SINGLE	36	690	CF855	0.02	0.2	2.0
SINGLE	48	520	CF856	0.02	0.2	2.0
SINGLE	52	480	CF857	0.02	0.2	2.0
SINGLE	56	440	CF858	0.02	0.2	2.0
DUAL	+/- 5	+/- 2500	CF874	0.02	0.2	1.0
DUAL	+/- 8	+/- 1560	CF876	0.02	0.2	1.0
DUAL	+/- 10	+/- 1250	CF878	0.02	0.2	1.0
DUAL	+/- 12	+/- 1040	CF879	0.02	0.2	1.0
DUAL	+/- 15	+/- 830	CF880	0.02	0.2	1.0
DUAL	+/- 18	+/- 690	CF881	0.02	0.2	1.0
DUAL	+/- 24	+/- 520	CF882	0.02	0.2	1.0
DUAL	+/- 28	+/- 445	CF884	0.02	0.2	2.0

*Standard model uses 115VAC as in CF839. Suffix H denotes 230VAC as in CF839H.

Mounting:
Threaded mounting holes on the base permit mounting to a chassis, cabinet wall/rack or bracket, or they may be used to screw on feet for test bench or tabletop use. Wall-mounting or DIN rail mounting accessory kits & feet are available from factory. Screw penetration depth is 0.2" max.

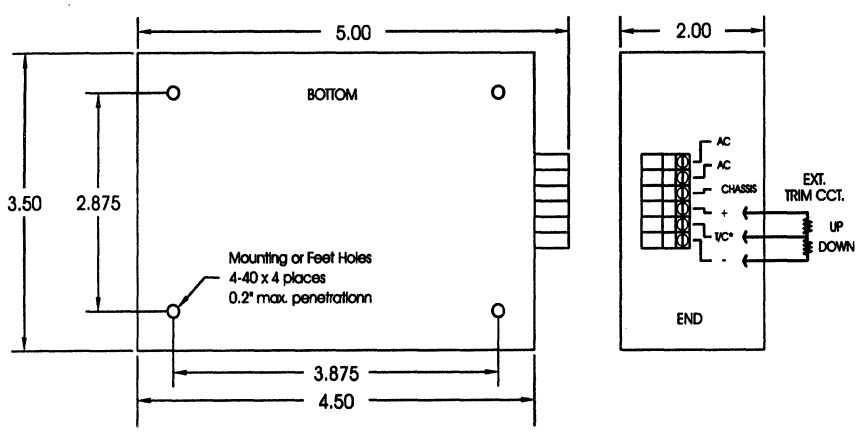
Trim Resistance Limits: (see diagram)
Down resistance may vary from 0 ohms to open cct (0 ohms yields 1.25V output). Up resistance may vary from 40 ohms min. to open cct. Contact factory for application assistance.

Series/Parallel Operation:
The modules may be connected in series for increased voltage and power with no external circuity. Parallel connected modules will require output balancing resistors (or wire lengths) and/or "oring" diodes for redundant systems. Contact factory for application assistance.

Input fusing:
Input fuse is a 1A-T for 115VAC models and 1/2A-T for 230VAC.

User-Specified and Custom Orders:
Other output voltages are easily configured with no NRE charge and fast delivery.

Standard Options:
- different output voltages
- other interface connectors
- different AC input frequency, voltage
- contact factory for details



* TRIM PIN FOR SINGLE O/P MODELS, SHARED COMMON FOR DUALS

DIMENSIONS IN INCHES

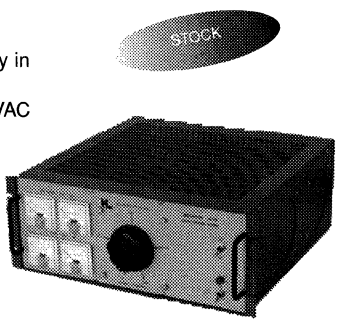
UNREGULATED POWER SUPPLIES ALSO AVAILABLE

WATTFLEX WF SERIES

- 500W **CONSTANT POWER** independent of output voltage, 12-170VDC in 2 models, 0-42A
- 7 user-selectable voltages controlled via switch or remotely thru D-connector for uP control
- Output tailored by 9 input tap switch from: 95-135VAC or 190-270VAC
- Max. full load ripple 2.5% rms

MEGAFLEX HC SERIES

- 1.3KW - DC & 2KVA - AC power supply in one - 4 models available
- Models range from: 0-350VDC & 0-250VAC 0-100A, adjustable 0-100%
- Input ranges from: 105-130VAC or 210-260VAC
- Max. full load ripple 1.5% rms



- ✔ *Rugged, low cost and easy to use for testing, R&D and burn-in applications*
- ✔ *Overload protection & alarm*
- ✔ *Isolated output for positive/negative operation*
- ✔ *Full rated output from 0-50 deg.C*
- ✔ *Other voltages and ranges welcome*

See our other products in section 1400 (page C•1052) and section 2900 (page D•1217)

HYBERLAB CORP. 330 MILLWAY AV., CONCORD, ONTARIO, CANADA, L4K 3W2 PHONE (905)761-0055 FAX(905)761-6203

IDEC PS5R Series Switching Power Supplies

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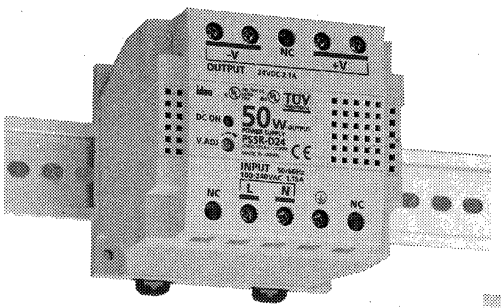
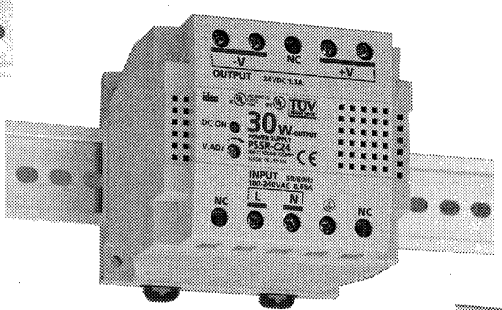
In Canada: (604) 946-1271, Fax: (604) 946-0368
IDEC on the web: *www.idec.com*



50W

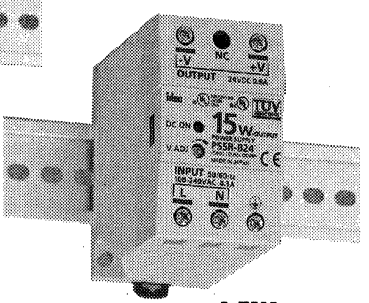
Part No. **PS5R-D24**
(output: 24VDC/2.1A)



30W

Part No. **PS5R-C12**
(output: 12VDC/2.5A)

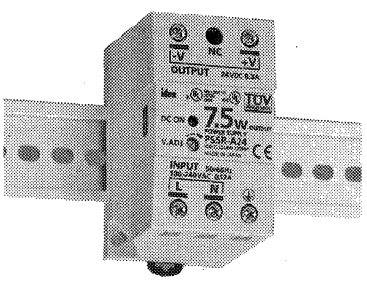
Part No. **PS5R-C24**
(output: 24VDC/1.3A)



15W

Part No. **PS5R-A12**
(output: 12VDC/0.6A)

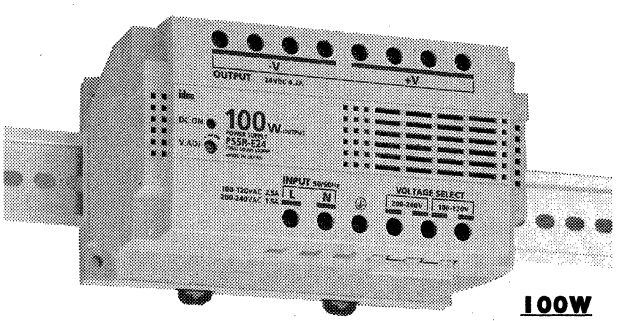
Part No. **PS5R-A24**
(output: 24VDC/0.3A)



7.5W

Part No. **PS5R-B12**
(output: 12VDC/1.2A)

Part No. **PS5R-B24**
(output: 24VDC/0.6A)



100W

PS5R-E24
(output: 24VDC/4.2A)

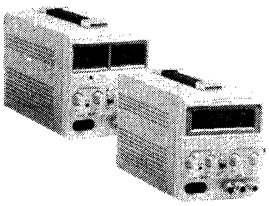
- Universal AC input (85 to 264V AC)
- DC Compatible input (105 to 370V DC)
- Unique spring-up terminals
- DIN rail or panel mount
- Five different output capacities
- UL, C-UL, and TÜV approvals
- CE marked
- UL 508 listing
- Certified to EN60950
- IP20 protection (EN60529)
- Compliant with EMC directives EN50081-2 and EN50082-2

GW INSTEK
1205 JOHN REED COURT, CITY OF INDUSTRY, CA 91745
TEL: 626-336-6537/FAX: 626-369-1748

ELECTRONIC TEST INSTRUMENTS

ISO 9002 CERTIFIED MANUFACTURER

DC Power Supply



PS- Small Series (Analog/Digital)

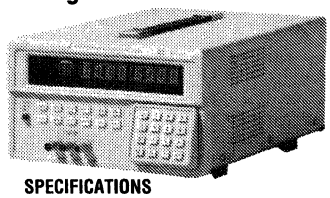
• External programmable and remote control • Continuous or Dynamic load for internal selectable • Low ripple and noise • 0.01% high regulation • Overload and Reverse polarity protection • Series or Parallel operation function • Light and compact design • Constant voltage and constant current modes • 3 ½ Digits 0.5" LED display (Digital type only)

SPECIFICATIONS

CONSTANT VOLTAGE MODE:
Regulation: Line regulation ≤0.01% + 3mV. Load regulation ≤0.01% + 3mV (rating current >3A). ≤0.01% + 5mV (rating current >3A). **Ripple & Noise:** ≤0.5mVrms 5Hz~1MHz (rating current ≤3A). **Recovery Time:** ≤100us (50% load change, minimum load 0.5A). **Temp. Coefficient:** ≤300PPM/°C. **Output Range:** 0 to rating voltage continuously adjustable.
CONSTANT CURRENT MODE:
Regulation: Line regulation ≤0.2% + 3mA. Load regulation ≤0.2% + 3mA.. **Ripple Current:** ≤3mA rms.

Output Range: 0 to rating current continuously adjustable.
METER:
Analog: Voltmeter and Ammeter each one pc. 2.5 class. Dimensions 50 x 50mm. **Digital:** 3 1/2 Digits 0.5" LED display (voltage and current switchable). Accuracy ±(0.5% of rdg + 2 digits).
INSULATION:
Chassis and Terminal: 20mΩ or above (DC 500V). **Chassis and AC Cord:** 30mΩ or above (DC 500V).
POWER SOURCE:
AC 100V, 120V, 220V, 240V ±10% 50/60Hz (External switchable).

Programmable Electronic Load



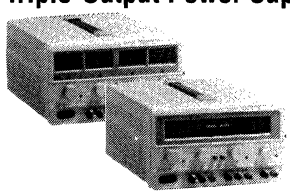
• Easy Operation with UP/DOWN Key • High Resolution: 20mV, 0.2mA, 0.3mΩ • Over Voltage, Over Current, Over Power Protection • Memory Storage & Recall of 100 points • Input Volts: 3 to 60V; Input Amperes: 6mA to 60A • Max. Power: 300W • Operation Mode: AVoltage Constant Current Constant Resistance • Transient Generator Frequency: 1Hz to 1KHz; Duty Range: 10% to 90% • Self Test & Software Calibration • IEEE-488.2 and SCPI compatible command set (OPTIONAL)

SPECIFICATIONS

Rating: Operating Voltage: 3-60V
Operating Current: 0-60A
Operating Power: 300 Watts
Constant Voltage Mode:
Operating Range: 3-60V
Setting Accuracy: 0.1% ± 40mV
Setting Resolution: 20mV
Constant Current Mode:
Operating Range: 0-60A
Setting Accuracy: 0-60A 0.1%±100mA
0-6A 0.1%±10mA
0-6A 0.1% ±1mA
Setting Resolution: 20mA, 2mA, 0.2mA
Constant Resistance Mode: Operating Range: 67mΩ to 1KΩ
Setting Accuracy:
100Ω - 1KΩ 0.3% ± 1Ω
10Ω - 100Ω 0.3% ± 100mΩ
67mΩ - 10Ω 0.8% ± 10mΩ

Constant Power Setting:
Operating Range: 0-300W
Setting Accuracy: 2% ± 4W
Setting Resolution: 0.1W
Dynamic Operation: Frequency Range: 1Hz - 1KHz
Resolution: 0.5Hz
Duty Range: 10% - 90%
Resolution: 1%
Memory: 0-99 RECALL POINTS

Triple-Output Power Supply



PC-3030/PC-3030D (Analog/Digital)

• Auto tracking • Auto series and parallel operation • Continuous or Dynamic load for internal selectable • Low ripple and noise • Overload and Reverse polarity protection • Constant voltage and constant current modes • Two digital pannel meters (PC-3030D) • Four analog meters (PC-3030)

SPECIFICATIONS

OPERATION MODE:
Independent: Two independent outputs and 5V fixed output. Output from 0 to rating volts and 0 to rating amperes. **Series:** Output from 0 to ± rating volts at rating amperes each. Output from 0 to double rating volts at rating amperes. **Parallel:** Output from 0 to double rating amperes at rating volts.
CONSTANT VOLTAGE MODE:
Regulation: Line regulation ≤0.01% + 3mV. Load regulation ≤0.01% + 3mV. **Ripple & Noise:** ≤1mVrms, 5Hz~1MHz.

Recovery Time: ≤100μs (50% load change, minimum load 0.5A)
CONSTANT CURRENT MODE:
Regulation: Line regulation ≤0.2% + 3mA. Load regulation ≤0.2% + 3mA.. **Ripple Current:** ≤3mA rms.
TRACKING OPERATION:
Tracking Error: ≤0.5% + 10mV of the master. **Series Regulation:** ≤300mV.
METER:
Analog: Voltmeter and Ammeter each two pc. 2.5 class. Dimensions 50 x 50 mm. **Digital:** 3 1/2 Digits panel meter x 2. 0.5" LED display. Accuracy ±(0.5% of rdg + 2 digits).

Programmable Power Supplies

PPT-3615

• Easy Operation,with UP/DOWN key • High Stability, Low Drift • High Resolution: 10mV, 1 mA • 4 Digit Display • Over Voltage Protection, Over Current Protection • Memory Store and recall 100 points for PPS-3635. 50 points for PPT-3615 • Self Test, Confirm Performance • FRONT/REAR switch select (output) • Triple Output (for PPT-3615 only) • Auto Tracking (for PPT-3615 only) • Auto Series and Parallel Operation (for PPT-3615 only) • Every STEP with a timer • IEEE-488.2 (Option)

SPECIFICATIONS:
Independent Mode: 3 independent outputs
Outputs from: (0-36V, 0-1.5A) x 2
0-8V, 0-3A
Series output: 0-±72V, 0-1.5A
Parallel output: 0-36V, 0-3A
Constant Voltage Mode:
Line Regulation: ≤ 3mV
Load Regulation: ≤ 3mV
Ripple & Noise:
Voltage: 1mVrms/3mVp-p
Noise: 2mVrms/30mVp-p
Current: ≤ 3mArms

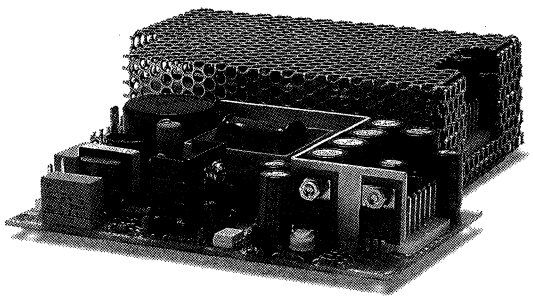
Read back resolution:
V=10Mv,C=≤.2%+10mA
Readback Voltage ACC:
V=≤.05%+25mV, C=≤.2%+10mA
Response Time:
Voltage up: ≤100 ms
No Load: ≤100ms
Voltage down: Full load ≤150ms
Light load ≤150ms
Memory: PPT 3615=50 points;
PPS3635=100 points
Timer: 1sec.-255min., Resolution: 1sec.
Function: output loop, **Meter:** 4 digit display

With over 20 years of manufacturing experience - **INSTEK** offers a complete family of test instruments which are manufactured under the compliance of the new *ISO9000 Regulations.*

These instruments range from: **Benchtop DMM's** (from 3 1/2 to 5 1/2 digits, some with IEEE); **Oscilloscopes** from 20MHz to 100MHz- (some with Cursor Readouts); **Function Generators** (some w/Sweep and Digital Displays); **Frequency Counters** (up to 2.7GHz); **Universal Counters** (up to 2.7GHz); **DC Linear Power Supplies** (from Single Outputs to Triple Outputs - voltages from DC to 1000V with available Current Ranges from 0 to 75 Amps. Programmable and Non-Programmable as well; **Millivolt Meters** (Single and Dual models); **AM/FM Stereo Signal Generators.**

ALL MODELS ARE SAFETY AGENCY APPROVED

Universal Input AC/DC Power Supplies



SRW SERIES FEATURES:

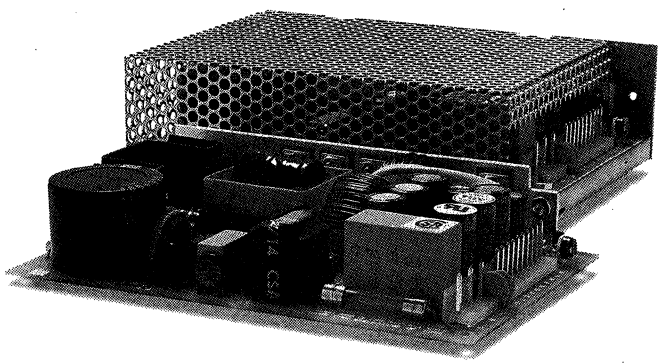
- ❑ Low Profile
- ❑ One to Four Outputs
- ❑ FCC/VDE Level "B" Input Filter
- ❑ All Models UL, CSA and TUV Certified
- ❑ Optional Chassis & Cover

Compact 3" x 5" x 1.1" size

45 watt — SRW-45

	Model No.	Output 1	Output 2	Output 3	Output 4
QUADS	SRW-45-4001	+5V@5A	-5V@2A	+12V@0.7A	-12V@0.7A
	SRW-45-4002	+5V@5A	-5V@2A	+15V@0.7A	-15V@0.7A
	SRW-45-4003	+5V@5A	+24V@1A	+12V@0.7A	-12V@0.7A
	SRW-45-4004	+5V@5A	+24V@1A	+15V@0.7A	-15V@0.7A
	SRW-45-4005	+5V@5A	+24V@1A	-12V@0.7A	-5V@0.7A
	SRW-45-4006	+5V@5A	+15V@2A	-15V@0.7A	-15V@0.7A
TRIPLES	SRW-45-3001	+5V@5A	+12V@3A		-12V@0.7A
	SRW-45-3002	+5V@5A	+15V@2A		-15V@0.7A
	SRW-45-3003	+5V@5A	+24V@1.5A		-12V@0.7A
DUALS	SRW-45-2001	+5V@5A	+12V@3A		
	SRW-45-2002	+5V@5A	-5V@4A		
	SRW-45-2003	+5V@5A	+24V@1.5A		
	SRW-45-2004	+12V@3A	-12V@2A		
	SRW-45-2005	+15V@2.5A	-15V@2A		
SINGLES	SRW-45-1001	+5V@9A			
	SRW-45-1002	+12V@3.75A			
	SRW-45-1003	+15V@3A			
	SRW-45-1004	+24V@1.9A			

Other output combinations available, please consult factory

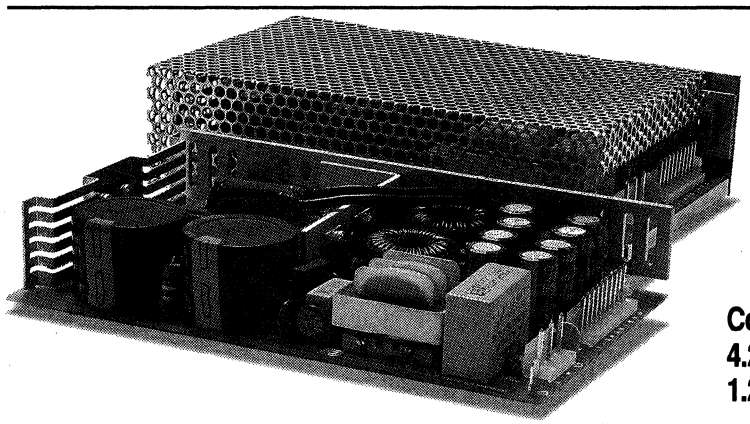


Compact 4"x 6" x 1.1" size

65 watt — SRW-65

	Model No.	Output 1	Output 2	Output 3	Output 4
QUADS	SRW-65-4001	+5V@5A	-5V@3A	+12V@2A	-12V@2A
	SRW-65-4002	+5V@5A	+12V@1A	+12V@2A	-12V@2A
	SRW-65-4003	+5V@5A	+24V@1A	+12V@2A	-12V@2A
	SRW-65-4004	+5V@5A	-5V@3A	+15V@2A	-15V@2A
	SRW-65-4005	+5V@5A	+24V@1A	+12V@2A	-5V@2A
	SRW-65-4006	+5V@5A	+24V@1A	+15V@2A	-15V@2A
TRIPLES	SRW-65-3001	+5V@5A		+12V@3A	-12V@1A
	SRW-65-3002	+5V@7A		+12V@2A	-12V@2A
	SRW-65-3003	+5V@7A		+15V@2A	-15V@2A
	SRW-65-3004	+5V@5A	-5V@4A	+12V@2A	
	SRW-65-3005	+5V@5A	-5V@4A	+24V@1A	
DUALS	SRW-65-2001	+5V@7A			-5V@5A
	SRW-65-2002	+5V@7A		+12V@3A	
	SRW-65-2003	+12V@3A			-12V@2.5A
	SRW-65-2004	+15V@2.5A			-15V@2A
	SRW-65-2005	+5V@7A		+24V@1.5A	
SINGLES	SRW-65-1001	+5V@13A			
	SRW-65-1002	+12V@5.4A			
	SRW-65-1003	+15V@4.3A			
	SRW-65-1004	+24V@2.7A			

Other output combinations available, please consult factory



Compact 4.25" x 7"x 1.2" size

115 watt — SRW-115

	Model No.	Output 1	Output 2	Output 3	Output 4
QUADS	SRW-115-4001	+5V@12A	-5V@4A	+12V@4A (6Apk)	-12V@2A
	SRW-115-4002	+5V@12A	+24V@1A	+12V@4A (6Apk)	-12V@2A
	SRW-115-4003	+5V@12A	-5V@4A	+15V@3A (4Apk)	-15V@2A
	SRW-115-4004	+5V@12A	+24V@1A	+15V@3A (4Apk)	-15V@2A
	SRW-115-4005	+5V@12A	+12V@1A	+24V@3A	-12V@1A
TRIPLES	SRW-115-3001	+5V@12A		+12V@4A (6Apk)	-12V@2A
	SRW-115-3002	+5V@12A		+15V@4A (6Apk)	-15V@2A
	SRW-115-3003	+5V@12A		+24V@3A	-12V@1A
DUALS	SRW-115-2001	+5V@12A		+24V@3A	
	SRW-115-2002	+12V@5A			-12V@5A
	SRW-115-2003	+15V@5A			-15V@5A
	SRW-115-2004	+24V@2.5A			-24V@2.5A

Other output combinations available, please consult factory

INTEGRATED POWER DESIGNS

Reserve your evaluation units or get additional information on our ready-to-ship universal input switchers.

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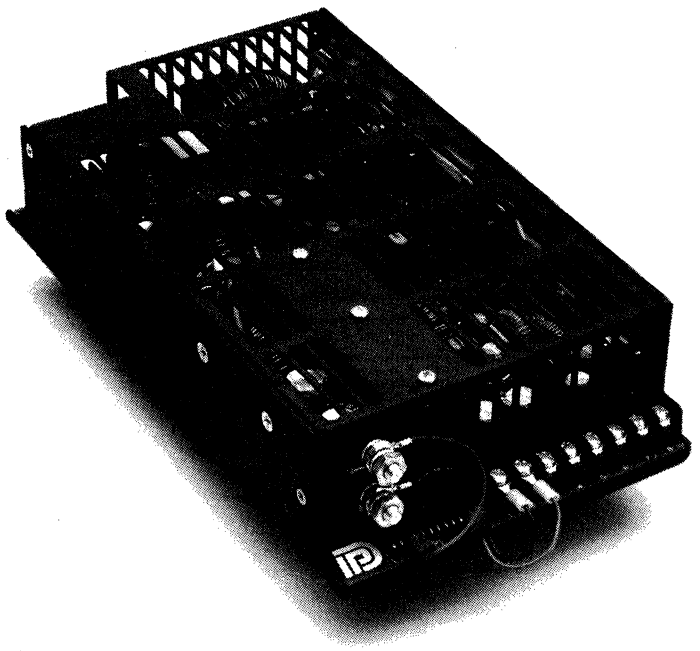
Universal Input AC/DC Power Supplies



SRW-200 SERIES

200 watt **SRW-200**

Model No.	Output 1	Output 2	Output 3	Output 4	Output 5
SRW-200-5001	5V/25A	24V/4A(6Apk)	12V/3A(4Apk)	5V/1A	12V/2A
SRW-200-5002	5V/25A	24V/4A(6Apk)	15V/3A(4Apk)	5V/1A	15V/2A
SRW-200-5003	5V/25A	12V/6A(8Apk)	12V/3A(4Apk)	5V/1A	24V/2A
SRW-200-5004	5V/25A	15V/4A(6Apk)	15V/3A(4Apk)	5V/1A	24V/2A
SRW-200-5005	5V/25A	24V/4A(6Apk)	24V/2A(3Apk)	12V/1A	12V/2A
SRW-200-4001	5V/25A	12V/6A(8Apk)	5V/3A		12V/2A
SRW-200-4002	5V/25A	24V/4A(6Apk)	12V/3A(4Apk)		12V/2A
SRW-200-4003	5V/25A	24V/4A(6Apk)	15V/3A(4Apk)		15V/2A
SRW-200-4004	5V/25A	12V/6A(8Apk)	24V/2A(3Apk)		24V/2A
SRW-200-4005	12V/10A	12V/6A(8Apk)	5V/4A		12V/2A
SRW-200-4006	24V/5A	12V/6A(8Apk)	5V/4A		12V/2A
SRW-200-3001	5V/25A	12V/6A(8Apk)	12V/3A(4Apk)		
SRW-200-3002	12V/10A	12V/6A(8Apk)	5V/4A		
SRW-200-2001	5V/25A	24V/4A(6Apk)			
SRW-200-2002	12V/10A	12V/6A(8Apk)			
SRW-200-2003	15V/8A	15V/4A(6Apk)			
SRW-200-2004	24V/5A	24V/4A(6Apk)			

Additional combinations available, please consult factory

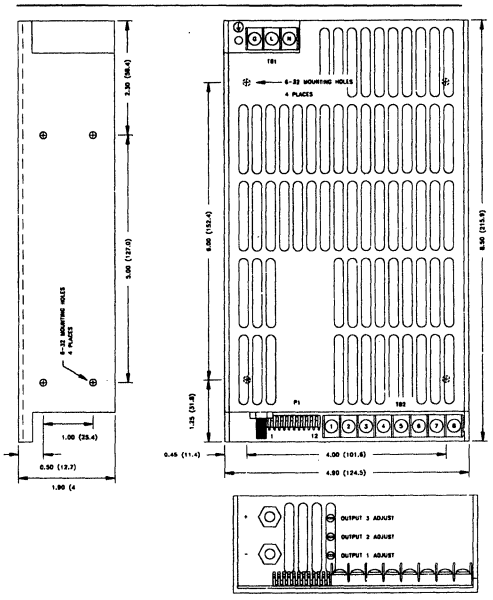
SRW-200 SERIES FEATURES:

❑ Universal 85-264 VAC Input ❑ VDE/FCC Level "B" EMI Filter ❑ Two to Five Outputs ❑ All Outputs Regulated ❑ Short Circuit Protected ❑ All Outputs Isolated ❑ Remote Sense ❑ 78% Efficiency ❑ Compact 8.5"x 4.9" x 1.9"size ❑ Convection Cooled

APPLICATIONS INFORMATION

- Sense Connections: Provided on outputs 1 and 2, compensate for up to 250 mV of cable losses.
- Power Fail Signal: Upon loss of AC power, the power fail signal falls to logic low at least 2 msec before the DC output drops out of regulation.
- Remote On/Off: The power supply is turned off with switch closure or logic low and turned on with an open circuit or logic high.
- OVP: Output 1 only. Factory set at 125%, ± 10% of output 1 voltage.
- Peck current on outputs 2 and 3 rated for 10 seconds maximum.
- 10% load is required on output 1 to insure proper regulation of remaining outputs.
- All outputs are isolated and may be referenced to each other or chassis ground as required.
- Convection Cooling: Sufficient ventilation must be provided to keep the ambient temperature in and around the power supply from exceeding 50° C.
- Consult factory for output 4 and 5 voltage adjust locations.

MECHANICAL SPECIFICATIONS



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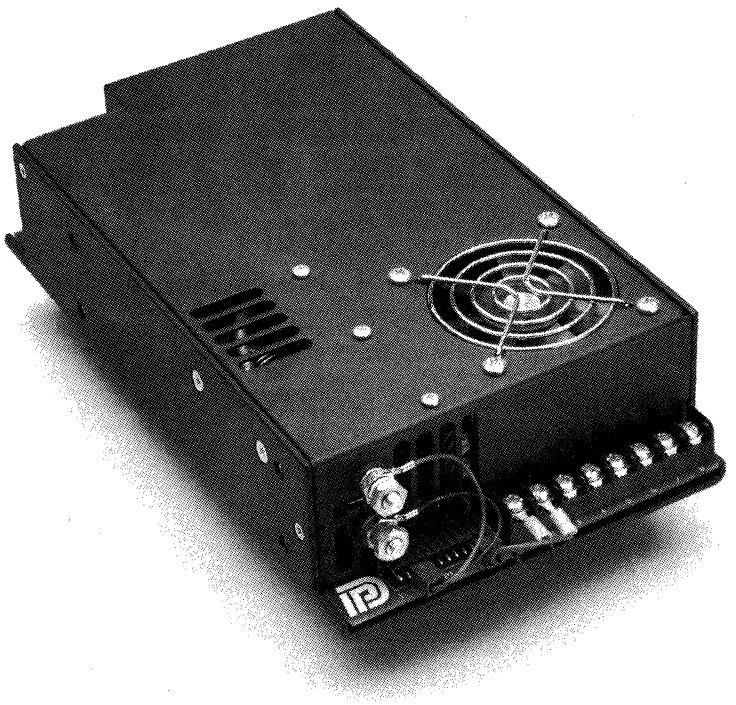
Universal Input AC/DC Power Supplies



SRW-300 SERIES

300 watt **SRW-300**

Model No.	Output 1	Output 2	Output 3	Output 4	Output 5
SRW-300-5001	5V/40A	24V/4A(6Apk)	12V/6A	5V/1A	12V/2A
SRW-300-5002	5V/40A	12V/8A(12Apk)	12V/6A	5V/1A	24V/2A
SRW-300-5003	5V/40A	12V/8A(12Apk)	24V/3A	15V/1A	15V/2A
SRW-300-5004	5V/40A	24V/4A(6Apk)	24V/3A	12V/1A	12V/2A
SRW-300-5005	24V/8A	12V/8A(12Apk)	5V/6A	15V/1A	15V/2A
SRW-300-5006	24V/8A	24V/4A(6Apk)	5V/6A	15V/1A	12V/2A
SRW-300-4001	5V/40A	12V/8A(12Apk)	5V/5A		12V/2A
SRW-300-4002	5V/40A	24V/4A(6Apk)	12V/6A		12V/2A
SRW-300-4003	5V/40A	24V/4A(6Apk)	15V/4A		15V/2A
SRW-200-4004	24V/8A	12V/8A(12Apk)	5V/6A		12V/2A
SRW-300-3001	5V/40A	12V/8A(12Apk)	12V/6A		
SRW-300-3002	5V/40A	12V/8A(12Apk)	24V/3A		
SRW-300-3003	5V/40A	15V/6A(8Apk)	15V/4A		
SRW-300-3004	12V/16A	12V/8A(12Apk)	5V/6A		
SRW-300-2001	5V/40A	24V/4A(6Apk)			
SRW-300-2002	12V/16A	12V/8A(12Apk)			
SRW-300-2003	15V/13A	15V/6A(10Apk)			
SRW-300-2004	24V/8A	24V/4A(6Apk)			

Additional combinations available, please consult factory

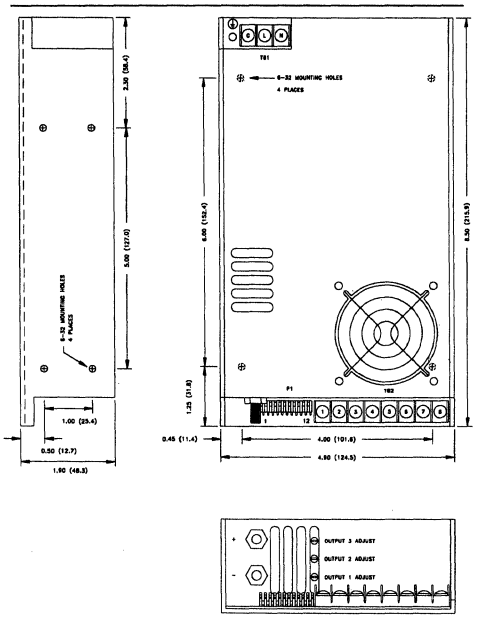
SRW-300 SERIES FEATURES:

❑ Universal 85-264 VAC Input ❑ VDE/FCC Level "B" EMI Filter ❑ Two to Five Outputs ❑ All Outputs Regulated ❑ Short Circuit Protected ❑ All Outputs Isolated ❑ Remote Sense ❑ 78% Efficiency ❑ Compact 8.5"x 4.9" x 1.9"size ❑ Internal Fan

APPLICATIONS INFORMATION

- Sense Connections: Provided on outputs 1 and 2, compensate for up to 250 mV of cable losses.
- Power Fail Signal: Upon loss of AC power, the power fail signal falls to logic low at least 2 msec before the DC output drops out of regulation.
- Remote On/Off: The power supply is turned off with switch closure or logic low and turned on with an open circuit or logic high.
- OVP: Output 1 only. Factory set at 125%, ± 10% of output 1 voltage.
- Peck current on outputs 2 rated for 10 seconds maximum.
- 10% load is required on output 1 to insure proper regulation of remaining outputs.
- All outputs are isolated and may be referenced to each other or chassis ground as required.
- Air flow into vents and out of fan exhaust must not be obstructed in self cooled units.
- 30 CFM minimum, pulled through end or directed at top of enclosure is required with customer supplied forced air.
- Consult factory for output 4 and 5 voltage adjust locations.

MECHANICAL SPECIFICATIONS



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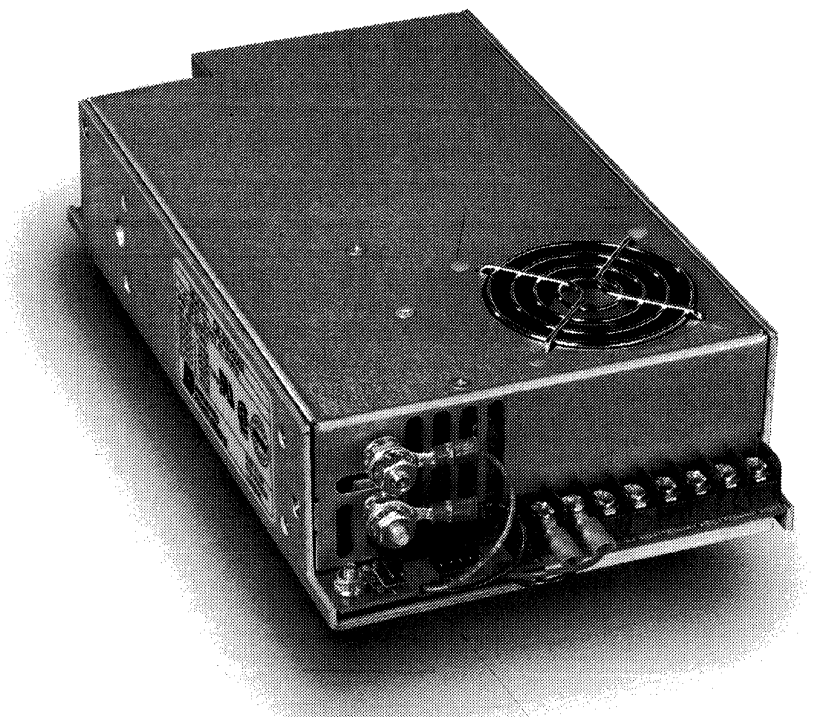


CE-300 SERIES

300 watt **SRW-300**

MODEL NO.	Output 1	Output 2	Output 3	Output 4	Output 5
CE-300-5001	+5V/40A	+24V/4A(6Apk)	+12V/6A	- 5V/1A	- 12V/2A
CE-300-5002	+5V/40A	+12V/8A(12Apk)	- 12V/6A	- 5V/1A	+24V/2A
CE-300-5003	+5V/40A	+12V/8A(12Apk)	+24V/3A	- 15V/1A	+15V/2A
CE-300-5004	+5V/40A	+24V/4A(6Apk)	24V/3A	- 12V/1A	+12V/2A
CE-300-5005	+24V/8A	+12V/8A(12Apk)	+5V/6A	- 15V/1A	+15V/2A
CE-300-5006	+24V/8A	24V/4A(6Apk)	+5V/6A	- 15V/1A	+15V/2A
CE-300-5008	+24V/8A	+5V/8A	+12V/6A	- 5V/1A	- 12V/2A
CE-300-4001	+5V/40A	+12V/8A(12Apk)	- 5V/5A		- 12V/2A
CE-300-4002	+5V/40A	+24V/4A(6Apk)	+12V/6A		- 12V/2A
CE-300-4003	+5V/40A	+24V/4A(6Apk)	+15V/4A		- 15V/2A
CE-300-4004	+24V/8A	+12V/8A(12Apk)	+5V/6A		- 12V/2A
CE-300-4005	+5V/40A	- 5.2V/12A	+12V/6A		- 12V/2A
CE-300-4006	+24V/8A	+12V/8A(12Apk)		- 12V/1.5A	5V/2A
CE-300-3001	+5V/40A	+12V/8A(12Apk)	- 12V/6A		
CE-300-3002	+5V/40A	+12V/8A(12Apk)	+24V/3A		
CE-300-3003	+5V/40A	+15V/6A(8Apk)	- 15V/4A		
CE-300-3004	+12V/16A	- 12V/8A(12Apk)	+5V/6A		
CE-300-2001	+5V/40A	+24V/4A(6Apk)			
CE-300-2002	+12V/16A	- 12V/8A(12 Apk)			
CE-300-2003	+15V/13A	- 15V/6A(10Apk)			
CE-300-2004	+24V/8A	- 24V/4A(6Apk)			
CE-300-1001	5V/60A				
CE-300-1002	12V/25A				
CE-300-1003	15V/20A				
CE-300-1004	24V/12A				

• Alternate output configurations are available.

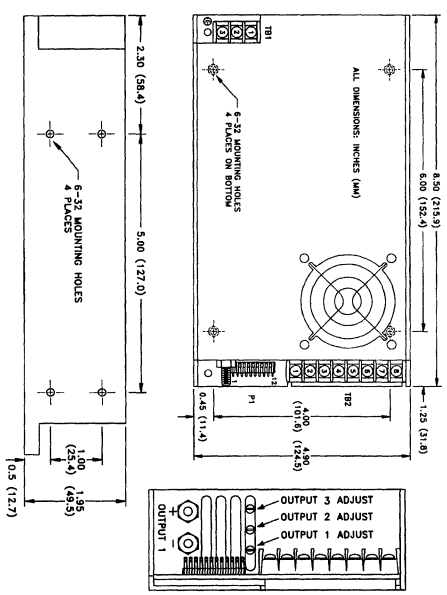
CE-300 SERIES FEATURES:

❑ Power factor correction ❑ Universal 85-264 Volt AC input ❑ One to five outputs ❑ Fully regulated outputs ❑ EMC Certified (EN50081-1, EN50082-1 & EN61000-4-5) ❑ UL, CSA, TUV & CE Approvals ❑ Compact 8.5"x 4.9"x 1.9"size ❑ Internal Fan

APPLICATIONS INFORMATION

- This product is intended for use in Information Technology Equipment to be used in residential, commercial or light industrial installations.
- Remote sense terminals (Figure 1) may be used to compensate for cable losses up to 250mV. The use of a twisted pair is recommended as well as a decoupling capacitor C_D(0.1 -10μF) and a capacitor C_L of 100μF/Amp connected across the load side.
- Each output can deliver its full rated current but total output power must not exceed 300 watts.
- A minimum load of 10% on output one will assure proper regulation of all other outputs.
- Peak current on output 2 is available for 10 seconds maximum with a 20% duty cycle.
- 500 LFM forced air, directed at or across the top of the perforated cover (optional) is required.
- Peak to peak output ripple and noise is measured directly at the output terminals of the power supply, without the use of the probe ground lead or retractable tip, 20 MHz. bandwidth.
- The power supply has been safety approved and final tested using a DC dielectric strength test. The use of an AC source for this test will result in breakdown and damage to internal components and should not be used.

MECHANICAL SPECIFICATIONS



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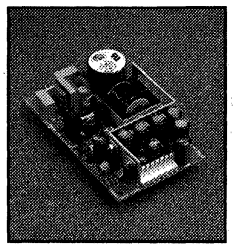


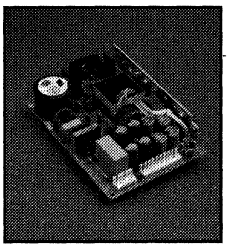
45 WATT - SRW-45 SERIES

Features:
• Universal 85-264 VAC Input • UL, CSA, TUV Safety Approvals • Short Circuit Protection • VDE/FCC Level "B" Input Filter • 75% Efficiency • Optional Chassis & Cover • Over 150,000 Hours MTBF • Isolated Outputs Available

Compact 3" X 5" X 1.1" Size

Outputs	Output #1	Output #2	Output #3	Output #4
4	5V	5V-24V	12V-15V	5V-15V
3	5V	12V-24V		12V-15V
2	5V-15V	5V-24V		
1	5V-24V			

Output 1 ± 5% adjust, Outputs 2, 3 & 4 fixed.



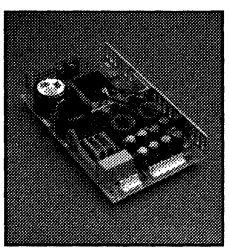
65 WATT - SRW-65 SERIES

Features:
• Universal 85-264 VAC Input • UL, CSA, TUV Safety Approvals • Short Circuit Protection • VDE/FCC Level "B" Input Filter • 75% Efficiency • Optional Chassis & Cover • Over 150,000 Hours MTBF • Power Fail Signal Available • Isolated Outputs Available

Compact 4" X 6" X 1.1" Size

Outputs	Output #1	Output #2	Output #3	Output #4
4	5V	5V-24V	12V-15V	5V-15V
3	5V		5V-24V	12V-15V
2	5V-15V			5V-24V
1	5V-24V			

Output 1 ± 5% adjust, Outputs 2, 3 & 4 fixed.



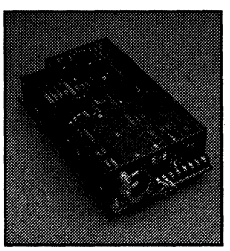
115 WATT - SRW-115 SERIES

Features:
• Universal 85-264 VAC Input • UL, CSA, TUV Safety Approvals • Short Circuit Protection • VDE/FCC Level "B" Input Filter • 80% Efficiency • Optional Chassis & Cover • Over 150,000 Hours MTBF • Power Fail Signal Available • Isolated Outputs Available

Compact 4.25" X 7" X 1.25" Size

Outputs	Output #1	Output #2	Output #3	Output #4
4	5V	5V-24V	12V-24V	12V-15V
3	5V		12V-24V	12V-15V
2	5V-15V			12V-24V
1	Consult Factory			

Output 1 ± 5% adjust, Outputs 2, 3 & 4 fixed.



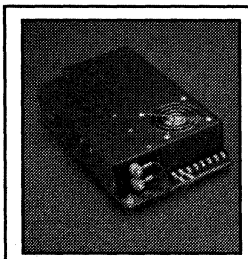
200 WATT - SRW-200 SERIES

Features:
• Auto Select 85-143/170-264 VAC Input • All Outputs Regulated • Short Circuit Protection • VDE/FCC Level "B" EMI Filter • All Outputs Isolated • Remote Sense • 78% Efficiency • UL, CSA, TUV Safety Approvals • Remote Inhibit Option • Power Fail Signal Available

Compact 4" X 6" X 1.1" Size

Outputs	Output #1	Output #2	Output #3	Output #4	Output #5
5	5V-24V	12V-24V	12V-24V	5V-12V	12V-24V
4	5V-24V	12V-24V	5V-24V		12V-24V
3	5V-12V	12V	5V-12V		
2	5V-24V	12V-24V			
1	3V-28V				

All Output 1 ± 5% adjust.



300 WATT - CE-300 SERIES

Features:
• Auto Select 85-132/170-264 VAC Input • All Outputs Regulated • Short Circuit Protection • VDE/FCC Level "B" EMI Filter • All Outputs Isolated • Remote Sense • 78% Efficiency • UL, CSA, TUV Safety Approvals • Internal Fan • Remote Inhibit Option • Power Fail Signal Available

Compact 8.5" X 4.9" X 1.9" Size

Outputs	Output #1	Output #2	Output #3	Output #4	Output #5
5	5V-24V	12V-24V	5V-24V	5V-15V	12V-24V
4	5V-24	12V-24V	5V-24V		12V-15V
3	5V-12V	12V-15V	5V-24V		
2	5V-24V	12V-24V			
1	3V-28V				

Outputs 1, 2 & 3 ± 5% adjust, Outputs 4 & 5 Fixed.

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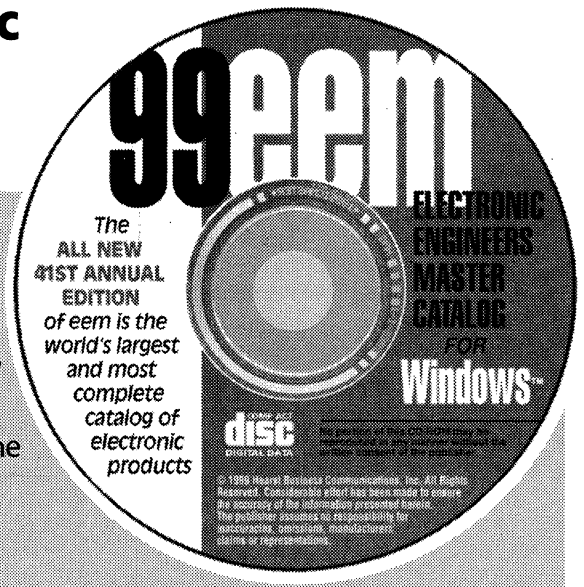

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eem SI UNITS

RELATIVE QUANTITY SYMBOLS

$\neq$	not equal to
$\approx$	approximately equal to
$\propto$	proportional to
$<$	smaller than
$\leq$	smaller than or equal to
$\ll$	much smaller than
$>$	larger than
$\geq$	larger than or equal to
$\gg$	much larger than
$\equiv$	identical to or equivalent
$\uparrow$	increases
$\downarrow$	decreases

PREFIXES FOR SI UNITS

Multiple	Prefix	Symbol
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p

Quantity	Symbol	SI Unit	Symbol	Derivation
acceleration	a	m s^{-2}	—	velocity/time
acceleration due to gravity	g	m s^{-2}	—	velocity/time
amount of substance	n	mole	mol	mole fraction (n) used
amplification factor	μ	*a ratio*	—	—
angle	$\theta_1, \varphi_1, \alpha_1$	—	—	—
angle of incidence	i	degree or radian	°	—
angle of refraction	r	degree or radian	°	—
angle, Bragg	θ	number	—	—
angle, critical	c	degree or radian	°	—
anode slope resistance	R_A	ohm	Ω	$\Delta V_a / \Delta I_a$
area	A	metres squared	m^2	$l \times b$
atomic number	Z	a number	—	number of protons
Avogadro constant	L, N_A	number	—	—
breadth	b	metre	m	fundamental unit
capacitance	C	farad	F	charge/p.d.
charge, electric	Q	coulomb	C	current × time
charge on electron	e	coulomb	C	$1{\cdot}6 \times 10^{-19}$ C
conductance	G	ohm^{-1}	Ω^{-1}	reciprocal of resistance
current, electric	I	ampere	A	fundamental unit
decay constant	λ	*a ratio*	—	—
density	ρ	kg m^{-3}	—	m/V
distance along path	s	metre	m	fundamental unit
efficiency	η	*a ratio*	—	work output/work input
electrochemical equiv.	z	g C^{-1}	—	mass/charge
electromotive force	E	volt	V	energy/charge
electron	e	—	—	—
energy	E	joule	J	N m
energy, kinetic	E_k	joule	J	N m. $E_k = 1/2mv^2$
energy, potential	E_p	joule	J	N m. $E_p = mgh$
Faraday constant	F	coulomb mol^{-1}	C mol^{-1}	96,500 C mol^{-1}
field strength, electric	E	V m^{-1}	—	potential gradient: p.d./dist.
field-strength magnetic	H	ampere-turns	—	current × no. of turns
flux, magnetic	Φ	weber	Wb	e.m.f/rate of change of flux
flux density	B	tesla	T	flux/area
focal length	f	metre	m	—
force	F	newton	N	kg m s^{-2}
free energy	ΔG	joule	J	—
frequency	f	hertz	Hz	oscillations/time
gas constant	r	joule	J	energy
half-life,radioactivity	$t_{1/2}$	second	s	fundamental unit
heat capacity	C	J K^{-1}	—	quantity of heat/temp. rise
heat of reaction	ΔH	joule	J	heat energy
heat capacity, specific	c	J K^{-1} kg^{-1}	—	heat capacity/mass
heat, quantity of	q	joule	J	energy

eem SI UNITS

Quantity	Symbol	SI Unit	Symbol	Derivation
height	h	metre	m	fundamental unit
image distance	υ	metre	m	fundamental unit
inductance, mutual	M	henry	H	induced e.m.f./rate of change of current
inductance, self	L	henry	H	—
intensity of radiation	I	*a number*	—	—
latent heat	L	joule	J	quantity of heat
latent heat, specific	l	J kg^{-1}	—	quantity of heat
latent heat, molar	L_m	joule mol^{-1}	J	quantity of heat
length	l	metre	m	fundamental unit
magnetizing force	H	ampere-turns	—	—
magnetic moment	m	Wb m	—	torque in unit magnetic field
magnification, linear	m	*a ratio*	—	—
mass	m	kilogramme	kg	fundamental unit
mass number	A	*a number*	—	number of neutrons + protons
molar volume	V_m	(dm^3)	—	volume of 1 mole
molar solution	M	*a ratio*	—	moles/dm^3
moment of force	—	N m	—	force × perp. distance
neutron number	N	*a number*	—	number of neutrons
number	n	—	—	—
number of molecules	N	—	—	—
number turns on coil	n	*a number*	—	—
number order spectrum	p	*a number*	—	—
object distance	u	metre	m	fundamental unit
peak current	I_o	ampere	A	see current
peak e.m.f.	E_o	volt	V	see e.m.f.
period	T	second	s	fundamental unit
permeability	μ	H m^{-1}	—	henry/metre
permeability, vacuum	μ_o	H m^{-1}	—	—
permeability, relative	μ_r	*a ratio*	—	$\mu = \frac{\mu}{\mu_o}$
permittivity	ε	F m^{-1}	—	farad/metre
permittivity, vacuum	ε_o	F m^{-1}	—	farad/metre
permittivity, relative	ε_r	*a ratio*	—	$\varepsilon_r = \frac{\varepsilon}{\varepsilon_o}$
potential, electric	V	volt	V	energy/charge
potential difference	V	volt	V	energy/charge
power	P	watt	W	J s^{-1}
pressure	p	pascal	Pa	N m^{-2}: force/area
radius	r	metre	m	fundamental unit
reactance	X	ohm	Ω	E_O/I_O
refractive index	n	*a ratio*	—	—
resistance	R	ohm	Ω	p.d./current
resistivity, electrical	ρ	ohm-metre	—	resistance × length
relative density	d	*a ratio*	—	ρ_{sub}/ρ_{water}
r.m.s. current	$I_{r.m.s}$	ampere	A	see current
r.m.s. voltage	$V_{r.m.s}$	volt	V	see e.m.f.
slit separation	s	metre	m	fundamental unit
tension	T	newton	N	see force
temperature, Celsius	θ	degree C	°C	from kelvin
temp. interval	θ	degree	° or K	—
temp. absolute	T	kelvin	K	fundamental unit
thickness	d	metre	m	fundamental unit
time	t	second	s	fundamental unit
torque	T	Nm	—	see moment
turns ratio	T	*a ratio*	—	n_{sec}/n_{prim}
(unit of electricity)	—	kW h	—	kilowatt × hour
velocity	u,υ	ms^{-1}	—	distance/time
velocity, angular	ω	$second^{-1}$	s^{-1}	angle/time
velocity, e.m.waves	c	m s^{-1}	—	—
velocity of sound	υ	m s^{-1}	—	—
volume	V	metre cubed	m^3	l × b × h
wavelength	λ	metre	m	fundamental unit
work	w	joule	J	force x distance (Nm)
weight	W	newton	N	kg m s^{-2}or mg

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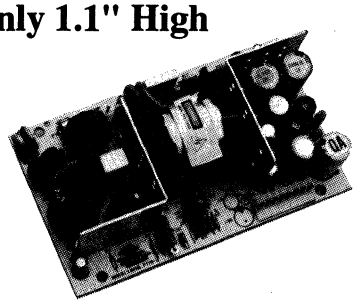

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- OVP & Short Circuit Protection
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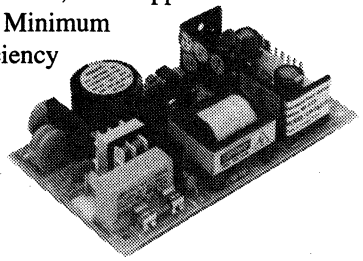
- 1 to 4 Outputs
- UL 2601, CSA & IEC Approvals

PU Series – Low Cost Switching Power Supplies

Power	Model	Input	Output						
			+5V	+12V	-12V	+24V	-5V	+15V	-15V
30W	PU30-10SL	Universal 85-264 Vac	5.0A	—	—	—	—	—	—
	PU30-12SL		—	2.5A	—	—	—	—	—
	PU30-13SL		—	—	—	—	—	2.0A	—
	PU30-14SL		—	—	—	1.3A	—	—	—
	PU30-31SL		3.0A	1.5A	0.2A	—	—	—	—
	PU30-32SL		3.0A	—	—	—	—	1.5A	0.2A
40W	PU40-25SL	Universal 85-264 Vac	3.0 A	—	—	1.0 A	—	—	—
	PU40-30SL		3.0 A	2.0 A	—	—	0.3 A	—	—
	PU40-31SL		3.0 A	2.0 A	0.3 A	—	—	—	—
	PU40-32SL		3.0 A	—	—	—	—	2.0 A	0.3 A
65W	PU65-10	Universal 85-264 Vac	10.0 A	—	—	—	—	—	—
	PU65-12		—	5.5 A	—	—	—	—	—
	PU65-13		—	—	—	—	—	4.5 A	—
	PU65-14		—	—	—	3.0 A	—	—	—
	PU65-31		6.0 A	3.0 A	0.5 A	—	—	—	—
	PU65-40		6.0 A	3.0 A	0.5 A	—	0.5 A	—	—
110W	PU110-10A	Universal 85-264 Vac	22.0 A	—	—	—	—	—	—
	PU110-12A		—	9.0 A	—	—	—	—	—
	PU110-13A		—	—	—	—	—	7.5 A	—
	PU110-14A		—	—	—	4.5 A	—	—	—
	PU110-23A		10.0 A	5.0 A	—	—	—	—	—
	PU110-31A		10.0 A	5.0 A	1.0 A	—	—	—	—
	PU110-32A		10.0 A	—	—	—	—	4.0 A	1.0 A
	PU110-40A		10.0 A	5.0 A	1.0 A	—	1.0 A	—	—
	PU110-45A		10.0 A	5.0 A	1.0 A	1.0 A	—	—	—
	PU110-46A		10.0 A	—	—	—	1.0 A	4.0 A	1.0 A
200W	PU200-10	Universal 90-260 Vac	40.0 A	—	—	—	—	—	—
	PU200-12		—	16.7 A	—	—	—	—	—
	PU200-13		—	—	—	—	—	13.4A	—
	PU200-14		—	—	—	8.4A	—	—	—
	PU200-23		30.0A	8.0A	—	—	—	—	—
	PU200-24		30.0A	—	—	—	—	6.0A	—
	PU200-25		30.0A	—	—	4.0A	—	—	—
	PU200-30		30.0A	8.0A	—	—	6.0A	—	—
	PU200-31		30.0A	8.0A	4.0A	—	—	—	—
	PU200-32		30.0A	—	—	—	—	6.0A	4.0A
	PU200-40		30.0A	8.0A	4.0A	—	F6.0A	—	—
	PU200-41		30.0A	—	—	F4.0A	—	6.0A	4.0A
	PU200-44		30.0A	8.0A	—	—	—	F4.0A	4.0A
	PU200-45		30.0A	8.0A	4.0A	F4.0A	—	—	—

UP065 Series 65 Watt 3" x 5" Package

- Universal Input Range 90-264 Vac
- High Density 3" x 5" x 1"
- UL , CSA , TUV Approved
- 75% Minimum Efficiency



Power	Model	Input	Output						
			+5V	+12V	-12V	+24V	-5V	+15V	-15V
65W	UP0651S-01	Universal 90-264 Vac	14.0A	—	—	—	—	—	—
	UP0651S-02		—	6.5A	—	—	—	—	—
	UP0651S-03		—	—	—	—	—	5.2A	—
	UP0651S-04		—	—	—	3.3A	—	—	—
	UP0653S-01		9.0A	3.75A	1.0A	—	—	—	—
	UP0653S-02		9.0A	3.75A	—	—	1.0A	—	—
	UP0653S-03		9.0A	—	—	—	—	3.0A	1.0A
	UP0653S-04		9.0A	—	1.0A	1.9A	—	—	—

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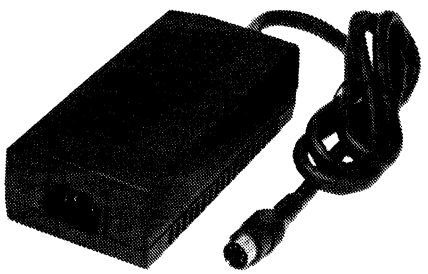
ISO 9002 REGISTERED

AC/DC POWER SUPPLIES



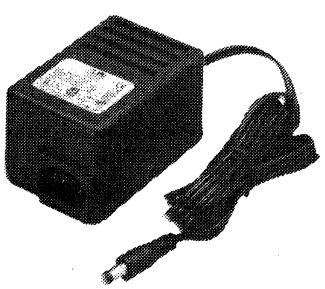
PUP/PMP Series — 30, 55, 80, 110, and 130 Watt External Switching Power Supplies with CE Mark

Power	Model	Input	Output +5V	+12V	-12V	+24V	-5V	+15V	-15V
30W	PUP30-10	Universal 85-264 Vac	5.0A	—	—	—	—	—	—
	PUP30-12		—	2.7A	—	—	—	—	—
	PUP30-13		—	—	—	—	—	2.3A	—
	PUP30-14		—	—	—	1.4 A	—	—	—
	PUP30-23		3.0A	2.0A	—	—	—	—	—
	PUP30-24		3.0A	—	—	—	—	1.5A	—
	PUP30-25		3.0A	—	—	1.0A	—	—	—
	PUP30-31		3.0A	0.8A	0.8A	—	—	—	—
	PUP30-32		3.0A	—	—	—	—	0.8A	0.8A
55W	PUP55-10	Universal 85-264 Vac	8.0 A	—	—	—	—	—	—
	PUP55-12		—	4.6A	—	—	—	—	—
	PUP55-13		—	—	—	—	—	3.7A	—
	PUP55-14		—	—	—	2.3A	—	—	—
	PUP55-23		5.0A	3.0A	—	—	—	—	—
	PUP55-24		5.0A	—	—	—	—	2.5A	—
	PUP55-25		5.0A	—	—	2.0A	—	—	—
	PUP55-31		5.0A	3.0A	0.5A	—	—	—	—
	PUP55-32		5.0A	—	—	—	—	2.5A	0.5A
110W	PUP110-10	Universal 85-264 Vac	22.0A	—	—	—	—	—	—
	PUP110-12		—	9.0A	—	—	—	—	—
	PUP110-13		—	—	—	—	—	7.5A	—
	PUP110-14		—	—	—	4.5A	—	—	—
	PUP110-23		10.0A	5.0A	—	—	—	—	—
	PUP110-31		10.0A	5.0A	1.0A	—	—	—	—
	PUP110-32		10.0A	—	—	—	—	4.0A	1.0A
	PUP110-40		10.0A	5.0A	1.0A	—	1.0A	—	—
	PUP110-45		10.0A	5.0A	1.0A	1.0A	—	—	—
	PUP110-46		10.0A	—	—	—	1.0A	4.0A	1.0A

NEW! PMP Series Medical Safety Approvals

- CE Mark on all models
- Universal Input Range 85-264 Vac
- UL 2601 Listed, CSA C22.2 & IEC 601-1 Approved
- Enclosed Polycarbonate Case 94V-0 Rated
- Built-In EMI/RFI Filter VDE "B" FCC "B"
- IEC 320 Inlet, DIN Output Connectors
- Optional On/Off Switch, PFD Signal and Output Connectors Available

NEW! SWI Series 10, 15, 24 Watt Compact Desktop Power Supplies

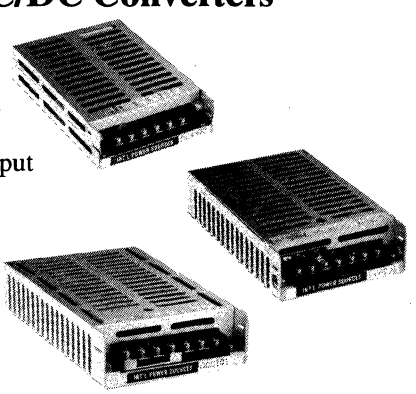


- Universal input voltage range
- IEC input receptacle
- UL, CSA and TUV approved
- CE mark on all models
- Wall plug in units
- 3.30" x 1.97" x 2.20"

NEW! IPS Series Industrial Power Supplies

- 75, 150, 300 and 600 Watt Modules
- DIN Rail or Chassis Mount
- Redundant Load Sharing
- N+1 Redundancy

15-150 Watt AC/DC Power Supplies and DC/DC Converters



- Single, Dual, and Triple Outputs
- Compact Size/Light Weight
- 500 VDC Input/Output Isolation
- High Efficiency-80KHz Switcher
- Low Cost
- Fully Enclosed
- 8 Input Ranges
- No Minimum Load
- Same Size AC or DC Input

Series	Output Power
ACA/DCA	15 Watts
ACB/DCB	25 Watts
ACC/DCC	50 Watts
ACE/DCE	100 Watts
ACF/DCF	150 Watts

Input Voltage Ranges
90-132 VAC
180-264 VAC
12 volt nominal (9-16 VDC)
24 volt nominal (19-32 VDC)
48 volt nominal (38-63 VDC)
110 volt nominal (85-140 VDC)

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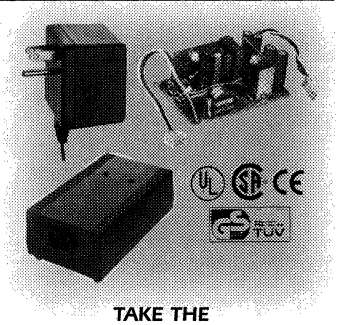
JEROME INDUSTRIES CORPORATION



TAKE THE
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ON

- **External Wall Plug-In/ Desktop & Open Frame**

Power Supplies
(Switchmode, Regulated & Unregulated)
Battery Chargers
(Ni-Cad, NMH, Gel Cell & Lead Acid)
Transformers

- **Standard, Modified and Custom Designs**

Require a Power Supply Which Cannot Be found "On The Shelf" due to Special Voltages/Currents, Connectors, Colors or Markings

Medical • Industrial Controls • Tele/Data Communication • Computer • Instrumentation

Try The Jerome Advantage!

- Free Engineering Assistance
- Modified Design Specialist
- Low Minimum Quantities
- Proven On-Time Delivery
- Designed and Manufactured in the U.S.A. - Deal Direct
- Prototypes Available in 2 Weeks (Standard Designs)

ISO 9001 REGISTERED

Switchmode Regulated DC Power Supplies

Standard Specifications

- Universal Input: 90-260 Vac 47-63 Hz
- Output Regulation: 5% (No Min Load)
- Operating Temperature: 0-40° C
- Maximum Ripple <100 mVp-p
- Short Circuit & Overload Protection
- Designed for Continuous Duty
- SELV Output
- MTBF > 100,000 Hrs @ 40° C

✔ **Power Factor Correction (PFC)**
✔ **Meets IPX1 Requirements**

		CASE SIZE			
		"A"	"L"	"Z"	"X"
Product	Vdc	Amps	Amps	Amps	Amps
WS_150	5	2.50	5.00	8.00	16.00
WS_155	5.5	2.25	4.50	7.30	14.60
WS_160	6	2.08	4.15	6.70	13.40
WS_165	6.5	1.90	3.80	6.20	12.40
WS_170	7	1.75	3.50	5.70	11.40
WS_175	7.5	1.65	3.30	5.30	10.60
WS_180	8	1.55	3.10	5.00	10.00
WS_190	9	1.50	3.00	4.80	9.60
WS_110	10	1.35	2.70	4.30	8.60
WS_111	11	1.25	2.50	4.00	8.00
WS_112	12	1.25	2.50	4.00	8.00
WS_113	13	1.15	2.30	3.70	7.40
WS_114	14	1.08	2.15	3.40	6.80
WS_115	15	1.00	2.00	3.20	6.40
WS_116	16	0.93	1.85	3.00	6.00
WS_118	18	0.83	1.65	2.70	5.40
WS_120	20	0.75	1.50	2.40	4.80
WS_122	22	0.68	1.35	2.20	4.40
WS_124	24	0.63	1.25	2.00	4.00
WS_126	26	0.58	1.15	1.85	3.70
WS_128	28	0.54	1.07	1.70	3.40
WS_130	30	0.50	1.00	1.70	3.40
WS_132	32	0.50	1.00	1.60	3.20
WS_136	36	0.45	0.90	1.40	2.80
WS_140	40	0.40	0.80	1.30	2.60
WS_144	44	0.38	0.75	1.20	2.40
WS_148	48	0.35	0.70	1.10	2.20
WS_301	+ 5/+ 12/-12	---	2/.75/.75	4/1/1	8/2/2
WS_302	+ 5/+ 15/-15	---	2/.6/.6	3/1/1	6/2/2
WS_201	+ 12/-12	---	1.2/1	3/1	6/2
WS_202	+ 15/-15	---	1/1	2.2/1	4.4/2
WS_203	+ 20/-20	---	.75/.75	1.4/1	2.8/2
WS_204	+ 24/-24	---	.625/.625	1/1	2/2
WS_205	+ 5/-5	---	4/1	7/2	12/4
WS_206	+ 5/+ 12	---	3/1	4/2	12/2
WS_207	+ 5/+ 15	---	2.5/1	4/1.6	12/2
WS_208	+ 5/+ 20	---	3/.5	6.5/.5	13/1
WS_209	+ 5/+ 24	---	3/.5	6.5/.5	13/1

Specify Case WSL150='L" CASE

Linear Regulated DC Power Supplies

Standard Specifications

- Input: 120 Vac 60 Hz, 220/240 Vac 50/60 Hz,115/230 Vac 50/60 Hz
- Output Regulation: 5% (No Min Load)
- Operating Temperature: 0-40° C
- Maximum Ripple <10 mVp-p
- Short Circuit & Overload Protection
- Designed for Continuous Duty
- SELV Output
- MTBF > 200,000 Hrs @ 40° C
- Wall Plug-In or Desktop Configurations

(Partial Listings)

Wall Plug-In	Desk Top	Input Voltage	Case	Output Voltage	Output Amps
---	EXD151L	115/230	X	5	0.85
RH110L	RHD110L	120	H	5	1.00
RF101L	RFD101L	120	F	5	1.20
---	EXD110F	230	X	5	1.75
RK110F	RKD110F	120	K	5	2.00
---	EYD151F	115/230	Y	5	2.50
---	RYD101F	120	Y	5	3.50
---	EKD154L	115/230	K	9	0.60
RK104F	RKD104F	120	K	9	1.00
PIDB-201	---	120	B	12	0.30
---	EKD152L	115/230	K	12	0.50
RH102L	RHD102L	120	H	12	0.50
---	EKD102L	230	K	12	0.60
RK102F	RKD102L	120	K	12	1.00
---	EXD102F	230	X	12	1.00
---	RYD102F	120	Y	12	2.00
---	RYD121F	120	Y	13.8	2.00
RH105L	RHD105L	120	H	15	0.50
RK105F	RKD105F	120	K	15	0.80
---	RYD105F	120	Y	15	1.60
---	EHYD155	115/230	Y	15	1.60
RK103 F	RKD103F	120	K	24	0.50
---	RYD103F	120	Y	24	1.00
RK119L	RKD119L	120	K	40	0.25
RK109F	RKD109F	120	K	48	0.25
---	RYD109F	120	Y	48	0.50
---	RYD210F	120	Y	5/-5	3.5/.1
---	RYD222F	120	Y	5/12	.7/1.5
RK221F	RKD221	120	K	5/12	1.2/.3
---	RYD221F	120	Y	5/12	3/.4
RK207F	RKD207F	120	K	+7/-8	1.2/.1
PIDF-60	---	120	F	+9/-9	.5/.15
PIDH-50	---	120	H	12/-12	.2/.2
RK202L	RKD202L	120	K	12/-12	.5/.5
---	RYD232F	120	Y	12/-12	1/1
RH303L	RHD303L	120	H	5/12/-12	.5/.1/.1
RK303F	RKD303F	120	K	5/12/-12	.6/.2/.2
RK311F	RKD311F	120	K	5/12/-12	1/.2/.2
---	EXD306F	230	X	5/12/-12	1.5/.1/.1
---	EYD353F	115/230	Y	5/12/-12	1.5/.12/.12
---	RYD301F	120	Y	5/12/-12	2.5/.25/.25

All designs are Approved or meet UL, CSA, TUV and CE requirements for Information Technology or Medical requirements.
Due to space limitations please call Customer Service for additional features on these products. We offer a complete product line of power supplies and battery chargers. **Deal Direct for fast response - Jerome Industries.**

Call Engineering Services (908) 353-5700 and ask for a "FREE" Catalog.
Jerome Industries Corp. 730 Division Street, Elizabeth, N.J. 07201 • Fax (908) 353-1021
Full On-Line Catalog Available at www.jeromeindustries.com

Lead Acid / Gel Cell Battery Chargers

Standard Specifications

- Input: 120 Vac 60 Hz, 220/240 Vac 50/60 Hz, 115/230 Vac 50/60 Hz, 90-260 Vac
- Operating Temperatures: 0-40°C
- Output Voltage Tolerance: +/- 1%
- Short Circuit & Overload Protection
- Designed for Continuous Duty
- Wall Plug-in or Desktop Configurations

Float Mode Chargers (Partial Listings)

Wall Plug-in	Desk Top	Input Voltage (Vin)	Case	Cells	End of Charge Volt	Avg. Charge Amps
PICB-201	---	120	B	2	4.6	0.35
PICHx-301	ILCHx-301	230	H	2	4.6	0.35
---	ILCK-301	115/230	K	2	4.6	1.00
PICK-201	ILCK-201	120	K	2	4.6	1.50
---	ILCY-201	120	Y	2	4.6	3.00
PICHx-302	ILCHx-302	230	H	3	6.9	0.35
PICB-202	---	120	B	3	6.9	0.35
PICH-202	ILCH-202	120	H	3	6.9	0.70
PICF-202	ILCF-202	120	F	3	6.9	1.00
---	ILCK-302	115/230	K	3	6.9	1.00
PICK-202	ILCK-202	120	K	3	6.9	1.50
---	ILCY-202	120	Y	3	6.9	3.00
PICB-203	---	120	B	4	9.2	0.30
PICH-203	ILCH-203	120	H	4	9.2	0.60
PICFx-303	ILCFx-303	230	F	4	9.2	0.60
PICF-203	ILCF-203	120	F	4	9.2	0.80
PICK-203	ILCK-203	120	K	4	9.2	1.20
---	ILCY-303	115/230	Y	4	9.2	2.00
---	ILCY-203	120	Y	4	9.2	2.50
PICB-204	---	120	B	6	13.8	0.20
PICFx-304	ILCFx-304	230	F	6	13.8	0.50
PICH-204	ILCH-204	120	H	6	13.8	0.50
PICF-204	ILCF-204	120	F	6	13.8	0.70
PICK-204	ILCK-204	120	K	6	13.8	1.00
---	ILCY-304	115/230	Y	6	13.8	1.50
---	WCL301	90-260	L	6	13.8	2.00
---	ILCY-204	120	Y	6	13.8	2.00
---	WCZ303	90-260	Z	6	13.8	3.20
---	WCL302	90-260	L	12	27.6	1.00
---	WCZ304	90-260	Z	12	27.6	1.60

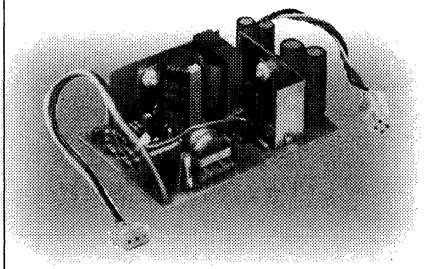
Dual Mode Chargers (Partial Listings)

Plug-in	Desk Top	Input Voltage (Vin)	Case	Cells	High Charge Volts	End Char Volt	Avg. Char Amps
PICH-209	ILCH-209	120	H	2	5.0	4.6	0.70
PICF-209	ILCF-209	120	F	2	5.0	4.6	1.00
PICK-209	ILCK-209	120	K	2	5.0	4.6	1.50
PICHx-310	ILCHx-310	230	H	3	7.5	6.9	0.50
PICH-210	ILCH-210	120	H	3	7.5	6.9	0.70
PICF-210	ILCF-210	120	F	3	7.5	6.9	1.00
PICK-210	ILCK-210	120	K	3	7.5	6.9	1.50
---	WCL31 0	90-260	L	3	7.5	6.9	3.00
---	WCZ31 0	90-260	Z	3	7.5	6.9	5.00
PICFx-311	ILCFx-311	230	F	4	9.9	9.2	0.30
PICH-211	ILCH-211	120	H	4	10.0	9.2	0.60
PICF-211	ILCF-211	120	F	4	10.0	9.2	0.80
---	ILCK-6	115/230	K	4	9.9	9.2	0.80
PICK-211	ILCK-211	120	K	4	10.0	9.2	1.20
PICFx-312	ILCFx-312	230	F	6	14.9	13.8	0.50
PICH-212	ILCH-212	120	H	6	15.0	13.8	0.50
---	ILCK-5	115/230	K	6	14.9	13.8	0.70
PICF-212	ILCF-212	120	F	6	15.0	13.8	0.70
PICK-212	ILCK-212	120	K	6	15.0	13.8	1.00
---	ILCY-8	115/230	Y	6	14.9	13.8	1.50
---	WCL312	90-260	L	6	14.9	13.8	2.00
---	ILCY-212	120	Y	6	15.0	13.8	2.00
---	WCZ312	90-260	Z	6	14.9	13.8	3.20
PICHx-313	ILCHx-313	230	H	12	29.8	27.6	0.25
---	ILCY-9	115/230	Y	12	29.8	27.6	0.75

Switchmode Regulated DC Open Frame Power Supplies

Standard Specifications

- Universal Input: 90-260 Vac 47-63 Hz
- Output Regulation: 5% (No Min Load)
- Operating Temperatures: 0-75°C
- Maximum Ripple < 100 mVp-p
- Short Circuit & Overload Protection
- Designed for Continuous Duty
- SELV Output
- MTBF > 100,000 Hrs @ 75°C
- Customer Specified Input & Output Configurations



		BOARD SIZE	
		"L"	"Z"
Product	Vdc	Amps	Amps
CS_150	5	5.00	8.00
CS_155	5.5	4.50	7.30
CS_160	6	4.15	6.70
CS_165	6.5	3.80	6.20
CS_170	7	3.50	5.70
CS_175	7.5	3.30	5.30
CS_180	8	3.10	5.00
CS_190	9	3.00	4.80
CS_110	10	2.70	4.30
CS_111	11	2.50	4.00
CS_112	12	2.50	4.00
CS_113	13	2.30	3.70
CS_114	14	2.15	3.40
CS_115	15	2.00	3.20
CS_116	16	1.85	3.00
CS_118	18	1.65	2.70
CS_120	20	1.50	2.40
CS_122	22	1.35	2.20
CS_124	24	1.25	2.00
CS_126	26	1.15	1.85
CS_128	28	1.07	1.70
CS_130	30	1.00	1.70
CS_132	32	1.00	1.60
CS_136	36	0.90	1.40
CS_140	40	0.80	1.30
CS_144	44	0.75	1.20
CS_148	48	0.70	1.10
CS_301	+5/+12/-12	2/.75/.75	4/1/1
CS_302	+5/+15/-15	2/.6/.6	3/1/1
CS_201	+12/-12	1.2/1	3/1
CS_202	+15/-15	1/1	2.2/1

Specify Board CSL150='L" CASE

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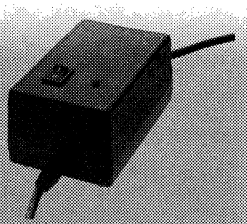
- Contact Jerome's Customer Service Department who will obtain your specifications (Engineering assistance is available).
- We will forward a quotation showing complete electrical and mechanical specifications, price and delivery information for prototypes and production.
- Place a prototype order for pre-production review.
- Upon satisfactory approval of the prototype a production order can be placed. Production units are available with your logo or information.
- All units designed and produced in the U.S.A.



More power supplies and battery chargers on the following page.

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Jerome Industries Corp. 730 Division Street, Elizabeth, N.J. 07201 • Fax (908) 353-1021
Full On-Line Catalog Available at www.jeromeindustries.com

UnRegulated DC Power Supplies

Standard Specifications

- Input: 120 Vac 60 Hz, 220/240 Vac 50/60 Hz, 115/230 Vac 50/60 Hz
- Operating Temperatures: 0-40°C
- Short Circuit & Overload Protection
- Designed for Continuous Duty
- Wall Plug-in or Desktop Configurations
- **Available in Medical UL 2601.1, CSA 22.2 #601.1, EN 60601.1 & CE Designs**

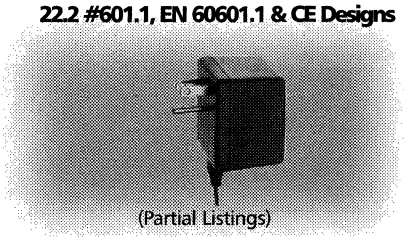
(Partial Listings)

Wall Plug-In	Desk Top	Case	Input Voltage	Output Voltage	Output Amps
PIDB-155	ILDB-155	B	120	1.8	1.50
PIDC-74	ILDC-74	C	120	6	1.00
PIDH-85	ILDH-85	H	120	8.5	0.75
---	ILDF-30	F	240	9	0.10
PIDB-28	ILDH-24	H	115	9	0.50
PIDHE-1	ILDHE-1	H	240	9	0.50
---	ILDK-109	K	115/230	9	1.00
PIDF-65	ILDF-65	F	120	9	1.40
---	ILDF-55	F	120/220	10	1.20
PIDF-37	ILDF-37	F	115	10.5	1.00
---	ILDK-58	K	115/230	12	0.50
PIDB-205	ILDB-205	B	120	12	0.50
PIDH-65	ILDH-165	H	120	12	0.70
PIDH-108	ILDH-108	H	120	12	1.00
---	ILDK-118	K	115/230	12	1.25
---	ILDM-232	M	115/230	12	1.75
PIDK-3	ILDK-3	K	120	12	3.00
---	ILDY-26	Y	115/230	12	3.00
---	ILDY-50	Y	230	12	4.00
PIDH-9	ILDH-9	H	120	12/-12	.5/.15
PIDB-42	ILDB-42	B	120	13.5	0.10
PIDJ-1	ILDJ-1	J	117	15	0.25
PIDF-104	ILDF-1044	F	120	15	1.00
PIDB-163	ILDB-163	B	120	16.2	0.33
PIDH-106	ILDH-106	H	120	18	0.71
PIDF-49	ILDM-33	M	230	18	1.20
---	ILDM-21	M	120	18	2.00
---	ILDY-25	Y	120	20	3.50
PIDJ-34	ILDJ-34	J	120	23	0.25
PIDB-224	ILDB-224	B	120	24	0.25
PIDH-107	ILDH-107	H	120	24	0.50
PIDF-124	ILDF-124	F	120	24	1.00
---	ILDY-24	Y	120	24	2.00
PIDJ-113	PIDJ-113	J	120	40	0.30
PIDF-56	ILDF-53	F	120	48	0.62
---	ILDM-53	M	230	48	0.62
PIDH-66	ILDH-66	H	120	82	0.05

AC to AC Transformers

Standard Specifications

- Input: 120 Vac 60 Hz, 220/240 Vac 50/60 Hz, 115/230 Vac 50/60 Hz
- Operating Temperatures: 0-40°C
- Short Circuit & Overload Protection
- Designed for Continuous Duty
- Wall Plug-in or Desktop Configurations
- **Available in Medical UL 2601.1, CSA 22.2 #601.1, EN 60601.1 & CE Designs**



(Partial Listings)

Wall Plug-In	Desk Top	Case	Input Voltage	Output Voltage	Output Amps
PITB-34	ILTB-34	B	120	2.3	2.83
PITB-139	ILTB-139	B	120	3.6	0.70
PITE-48	ILTE-48	E	120	4.8	0.10
---	ILTH-10	H	120/240	6	1.00
PITB-63	ILTB-63	B	120	7.5	1.50
PITB-209	ILTB-209	B	115	9	0.35
PITH-37A	ILTH-37A	H	120	9	1.30
PITH-15	ILTH-15	H	120	10	1.50
PITB-28	ILTS-28	B	120	12	0.25
---	ILTK-8	K	220/240	12	0.93
PITB-205	ILTB-205	B	120	12	1.00
PITB-140	ILTB-140	B	120	12	1.25
---	ILTK-17A	K	120/240	12	1.70
PITF-23	ILTF-23	F	120	12	2.00
---	ILTM-10	M	120	12	4.00
PITB-67	ILTB-67	B	120	13.5	1.10
PITH-61	ILTH-61	H	100	14	1.40
PITB-152	ILTB- 152	B	120	15	0.65
---	ILTF-62	F	120/220	16	1.00
PITF-43	ILTF-43	F	120	16	2.50
---	ILTY-30	Y	115/230	16	3.50
PITH-124	ILTH-124	H	110	18	0.80
---	ILTK-24	K	115/230	18	1.11
PITF-28A	ILTF-28A	F	120	18	2.00
---	ILTK-14	K	115/230	20	1.00
PITB-224	ILTB-224	B	120	24	0.50
---	ILTM-2	M	230	24	2.00
---	ILTY-12B	Y	120	24	3.00
PITF-22	ILTF-22	F	120	25.4	1.00
PITF-26	ILTF-26	F	120	27	1.00
PIT-44	ILTF-44	F	120	28.5	1.20
---	ILTX-28	X	230	115	1.00

Ni-Cad/NiMH Battery C/10 and Fast Battery Chargers

Standard Specifications

- Input:120 Vac 60 Hz, 220/240 Vac 50/60 Hz, 115/230 Vac 50/60 Hz, 90-260 Vac, 47-63 Hz
- Operating Temperatures: 0-40°C
- Short Circuit & Overload Protection
- Designed for Continuous Duty
- Wall Plug-in or Desktop Configurations

Fast Chargers

- Multiple Level Regulated Current Charge
- Automatic Switch back to Low level Charge
- Delta-V End of Charge Detection circuit with Time-Out back up circuit
- LED's indicate "Power On" & Blinks during "Low Charge" state

(Partial Listings)

Wall Plug-in	Desk Top	Input Voltage	Case	Charge Voltage	Charge Amps	# Cells
---	ILCX-10	115/230	X	7.5	1.00	6
PICK-30	ILCK-30	120	K	9	0.75	6
PICKX-58	ILCKX-58	230	K	18	0.30	12
PICKX-56	ILCKX-56	230	K	12	0.40	8
PICK-31	ILCK-31	120	K	12	0.60	8
PICKX-57	ILCKX-57	230	K	15	0.35	10
PICK-51	ILCK-51	120	K	15	0.50	10
PICK-50	ILCK-50	120	K	18	0.50	12

C/10 Overnight Chargers

- Unregulated Constant Current (Regulated Available)
- Output Current Tolerance: +/- 10% @ Vin Nominal

(Partial Listings)

Wall Plug-In	Desk Top	Input Voltage	Case	Charge Voltage	Charge Amps	Number of Cells
PICE-17	---	120	E	4.5	0.01	3
PICE-46	---	120	E	5.8	0.03	4
PICB-121	----	115/230	B	6.5	0.30	4
---	ILCB-6	230	B	11.0	0.05	7
PICE-64	---	120	E	14.5	0.05	10
PICK-27	ILCK-27	120	K	14.5	0.70	10
PICB-130	---	120	B	17.4	0.12	12
PICH-9	ILCH-9	120	H	34.8	0.40	24

ALL UNITS
Available Specifications:

DC Inputs for DC to DC Operation ■ Separate Battery Charger Output ■ Power On/Off Switch ■ Additional Noise and/or Surge Protection ■ Expanded Operating Temperatures ■ LED to Indicate Power "On" ■ Output Cordset and Connector Configurations ■ Case Color, Markings and Company Logos ■ Custom Features

Agency Specifications:

UL 544 / 2601.1 / 1310 / 1012 / 1950
60950 CSA 22.2 # 125 / 601.1 / 223 / 950
TUV and CE for EN 60601.1 / 60950

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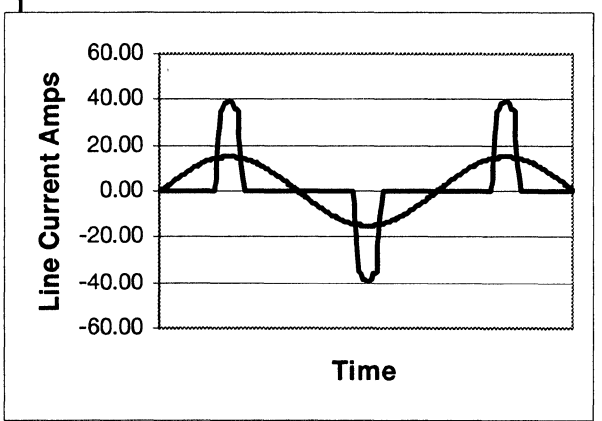
IGBT based lossless switching
Computer aided design ensures reliability
State of the Art automated manufacturing
Dedicated staff to support your success



Graph showing advantage of PFC (Power Factor Correction) over conventional rectification in reducing line currents and harmonic distortion.

Series 1000 500-1000 Watts

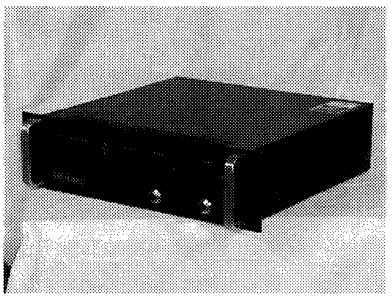
Mains Input - 110 or 220 Vac
Output voltage from 500 V to 60 kV
19" Rack mount 5.25",17" HL

DCS 102 1000 Watts

Active PFC of 0.98
Universal Input 90-262 Vac
Output voltage from 500 V to 60 kV
19" Rack mount 5.25",17" HL

DCS 202 2000 Watts

Active PFC of 0.98 optional
Mains Input - 180-262 Vac
Output voltage from 500 V to 60 kV
19" Rack mount 5.25",17" HL



DCS 302 3000 Watts

Active PFC of 0.98 optional
Mains Input - 180-262 Vac
Output voltage from 500 V to 60 kV
19" Rack mount 5.25",17" HL

DCS 502_{LV} 5000 Watts

3ϕ input 208, 400 or 480 Vac
Output voltage from 500 V to 8 kV
19" Rack mount 7",17" HL

DCS 502_{HV} 5000 Watts

3ϕ input 208, 400 or 480 Vac
Output voltage from 10 kV to 60 kV
19" Rack mount 7",17" HL

DCS 203 20000 Watts

3ϕ input 180-254 Vac
Output voltage from 60 kV to 160 kV
Reliable Oil Insulated HV output
19" Rack mount 19-1/4",20" HL
Electronic soft start reduces inrush current

Features

Reversible and floating outputs available
Digital Voltage and Current Metering
Customized to meet your OEM needs
Instrumented or low cost blank front panel available
Automatic Voltage/Current crossover
Excellent ripple and stability
Designed to exceed UL1012, EN61010, UL544
Safety Agency Approval Available (Consult Factory)
RS-232, IEEE-488 or CANBUS remote interface

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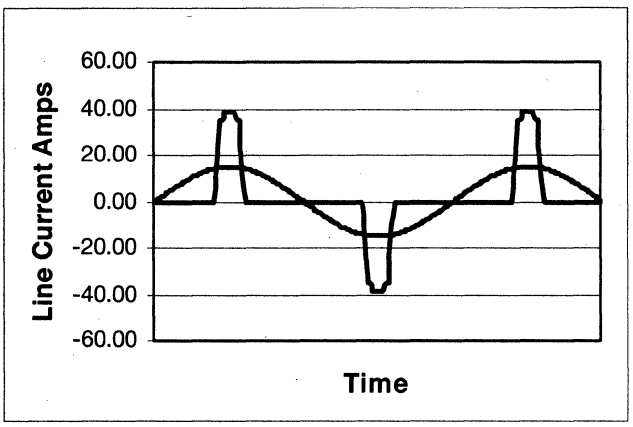
Dedicated staff to support your success



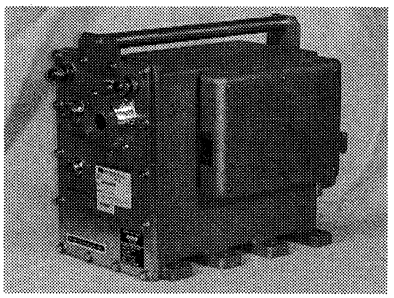
Graph showing advantage of PFC (Power Factor Correction) over conventional rectification in reducing line currents and harmonic distortion.

XRSE-102 1000 Watts

Universal Input - 90-254 Vac
Single Ended Output up to 160 kV
Constant power at 30% Output
Dual Filament Control
Rugged Design for Continuous Use
Internally Protected from Tube Arcs
Portable unit on wheels 19",19",17" HWL

XRDE-102 2000 Watts

Universal Input - 90-254 Vac
Double Ended Output up to 320 kV
Constant power at 30% Output
Dual Filament Control
Rugged Design for Continuous Use
Internally Protected from Tube Arcs
Portable unit on wheels 19",19",17" HWL



XRSE-302 3000 Watts

Universal Input - 90-254 Vac
Single Ended Output up to 160 kV
Dual Filament Control
Rugged Design for Continuous Use
Internally Protected from Tube Arcs
Constant power at 30% Output
Portable unit on wheels 19",19",17" HWL

XRDE-302 4500 Watts

Universal Input - 90-254 Vac
Double Ended Output up to 320 kV
Dual Filament Control
Rugged Design for Continuous Use
Internally Protected from Tube Arcs
Constant power at 30% Output
Portable unit on wheels 19",19",17" HWL

XRSE-502 5000 Watts

Mains Input - 3ϕ 180-254 Vac
Single Ended Output up to 60 kV
Constant power at 30% Output
Closed Loop Filament Current Control
Internally Protected from Tube Arcs
19" Rack Mount Unit 8-3/4",17" HL

Features

Closed Loop Emission Control
Low Stored Energy
Customized to meet your OEM needs
Excellent ripple and stability
Designed to exceed UL1012, EN61010, UL544
Safety Agency Approval Available (Consult Factory)
RS-232, IEEE-488 or CANBUS remote interface
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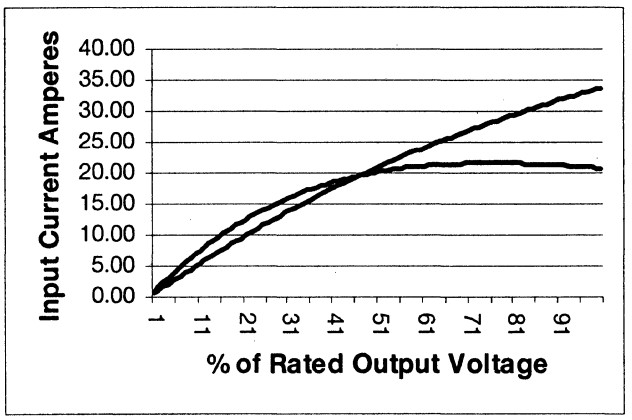
Dedicated staff to support your success



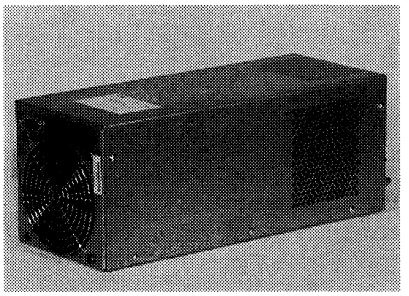
Graph showing advantage of MCP (modified current profile) over traditional constant current for the $LS2500_{LV}$.

$LS102_{LV}$ 1200 J/s peak
Active PFC of 0.98
Universal Input 90-262 Vac
MCP, Output voltage from 500 V to 3 kV
Small 3.5",5",14" HWL

$LS1500_{HV}$ 1500 J/s peak
Selectable input 110/220 Vac
Output voltage from 5 kV-30 kV
Small 6",6",14" HWL
TUV approved to IEC-601-1

$LS1500_{HVT}$ 1500 J/s peak
Selectable input 110/220 Vac
Output voltage up to 30 kV
Internal DC Thyratron Heater/Reservoir
Small 6",6",14" HWL
TUV approved to IEC-601-1

Safety Agency Approval Available on Most Models (Consult Factory)



$LS202_{LV}$ 2500 J/s peak
Active PFC of 0.98
MCP, Output voltage from 500 V to 3 kV
Small 5",5",12" HWL
Auxillary 24 Vdc @ 6 Amps

$LS2500_{LV}$ 3100 J/s peak
Active PFC of 0.98
MCP, Output voltage from 500 V to 8 kV
Small 6",6",14" HWL
TUV approved to IEC-601-1

$LS2500_{HV}$ 2500 J/s peak
Active PFC of 0.98
MCP, Output voltage from 10 kV to 8 kV
Small 6",6",14" HWL

$LS402_{LV}$ 5000 J/s peak
Active PFC of 0.98
MCP, Output voltage from 500 V to 8 kV
Rack mount 5U tall and 12" deep

$LS6000_{LV}$ 7000 J/s peak
3ϕ input 208, 400 or 480 Vac
Approved to UL-1012, EN-60610
Output voltage from 500 V to 5 kV
Rack mount 5U tall and 17" deep

$LS8000_{LV}$ 10 kJ/s peak
3ϕ input 208, 400 or 480 Vac
Approved to UL-1012, EN-60610
Output voltage from 500 V to 5 kV
Rack mount 5U tall and 17" deep

$LS123_{LV}$ 15 kJ/s peak
3ϕ input 208, 400 or 480 Vac
Approved to UL-1012, EN-60610
Output voltage from 500 V to 5 kV
Rack mount 7U tall and 17" deep

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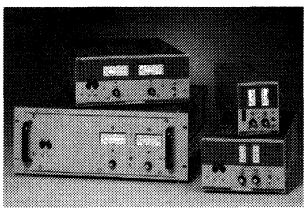
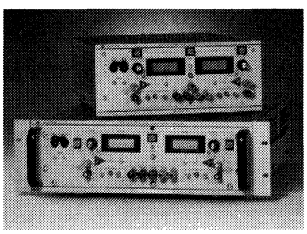


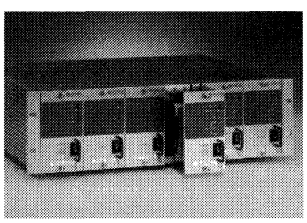
d-c unipolar power
50-1000 Watts
- Conventional filtering and high speed mode (no output filter), user selectable.
- Fast analog programming: up to 1 Volt per microsecond. in high speed mode.
- Precision stabilization: 0.001% source, 0.002% load.

Group ATE Power Supplies
www.kepcopower.com/ate.htm



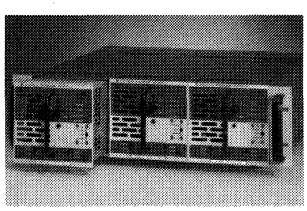
d-c bipolar power
100-400 Watts
- Source and sink, four quadrant operation.
- Fast analog programming: up to 11 Volts per microsecond.
- Precision stabilization: 0.001% source, 0.002% load.
- Digital programming cards for GPIB, (12 & 16 bit resolution).
- Long range serial bus and VXI.

Group BOP Power Supplies
www.kepcopower.com/bop.htm



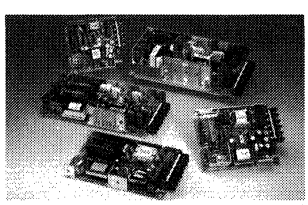
d-c plug-in,
hot swappable power
50-150 Watts
- Wide range a-c input.
- Built-in isolation diodes for hot swap.
- Current share for N+1 redundancy.
- Mount 6-8 abreast in 3U x 19″ housing.

Group HSF Power Supplies
www.kepcopower.com/hsf.htm



d-c plug-in,
hot swappable power
1000-1500 Watts
- Wide range a-c input (1000W models).
- Power factor correction.
- Current share for N+1 redundancy.
- Mount 3 abreast in 3U x 19″ housing.

Group HSP Power Supplies
www.kepcopower.com/hsp.htm



d-c modular power
15-150 Watts
- Wide range a-c input.
- Low profile, open frame construction (optional enclosure).
- Low cost.
- 25 models, 5V to 48V.

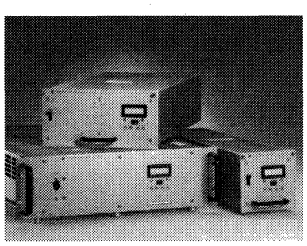
Group FAW Power Supplies
www.kepcopower.com/faw.htm

d-c programmable bench power
100 Watts
- Keyboard controlled, GPIB remote digital programming.
- Self calibrating.
- VISA software for system integration.
- Precision stabilization: 0.01% voltage, 0.02% current.

Group ABC Power Supplies
www.kepcopower.com/abc.htm

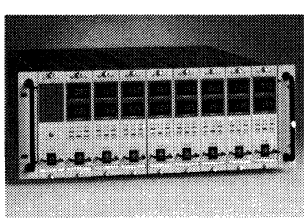
d-c programmable
high voltage power
200 Watts
- Keyboard controlled, GPIB remote digital programming.
- Fast analog programming.
- 0-500V, 0-1000V, 0-2000V.
- Precision stabilization: 0.005% voltage, 0.015% current.

Group BHK-MG Power Supplies
www.kepcopower.com/bhkmg.htm



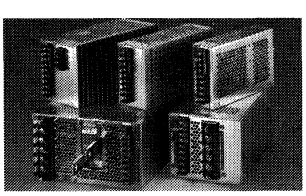
d-c programmable system power
360-1080 Watts
- Long range serial bus, GPIB, VXI control.
- Plug-in construction (360 & 720 models).
- Built-in enable/disable and polarity relays.
- Precision stabilization: 0.002% voltage, 3mA current.

Group MAT Power Supplies
www.kepcopower.com/mat.htm



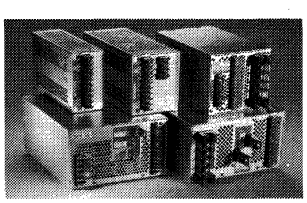
d-c programmable system power
200 Watts
- Plug-in design, up to 9 units abreast in 4U x 19″ rack.
- Digital control: GPIB, long range serial bus, VXI.
- N+1 redundancy, hot swap capability.
- Precision stabilization: 0.002% voltage, 0.02% current.

Group MST Power Supplies
www.kepcopower.com/mst.htm



d-c modular power
50-1500 Watts
- Selectable 115/230V a-c input.
- Fully enclosed, industrial construction.
- 31 models, 3.3V to 48V.

Group RAX Power Supplies
kepcopower.com/rax.htm



d-c modular power
100-1500 Watts
- Wide range a-c input.
- Power factor correction.
- Heavy duty, enclosed industrial construction.
- 35 models, 3.3V to 48V.

Group RCW Power Supplies
www.kepcopower.com/rcw.htm

AN ISO 9001 COMPANY

KEPCO®

THE POWER SUPPLIER™
SINCE 1946

For complete specifications send for Kepco's Catalog 146-1862.
Data and specifications subject to change without notice.

KEPCO, INC. • 131-38 Sanford Ave., Flushing, NY 11352 USA • Tel: (718) 461-7000 • Fax: (718) 767-1102 • E-Mail: hq@kepcopower.com • URL: http://www.kepcopower.com

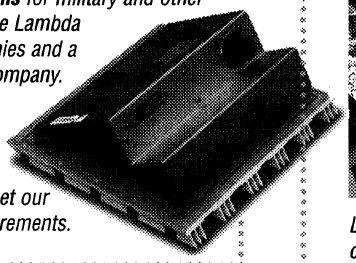
VISIT OUR WEBSITE: www.kepcopower.com

LAMBDA Novatronics Inc.

2855 W. McNab Road • Pompano Beach, FL 33069
HOTLINE: 800 942 5205 • FAX: 954 984 2479 • EMAIL: LNIMARKET@aol.com
WEBSITE: www.lambdanovatronics.com

who are we

*For over 30 years Lambda Novatronics Inc. (LNI) has been one of the leading designers and manufacturers of special application **electronic power subsystems** for military and other "high-end" applications. We are a wholly owned subsidiary of the Lambda Group, which is one of the world's largest power supply companies and a division of Siebe plc, the U.K.'s largest diversified engineering company.*



The Total Power Solution

The cornerstone of LNI's business is our ability to offer highly produceable product designs and standard product to meet our customers' challenging electrical, mechanical and financial requirements.

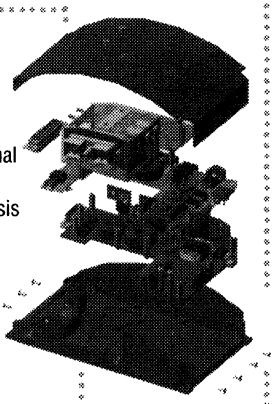
- CUSTOM POWER SUPPLIES • classic design to specification • low voltage switching power supplies • AC Input, DC Input or dual Inputs • single or multiple DC outputs
- MODULE BASED CUSTOM PRODUCT: Based on standard product Building Blocks: lower NRE, shorter lead time, lower overall risk
- CONTRACT MANUFACTURING: In response to industry needs, LNI offers turn-key Build-to-Print service to our customers for power products. With a focus on: • Technology/Reliability Upgrade • Cost: Lower recurring cost • Schedule: Seamless transition from your factory to ours
- OFF-THE-SHELF • HPM Series: 1000W single output modules • MIL-28-100 Series: 100W DC/DC converters • PFC Modules • MIL-1PH-300 Series: 200-300W AC/DC converters • MIL-270-300 Series: 200-400V input, single output, power to 300W. • VME Power

design & development

LNI's primary design goal is manufacturability. The results:
• Modular Designs • Highly Reliable • Highly repairable
• Competitively Priced • Meets all systems needs

DESIGN RESOURCES & TOOLS

- ELECTRICAL DESIGN: *SPICE:* circuit analysis, small and large signal analysis using latest models, loop analysis and transient response *MATH CAD:* transformer design, EMI filter design, efficiency analysis *RPP:* reliability prediction (MTBF) Software in accordance with MIL-HDBK-217
- MECHANICAL DESIGN: *SDRC's IDEAS:* three dimensional solid modeling software *NISA II:* finite element analysis, thermal and structural modeling software *ORCAD:* printed wiring board layout software *INTERNAL DESIGN:* area study and weight calculation software (Fortran/Visual Basic) with library of parts



off the shelf power supply solutions

LNI realizes that development and recurring costs are constantly under pressure. For programs and projects that can be met using standard product LNI has the solution.

- Designs based on DC to DC modules (see DC-DC Converter section)
- Products tailored to specific system needs.
- Stand alone product solutions available from stock.

awards

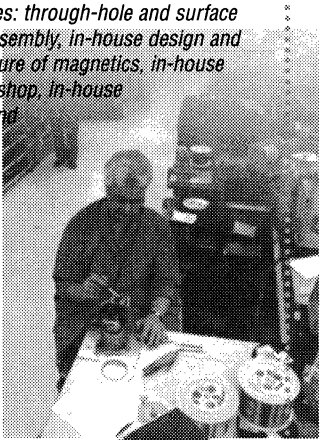
***Lockheed Martin** has designated LNI as a STAR supplier. This is the highest level of recognition within Lockheed Martin's Continuous Improvement Supplier Program.*

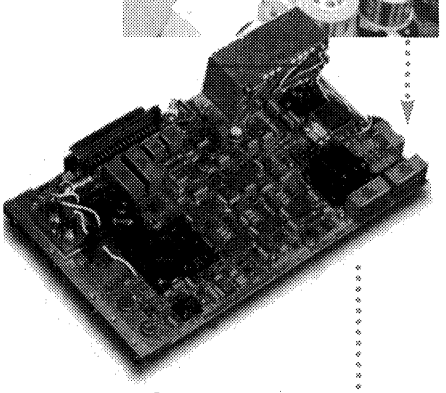
***Raytheon Texas Instrument** has recognized LNI for the successful implementation of the principles of Continuous Flow Manufacturing.*

***McDonnell Douglas** (Boeing) has endorsed LNI as a Bronze level supplier in association with our performance in the areas of overall quality and on-time delivery as well as certification of our Statistical Process Control (SPC) system.*

production

LNI has excellent internal manufacturing capabilities: through-hole and surface mount assembly, in-house design and manufacture of magnetics, in-house machine shop, in-house coating and finishing.





testing

LNI offers its customers a full array of internal testing services including:
***Environmental Stress Screening:** Temperature cycling (including simultaneous temperature/vibration measurement) is conducted per customer profile.*
***Electro-Magnetic Interference:** EMI testing per MIL-STD-461 is performed in-house.*
***Electrical Testing:** LNI's production test group performs all module and final acceptance testing utilizing in-house designed and built fixtures.*

reliability

Quality at LNI means error-free output which meets the needs of our internal and external customers. • TQM Systems • ISO 9001 registered (since 1994) • Six Sigma program SPC (Statistical Process Control)

SEE OUR LINE OF DC-DC CONVERTERS
Volume D, Section 4025
D•2004

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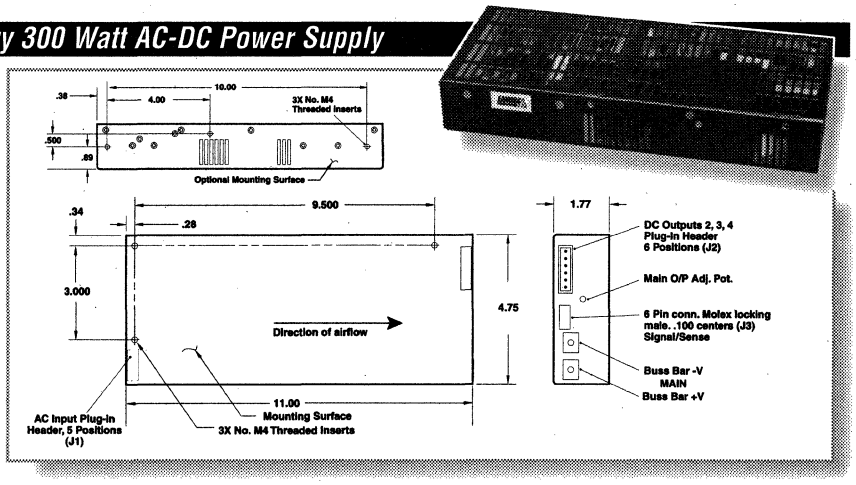
WEBSITE: www.lambdanovatronics.com

MIL-1PH-300 SERIES — Military 300 Watt AC-DC Power Supply

Single and Multiple Outputs, Up to 300 Watts

- **Wide Input Range:**
  - 85 - 265 VAC
  - 47 - 63 Hz
  - Single Phase
  - Power Factor Corrected
- **Rugged:**
  - Compliant with MIL-STD-810 Groundbased and Shipboard Mechanical Shock and Vibration
  - MTBF 159,000 Hours
- **Compact Package:**
  - Natural Convection Cooling up to 200 Watts
  - -40°C to +80°C Ambient Operation
  - Two Mounting Orientations
- **Great Value:**
  - Off-the-Shelf
  - Non-Developmental
  - Competitive Price



AC INPUT CHARACTERISTICS

AC Input: 85-265 VAC, 47-63Hz.

Power Factor: 0.95 minimum from 50% to 100% load (at nominal line of 120 VAC).

Efficiency: 70%-Typical at 200 Watts, 75% Typical at 300 Watts.

Inrush Current: The maximum inrush current shall be limited to 75A peak under any combination of line and load.

Input Harmonics: All models conform to IEC 555-2 and EN60555-2.

EMI: CE03 (BB)(NB) MIL-STD-461C Notice 2 Part 2. Conducted EMI conforms to FCC Part 15, Subpart J, Class B and VDE 0871, Curve B.

Input Transient Protection: IEEE-C62.41-1991 location category A2 (A3 with external MOV's). IEC-801, -2, -4, 5 Class 3.

Fusing: AC line is fused internally.

DC OUTPUT CHARACTERISTICS

Output Power: 200 Watts with natural convection cooling; 300 Watts maximum with forced air cooling.

Regulated Voltage: Line and load regulation 1% from no load to full load on main output. 5% for 50% line/load variation on auxiliaries.

DC Output Range: ±5% user adjustable on main output. Auxiliary outputs are fixed.

Ripple Noise: 2% pk-pk typical.

Isolation Rating: 3000VRMS input to output (Selv Construction). 1500VRMS input to chassis ground and 500VRMS output to ground.

Overvoltage Protection: OV protection is provided on single output modules and main output of multiple output modules.

MIL-VME-28 SERIES — Plug-In Military 28VDC Input VMEbus Power

6U, Single Pitch Format VMEbus Power Supply

- Up to 200 Watts Output
- Military and High Reliability Applications
- Standard VMEbus Outputs
- Meets NAVMAT Derating
- Remote On/Off ■ Output Status
- System Reset ■ Isolated Outputs
- Input Voltage Fail
- Standby Output Voltage
- Parallel Capability
- Conduction Cooled
- Competitive Price

DC INPUT CHARACTERISTICS

Input: 18-36 VDC.

EMI: External high frequency filter required. Consult Lambda Novatronics.

Input Reverse Polarity Protection

DC OUTPUT CHARACTERISTICS

Outputs: Up to 200 Watts based on rail temperature. Independently regulated outputs for maximum system performance and reliability.

Parallel: 5V Output has parallel (Option H) capability for higher power and fault tolerant applications.

Remote Sense: 5V Output.

Version 1: 5, +12, -12, 5.1

Version 2: 5, +15, -15, 5.1

Remote On/Off: Short terminal to -VIN to turn ON. Open circuit OFF.

DIAGNOSTICS

System Reset: Open Collector

Input Fail: Open Collector

Output Status: Both visual and TTL Signals for 5 and ±12 or ±15.

Hold-Up: Up to 8ms at 160 Watts.

Efficiency: Greater than 75%.

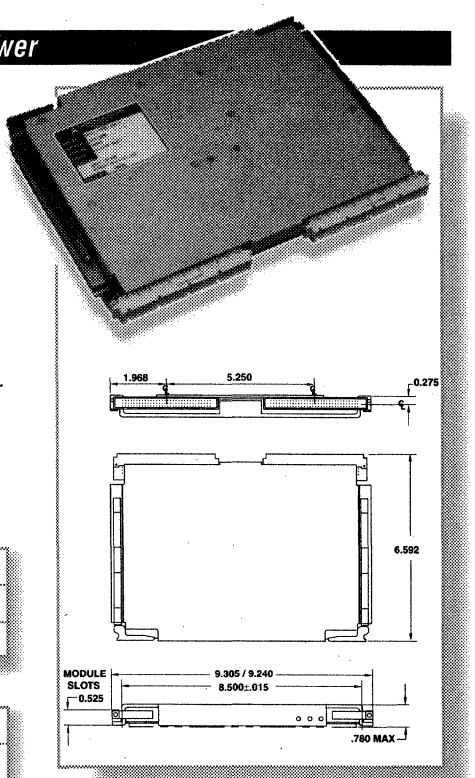
Output Ratings:

VERSION 1

Output Voltage	5	+12	-12	5.1
Ripple (mVp-p)	50	100	100	50
Output Currents	20	4.2	4.2	0.5

VERSION 2

Output Voltage	5	+15	-15	5.1
Ripple (mVp-p)	50	100	100	50
Output Currents	20	3.3	3.3	0.5



Specifications Subject to Change Without Notice

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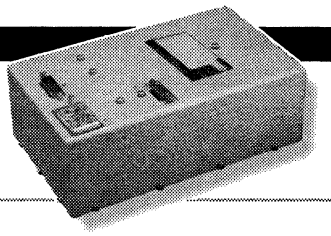
HPM-3PH SERIES — 1000 Watt 3 Phase Military High Power Module



12, 28, and 155 VDC Outputs Up to 1000 Watts

- **Full Military Performance:**
  - High Efficiency
  - Input Transients Per MIL-STD-704D
  - EMI Filtering Per MIL-STD-461C
  - Qualified to MIL-STD-810
- **Compact Design:**
  - High Density- 9 Watts Per Cubic Inch
  - Conduction Cooled
- **Features:**
  - Parallel Operation Up to 10 Units
  - Synchronization
  - Remote On/Off
  - Remote Sense
  - Thermal Protection
  - Overcurrent/Overvoltage Protection
  - Two Year Warranty

AC INPUT CHARACTERISTICS

AC Input: 115/200/VAC, 3 Phase.
Frequency: 47-440 Hz, per MIL-STD-704D.
Nominal Input Current: 3 Phase: 3.7A rms per phase at 1000 Watts Output Power.
Inrush Current Limiting: Less than 18A for 1 millisecond.
Power Factor: 0.89 @ 60 Hz and 0.91 @ 400 Hz for 1000 Watts Output Power.

Specifications Subject to Change Without Notice

EMI: Fully shielded input EMI section complies with MIL-STD-461C part 2, class A1b CD01, CD03, CS01, CS02, CS06, RE02, RS02, RS03.

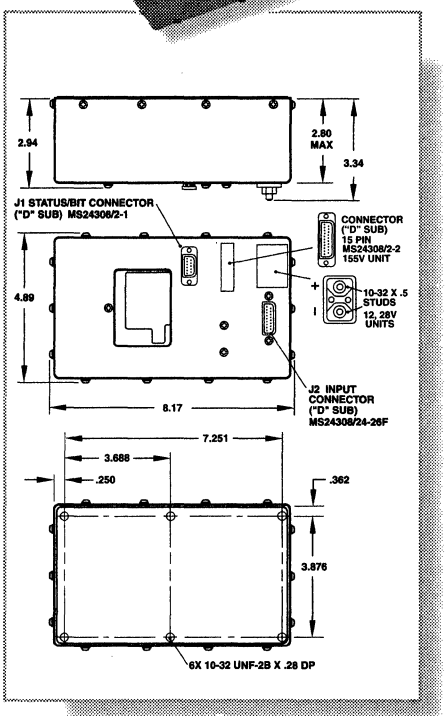
DC OUTPUT CHARACTERISTICS

Output Power: Single output at 12,28,&155 VDC.

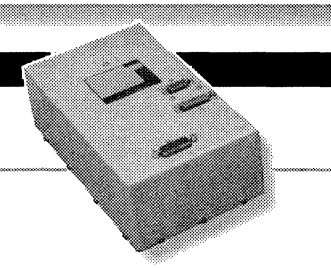
VOLTAGE	MAXIMUM CURRENT (AMPS)	MAXIMUM RIPPLE (MV) P-P	MAXIMUM NOISE (MV) P-P	EFFICIENCY (%)
12	83	120	360	>79
28	36	200	560	>83
155	6.45	←1000 TOTAL→		>85

Regulated Voltage:
Line Regulation: ±0.5%
Load Regulation: ±0.5% for load variations from no load to full load and full load to no load.
Temperature Coefficient: 0.01%/ °C.
Output Overshoot/Undershoot: No Overshoot/Undershoot at turn-on turnoff or input power failure. Limited to 3% of rated voltage under pulse load conditions.
Overcurrent Protection: Protection is current foldback to <30% of full load, with max limits set at <130% of full load. Upon removal of the overload condition, normal operation resumes automatically.
Overvoltage Protection: The latch protection will be set between 120% and 130% of the nominal/output voltage.
Remote Sense: 0.5V drop.

Isolation Rating: Input to Output:	1480 VDC
Output to Chassis: (12,28 VDC)	100 VDC
Input to Chassis (155 VDC):	1000 VDC
Input to Chassis:	1480 VDC



HPM-270 SERIES — 1000 Watt DC-DC Military High Power Module



12, 28, and 155 VDC Outputs Up To 1000 Watts

- **Full Military Performance:**
  - High Efficiency
  - Input Transients Per MIL-STD-704D
  - EMI Filtering Per MIL-STD-461C
  - Qualified To MIL-STD-810
- **Compact Design:**
  - High Density- 9 Watts Per Cubic Inch
  - Conduction Cooled
- **Features:**
  - Parallel Operation Up To 10 Units
  - Synchronization
  - Remote On/Off
  - Remote Sense
  - Thermal Protection
  - Overcurrent/Overvoltage Protection
  - Two Year Warranty

DC INPUT CHARACTERISTICS

DC Input: 270 VDC nominal, per MIL-STD-704D.
Nominal Input Current: 270 VDC: 4.35A at 1000 Watts Output Power.
EMI: Fully Shield input EMI section complies with MIL-STD-461C part 2, class A1b CE01, CE03, CS01, CS02, CS06, RE02, RS02, RS03.

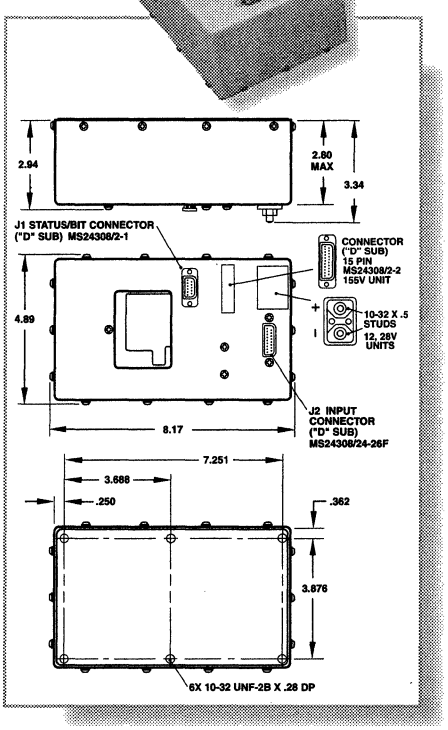
DC OUTPUT CHARACTERISTICS

Output Voltage: Single output at 12, 28 and 155 VDC.

VOLTAGE	MAXIMUM CURRENT (AMPS)	MAXIMUM RIPPLE (MV) P-P	MAXIMUM NOISE (MV) P-P	EFFICIENCY (%)
12	83	120	360	>79
28	36	200	560	>83
155	6.45	←1000 TOTAL→		>85

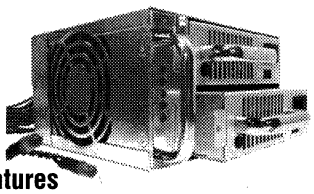
Regulated Voltage:
Line Regulation: ±0.5%
Load Regulation: ±0.5% for load variations from no load to full load & full load to no load.
Temperature Coefficient: 0.01%/ °C.
Output Overshoot/Undershoot: No Overshoot/Undershoot at turn-on, turnoff or input power failure. Limited to 3% of rated voltage under pulse load conditions.
Overcurrent Protection: Protection is current foldback to <30% of full load, with max limits set at <130% of full load. Upon removal of the overload condition, normal operation resumes automatically.
Overvoltage Protection: The latch protection will be set between 120% and 130% of the nominal/output voltage.
Remote Sense: 0.5V drop.

Isolation Rating: Input to Output:	1480 VDC
Output to Chassis: (12,28 VDC)	100 VDC
Input to Chassis (155 VDC):	1000 VDC
Input to Chassis:	1480 VDC



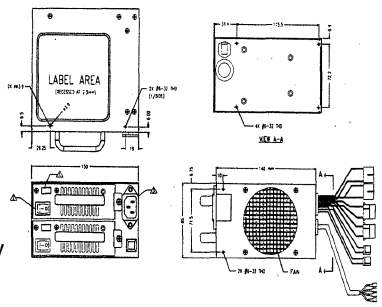
LIEN ENGINEERING, INC. Power Supplies

Redundant Power Supplies 250 Watt Hot Swappable, N+1

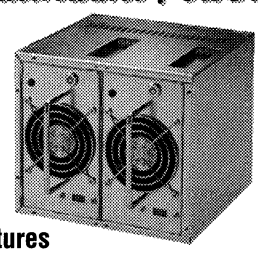


Features
- User selectable, 115/230 VAC Input
- Proven High Reliability Design
- High Efficiency • UL, CSA TUV Approved
- On Board EMI/RFI Filtering-Meets FCC Class B
- Reliable MOS-FET Design
- Standard AT PC Wiring Interface

Specifications
Dimensions: 5.9″ x 3.4″ x 5.5″
Input Voltage: 115VAC/230VAC; 47-63 Hz External switch
Inrush Current: <30A Peak @ 115VAC; <15A Peak @ 230VAC
Input Current: 7A Max RMS @ 115Vac; 4A Max RMS @ 230VAC
Efficiency: 80% Typical at full load 115VAC input
Ripple & Noise: ±1% Peak to peak maximum of all outputs
Adjustment Range: ±10% Rated output
Hold-Up Time: 16ms minimum at full load and 115VAC nominal Line
Protection: Overcurrent protection; Overvoltage protection; Continuous short circuit protection Power Good Signal: the supply provides a TTL compatible "high" Level to indicate proper operation of the power supply
Operating Temperature: 0°C to 50°C
Storage Temperature: -20°C to 70°C
MTBF: >50,00 POH at maximum operating temperature

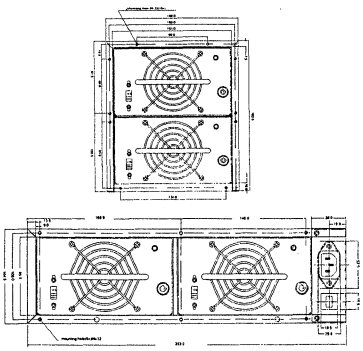


Redundant Power Supplies 300 to 400 Watt Hot Swappable, N+1 ATX



Features
- User selectable, 115/230 VAC Input
- Proven High Reliability Design
- High Efficiency • UL, CSA TUV Approved
- On Board EMI/RFI Filtering-Meets FCC Class B
- Reliable MOS-FET Design
- Standard ATX PC Wiring Interface

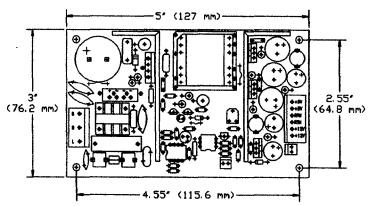
Specifications
Dimensions: 219mm x 168mm x 184mm
Input Voltage: 115VAC/230VAC; 47-63 Hz External switch
Inrush Current: <30A Peak @ 115VAC; <15A Peak @ 230VAC
Input Current: 7A Max RMS @ 115Vac; 4A Max RMS @ 230VAC
Efficiency: 70% Typical at full load 115VAC input
EMI Filter: Meets FCC Class B
Ripple & Noise: ±1% Peak to peak maximum of all outputs
Adjustment Range: ±10% Rated output
Hold-Up Time: 20ms minimum at full load and 115VAC nominal line
Protection: Overcurrent protection; Overvoltage protection; Continuous short circuit protection Power Good Signal: the supply provides a TTL compatible "high" Level to indicate proper operation of the power supply.
Operating Temperature: 0°C to 50°C
Storage Temperature: -20°C to 70°C
MTBF: >100,00 POH at maximum operating temperature



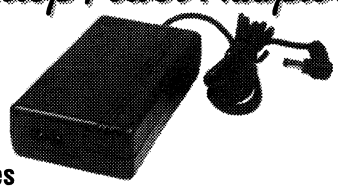
Universal Open Frame Power Supplies S59 Series 50 and 100 Watt Single and Dual Output Switching Power Supplies

Features
- Auto Selecting, Full Range 90-260 VAC Input
- Proven High Reliability Design
- High Efficiency • Fan and Power "On" LED Output
- UL, CSA TUV Approved
- On Board EMI/RFI Filtering Meets FCC Class B

Specifications
Dimensions: 3.0″ x 5.0″ x 1.4″
Input Voltage: 90VAC to 260VAC; 47-63Hz No external jumpers or switching required.
Inrush Current: <30A Peak @ 115VAC; <15A Peal @ 230VAC
Efficiency: >75% Typical at full load
EMI Filter: Meets Fcc Class B & VDE Class A (Class B optional)
Output Rating: (Amps) +5VDC @ 0-3.0;+12VDC @ -3.0/5.0pk
"Power ON" LED Output: +5VDC with on board 270Ω limit resistor
Output connection for fan: +12VDC @ 100mA with filter
Noise: (mv P-P) 60mV for +5V; 100mV for +12V
Ripple & Noise: 1% Peak to peak maximum of all outputs
Operating Temperature: 0°C to 45°C
Storage Temperature: -45°C to 85°C
MTBF: >100,00 POH at maximum operating temperature

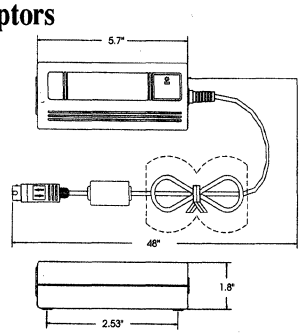


Desktop Power Adaptors Slimline Series 10 to 60 Watt Single and Dual Output Switching Desktop Power Adaptors



Features
- Auto Selecting, Full Range 90-260 VAc Input
- Proven High Reliability Design
- High Efficiency • UL, CSA TUV Approved
- On Board EMI/RFI Filtering Meets FCC Class B
- Compact Size
- Reliable MOS-FET design

Specifications
Dimensions: 2.4″ x 4.25″ x 1.15″
Input Voltage: 90VAC to 264VAC; 47-63Hz No external jumpers or switching required.
Inrush Current: <30A Peak @ 115VAC; <15A Peal @ 230VAC
Output Rating: (Amps) +5VDC @ 0-3.0; +12VDC @ -3.0/5.0pk
Voltage Regulation: ±5% Maximum
Ripple & Noise: 1% Peak to peak maximum of all outputs
Operating Temperature: 0°C to 45°C
Storage Temperature: -45°C to 85°C
MTBF: 100,00 POH at maximum operating temperature



7940 Arjons Drive • San Diego, CA 92126 • 619-695-1070 • Fax: 619-695-6501

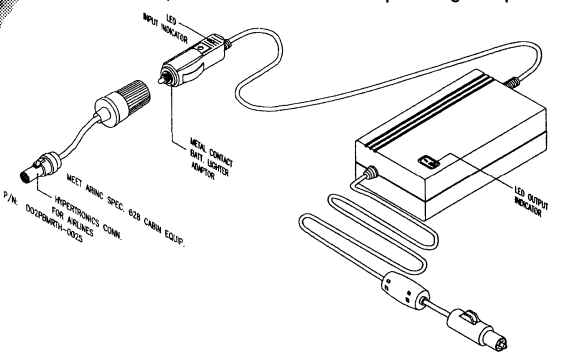
LIEN ENGINEERING, INC.

Desktop Power Adaptors

DC/DC Automobile Adaptors

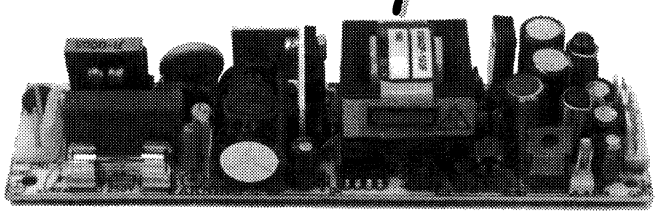
50 Watt Single and Dual Output DC to DC Power Adaptors

Specifications
Dimensions: 2.4″ x 4.25″ x 1.4″
Input Voltage: 10VDC to 18VDC
Input Current: 3.0-4.0A
Output Voltage: 5VDC to 24VDC
Output Rating: 0-9.0A
Voltage Regulation: ±5% Maximum
Noise: (m P-P)200mV for +24V
Operating Temperature: 0°C to 45°C
Storage Temperature: -40°C to 85°C
MTBF: 100,00 POH at maximum operating temperature



Features
- Compact size
- Proven High Reliability Design
- Durable Construction
- High Efficiency
- UL, CSA, TUV Approved
- On Board EMI/RFI Filtering - Meets FCC Class B
- Reliable MOS-FET design
- Airline Cable Available

Universal Open Frame Power Supplies



S93 Series

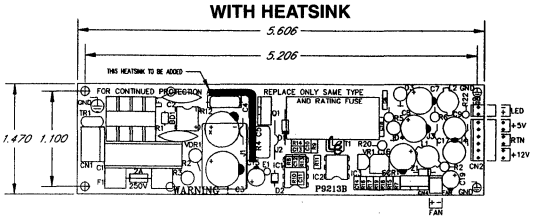
S41 Series-40 & 60 Watt ; S48 Series- 80 and 150 Watt; S50 Series- 15 Watt; S59 Series - 50 & 100 Watt; S60 Series- 10 Watt; S93 Series- 20 and 35 Watt Single & Dual Output Switching Power Supplies

Specifications
Dimensions: 1.5″ x 5.6″ x 1.1″
Input Voltage: 90VAC to 260VAC ;47-63Hz
Inrush Current: <30A Peak @ 115VAC; <15A Peak @ 230VAC
Efficiency: >75% Typical at full load
Output Rating: (Amps) +5VDC @ 0-3.0/+5VDC @ 0-1.0; +12VDC @ 0-1.0/2.0 pk
Ripple & Noise: 1% Peak to peak maximum of all outputs
Adjustment Range: ±10% Rated output
Hold-Up Time: 12ms Minimum at full load and 115VAC nominal line
Line Regulation: 0.5% Maximum
Operating Temperature: 0°C to 55°C
Storage Temperature: -40°C to 85°C

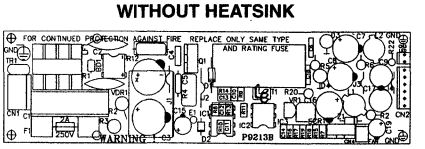
Features
- Auto Selecting, Full Range 90-260 VAC Input
- Proven High Reliability Design
- High Efficiency
- Fan and Power "On" LED Output
- UL, CSA, TUV Approved
- On Board EMI/RFI Filtering Meets FCC Class B
- Reliable MOS-FET Design

For over 25 years, Lien Engineering, Inc. Has been producing innovative Power Conversion and Enclosure Products for large and small computers, computer peripherals, medical, communications, and other industrial requirements.

WITH HEATSINK



WITHOUT HEATSINK



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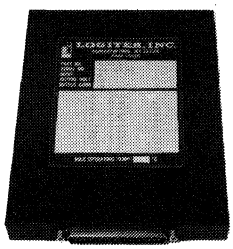
AC/DC Power Supplies
PS Series
25 Watts to 300 Watts



FEATURES

- *FULL MIL * MIL SPEC * INDUSTRIAL GRADE*
- *SINGLE * DUAL * TRIPLE * QUAD OUTPUTS*
- *UNIVERSAL AC/DC INPUT*
- *NAV MAT P-4855 48 Hr Burn-In/Vibration/Derating*
- *HIGH DENSITY – LOW PROFILE*
- *3 YEAR WARRANTY*

SPECIFICATIONS

Vin	Vout Volts	Iout Amps	Watts	No. Outputs	Case Size	Model
	5.0	5.0	25	1	A	PS( )25AS5
	12.0	2.1	25	1	A	PS( )25AS12
	15.0	1.7	25	1	A	PS( )25AS15
	24.0	1.1	25	1	A	PS( )25AS24
	28.0	0.9	25	1	A	PS( )25AS28
	5.0	10.0	50	1	B	PS( )50AS5
	12.0	4.2	50	1	B	PS( )50AS12
	15.0	3.4	50	1	B	PS( )50AS15
	24.0	2.0	50	1	B	PS( )50AS24
	28.0	2.0	50	1	B	PS( )50AS28
	±5.0	5.0	50	2	C	PS( )50AD5
	±12.0	2.1	50	2	C	PS( )50AD12
	±15.0	1.7	50	2	C	PS( )50AD15
100-126VAC,	5.0	15.0	75	1	D	PS( )75AS5
200-252VAC,	12.0	6.3	75	1	D	PS( )75AS12
47-440Hz	15.0	5.0	75	1	D	PS( )75AS15
1 & 3 Phase	28.0	2.7	75	1	D	PS( )75AS28
Delta or Wye,	±12.0	3.1	75	2	E	PS( )75AD12
and	±15.0	2.5	75	2	E	PS( )75AD15
120-320 vdc	5, ±12	10, 1	75	3	E	PS( )75AT5/12
	5, ±15	9, 1	75	3	E	PS( )75AT5/15
	5, 12, 28	8, 0.9, 0.5	75	4	E	PS( )75AQ5/12
	5, 15, 28	7, 0.9, 0.5	75	4	E	PS( )75AQ5/15
	12.0	12.5	150	1	F	PS( )150AS12
	15.0	10.0	150	1	F	PS( )150AS15
	24.0	6.3	150	1	F	PS( )150AS24
	28.0	5.4	150	1	F	PS( )150AS28
	±12.0	6.25	150	2	G	PS( )150AD12
	±15.0	5.0	150	2	G	PS( )150AD15
	5, ±12	20, 2.1	150	3	G	PS( )150AT5/12
	5, ±15	20, 1.7	150	3	G	PS( )150AT5/15
	5, 12, 28	20, 1, 1	150	4	G	PS( )150AQ5/12
	5, 15, 28	20, 1, 0.7	150	4	G	PS( )150AQ5/15
	5	60	300	1	H	PS( )300AS5
	12.0	25.0	300	1	H	PS( )300AS12
	15.0	20.0	300	1	H	PS( )300AS15
	24.0	12.5	300	1	J	PS( )300AS24
	28.0	10.7	300	1	J	PS( )300AS28

Enter model type X, M or I in parenthesis.

OUTPUT CHARACTERISTICS

LINE REGULATION: Within 0.1% for input change from low line to high line, at constant load. For single, dual and main outputs 100 mV maximum for auxiliary outputs.
LOAD REGULATION: 0.1% for 0-100% of rated load at nominal input line for single, dual and main outputs. 150 mV for auxiliary outputs with 20% minimum main load.
PARD (Noise and Ripple): 50 mV p-p typical, 100 mV p-p maximum for 5V outputs (20 MHz bandwidth). 1% of the output voltage, with a maximum of 200 mV p-p, for all other outputs (20 MHz bandwidth).
CURRENT LIMITING: Constant current, limited to 130% of rated setting for single, dual and main outputs. And 160% of rated auxiliary outputs. (typical)
INRUSH CURRENT: Limited to 500% of nominal input current.
LOAD TRANSIENT RECOVERY TIME: Output voltage returns to regulation limits within 0.5 mSec from half load to full load.
LOAD TRANSIENT OVER/UNDER SHOOT: 0.5 volt maximum from nominal output voltage set point.
SHORT CIRCUIT PROTECTION: Under any short circuit condition, output voltage drops to less than one volt, with automatic recovery.
HOLD UP TIME (AC/DC only): 16mSec at DC to 67Hz, 2.5mSec above 380Hz.
REMOTE ERROR SENSING: Sensing pins compensate for up to 0.5 volt drop on output leads.
AUXILIARY OUTPUT CROSS REGULATION: 1.0% maximum deviation when main output load changes from half load to full load.
OVERVOLTAGE PROTECTION: Automatic electronic shut down if voltage exceeds 30% of single and triple (main) output.
AUXILIARY OUTPUT TRACKING: Within 2%.
EMI/RFI CHARACTERISTICS: Designed to conform to the requirements of MIL-STD 461C. Meets most requirements when tested IAW MIL-STD462.
REMOTE TURN ON/OFF (TTL INHIBIT): Provides for remote on/off control. A TTL (logic 1) sign will inhibit the output.

*** PSX, PSM, PSI, PSC** are Fit/Form/Function Interchangeable.
PSX = Mil Spec components where available. Others are screened to applicable portions of MIL STD 883B. • All semi-conductors are herm sealed where available. • Mil PC boards. • Operating temp. -55°C to +100°C.
PSM = Components are screened to applicable portions of MIL STD 883B. • Mil PC boards. • Operating temp. -55°C to +100°C.
PSI = Industrial grade components. • Commercial PC boards. • Operating temp. -40°C to +85°C.
PSC = All Commercial components. • Commercial PC boards. • Operating temp. -20°C to +70°C.
INPUT TRANSIENT PROTECTION: Per MIL-STD-704A

ISOLATION: 1000 vdc input to output & case. 200 vdc, output to case.
TEMPERATURE COEFFICIENT: 0.01% per °C.
INSULATION RESISTANCE: 50 Megohms at 50 vdc.
EFFICIENCY: 70% to 83% depending on number of outputs and levels.
VIBRATION: Per MIL-STD-810C Method 514.2 Procedure 1A.
SHOCK: 30 g's ea. axis per MIL-STD-810C Method 516.2 Procedure 1. Hammer shock per MIL-STD-901C.
ACCELERATION: 6 g's per MIL-STD-810C Method 513.2, Procedure 11 & 14 g's per Procedure 1.
ENCLOSURE: Aluminum housing/baseplate.

HUMIDITY: 95% at 71°C per MIL-STD-810C, Method 507.1.
ALTITUDE: To 40,000 ft per MIL-STD-810C, Method 504.1, category 6 equipment.
SALT FOG: Per MIL-STD-810C, Method 509.1.
SAND, DUST, FUNGUS: Per MIL-STD-810C.
QUALITY: MIL-STD-45208.

See our MC Series DC-DC Converters in Volume D, pages D.2005, 2008

See Page D•1667 for Case Dimensions and Pinouts.

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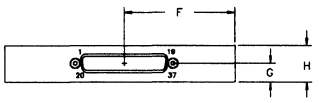
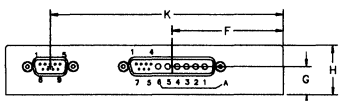
AC/DC Power Supplies
PS Series
Case Styles & Pinouts

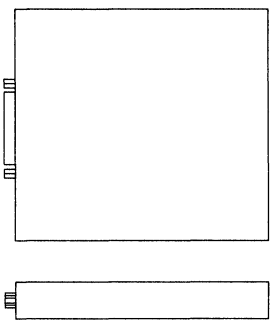
STANDARD CONFIGURATION

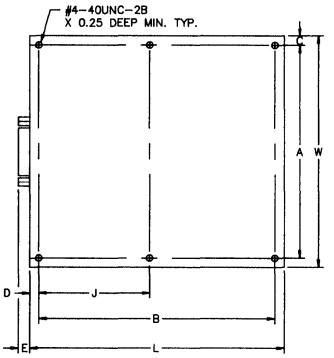


300 WATT 5V, 12V & 15V CONFIGURATION



(Connector 1) (Connector 2)





CASE DIMENSIONS

CASE	W	L	H	A	B	F	
A	2.8	3.4	0.8	2.4	3	1.4	Inches
	71	86.4	20.3	60.96	76.2	35.6	mm
B	3.25	4	0.8	2.85	3.6	1.63	Inches
	82.6	101.6	20.3	72.4	91.44	41.4	mm
C	3.5	4.85	0.8	3.1	4.45	1.75	Inches
	88.9	123.19	20.3	78.74	113.03	44.45	mm
D	3.25	4.5	0.8	2.85	4.1	1.63	Inches
	82.6	114.3	20.3	72.39	104.14	41.3	mm
E	4.5	5	0.8	4.1	4.6	2.25	Inches
	114.3	127	20.3	104.14	116.84	57.15	mm
F	4.5	5.75	0.8	4.1	5.35	2.25	Inches
	114.3	146	20.3	104.14	135.89	57.2	mm
G	4.75	6	0.8	4.35	5.6	2.38	Inches
	120.65	152.4	20.3	110.49	142.24	60.45	mm
H	5.00	7.25	.85	4.6	6.85	1.82	Inches
	127.0	184.2	21.6	116.8	173.9	46.2	mm
J	5.00	6.40	.80	4.6	6.0	2.50	Inches
	127.0	162.5	20.3	116.8	152.4	63.5	mm

PINOUTS

	25 Watt				50 Watt			
	Single	Input	Pin #		Single	Dual	Input	Pin #
1.	Input	115 Vac, 1Ø	1, 2 (neut)	1.	Input	Input	115 Vac, 1Ø	1, 2 (neut)
2.	Input	115 Vac, 3Ø, Δ	1, 9, 10	2.	Input	Input		
3.	-TTL	115 Vac, 3Ø, Y	1, 9, 10, 2 (neut)	3.	-TTL	-TTL	115 Vac, 3Ø, Y	1, 9, 10, 2 (neut)
4.	+TTL	230 Vac, 1Ø	9, 10	4.	+TTL	+TTL	230 Vac, 1Ø	1, 9, 10
5.	+ Sense	230 Vac, 3Ø, Δ	1, 9, 10	5.	+ Sense	+ Sense 1	230 Vac, 3Ø, Δ	1, 9, 10
6.	+ Output	120-320 Vdc	1, 9 or 10	6.	+ Output	+ Output 1	120-320 Vdc	1, 9 or 10
7.	NC			7.	+ Output	+ Output 1		
8.	NC			8.	NC	+ Sense 2		
9.	Input			9.	Input	Input		
10.	Input			10.	Input	Input		
11.	Ground			11.	Ground	Ground		
12.	- Sense			12.	- Sense	- Sense 1		
13.	- Output			13.	- Output	+ Output 2		
14.	NC			14.	- Output	- Output 2		
15.	NC			15.	NC	- Sense 2		

Dim C&D = 0.2", 5.1mm; Dim E = 0.23", 5.8mm.; Dim. G = 0.455", 11.56mm. except case H; Dim. G = 0.536", 13.61mm.; Case H, Dim. J = 4.92", 124.9mm, Dim. K = 3.94, 100.1mm.

PINOUTS

	75 Watt						150 Watt						
	Single	Dual	Triple	Quad	Input	Pin #		Single	Dual	Triple	Quad	Input	Pin #
1.	Input	Input	Input	Input	115 Vac, 1Ø	1, 2 (neutral)	1.	Input	Input	Input	Input	115 Vac, 1Ø	1, 2 (neutral)
2.	Input	Input	Input	Input	115 Vac, 3Ø, Δ	1, 14, 15	2.	Input	Input	Input	Input		
3.	-TTL	NC	NC	NC	115 Vac, 3Ø, Y	1, 14, 15, 2	3.	-TTL	NC	-TTL	-TTL	115 Vac, 3Ø, Y	1, 14, 15, 2
4.	+TTL	-TTL	-TTL	-TTL	230 Vac, 1Ø	14, 15	4.	+TTL	NC	+TTL	+TTL	230 Vac, 1Ø, Δ	1, 14, 15
5.	+ Sense	+TTL	+TTL	+TTL	230 Vac, 3Ø, Δ	1, 14, 15	5.	NC	NC	+AUX	+AUX	230 Vac, 3Ø	1, 14, 15
6.	+Output	+AUX	+AUX	+AUX	120-320 vdc	1, 14 or 15	6.	NC	+TTL	+AUX CM	+AUX CM	120-320 vdc	1, 14 or 15
7.	+Output	+AUX CM	+AUX CM	+AUX CM			7.	NC	-TTL	-AUX CM	-AUX CM		
8.	+Output	-AUX CM	-AUX CM	-AUX CM			8.	NC	+Output	-AUX	-AUX		
9.	Input	-AUX	-AUX	-AUX			9.	+Output	+Output	+Output	+Output		
10.	Input	+Sense	+Sense	+Sense			10.	+Output	+Sense	+Output	+Output		
11.	Ground	+Output	+Output	+Output			11.	+Output	-Sense	+Output	+Output		
12.	-Sense	+Output	+Output	+Output			12.	+Output	-Output	+Output	+Output		
13.	-Output	+Output	+Output	+Output			13.	+Sense	-Output	+Sense	+Sense		
14.	-Output	-Output	Input	Input			14.	Input	Input	Input	Input		
15.	-Output	-Sense	Input	Input			15.	Input	Input	Input	Input		
16.			NC	NC			16.	Ground	NC	Ground	Ground		
17.			Ground	Ground			17.	-Output	Ground	-Output	-Output		
18.			NC	NC			18.	-Output	NC	-Output	-Output		
19.			NC	+AUX Q			19.	-Output	Output	-Output	-Output		
20.			NC	-AUX Q			20.	-Output	+Output	-Output	-Output		
21.			NC	NC			21.	-Output	+Sense	-Output	-Output		
22.			-Sense	-Sense			22.	-Output	-Sense	-Output	-AUX		
23.			-Output	-Output			23.	-Sense	-Output	-Sense	-Sense		
24.			-Output	-Output			24.	+Output	-Output	+Output	+AUX		
25.			-Output	-Output			25.	+Output	NC	+Output	+Output		

See our MC Series DC-DC Converters in Volume D, pages D.2005, 2008

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AC/DC Power Supplies PS Series
Case Styles & Pinouts cont'd

PINOUTS

	300 Watt		(24V and 28V)	Input	Pin #
1.	Input	20.	Input	115 Vac, 1Ø	1, 2 (neutral)
2.	Input	21.	Input		
3.	NC	22.	–TTL	115 Vac, 3Ø, Y	1, 2 (neutral), 20, 21
4.	NC	23.	+TTL	230 Vac, 1Ø, Δ	1, 20, 21
5.	Case Gnd	24.	+Output	230 Vac, 3Ø, Y	1, 2 (neutral), 20, 21
6.	+Sense	25.	+Output	120-320 vdc	20, 21
7.	-Sense	26.	+Output		
8.	+Output	27.	+Output		
9.	+Output	28.	+Output		
10.	+Output	29.	+Output		
11.	+Output	30.	+Output		
12.	+Output	31.	–Output		
13.	+Output	32.	–Output		
14.	–Output	33.	–Output		
15.	–Output	34.	–Output		
16.	–Output	35.	–Output		
17.	–Output	36.	–Output		
18.	–Output	37.	–Output		
19.	–Output				

PINOUTS

	300 Watt		(5V, 12V & 15V)		
	Connector 1		Connector 2	Input	Pin #
1.	Input	A1	–Output	115 Vac, 1Ø	(1, 6), (4, 9) neutral
2.	Input	A2	–Output	115 Vac, 3Ø, Δ	(1, 6), (2, 7), (3, 8)
3.	Input	A3	–Output	115 Vac, 3Ø, Y	(1, 6), (4, 9) neutral, (2, 7), (3, 8)
4.	Input	A4	+Output	230 Vac, 1Ø, Δ	(1, 6), (2, 7), (3, 8)
5.	Gnd	A5	+Output	230 Vac, 3Ø, Y	(1, 6), (4, 9) neutral, (2, 7), (3, 8)
6.	Input	A6	+Output	120-320 vdc	(2, 7), (3, 8)
7.	Input	1.	+Sense		
8.	Input	2.	+TTL		
9.	Input	3.	N/C		
		4.	N/C		
		5.	–Sense		
		6.	–TTL		
		7.	N/C		

CONNECTOR DESIGNATIONS

	25 Watt (Single)	50 Watt (Single & Dual)	75 Watt (Single & Dual)	75 Watt (Triple & Quad)	150 Watt (Single, Dual, Triple & Quad)	300 Watt (Single) 5, 12, 15 & 18 vdc	300 Watt (Single) 24 & 28 vdc
CONNECTOR:	DAMME15PR	DAMME15PR	DAMME15PR	DBMME25PR	DBMME25PR	DEMM9PL & CBM13W6F57R8000	DBMME37PR
MATE:	DAMM15S	DAMM15S	DAMM15S	DBMM25S	DBMM25S	DEMAM9S & CBM13W6M00000	DBMM37S

See our MC Series DC-DC Converters in Volume D, pages D.2005, 2008

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DC/DC Power Supplies
PS Series
25 Watts to 150 Watts

FEATURES

- *FULL MIL * MIL SPEC * INDUSTRIAL GRADE*
- *SINGLE * DUAL * TRIPLE * QUAD OUTPUTS*
- *NAV MAT P-4855 48 Hr Burn-In/Vibration/Derating*
- *HIGH DENSITY - LOW PROFILE*
- *3 YEAR WARRANTY*

SPECIFICATIONS

Vin	Vout Volts	Iout Amps	Watts	No. Outputs	Case Size	Model
14-36 vdc	5.0	5.0	25	1	A	PS( )25DS5
	12.0	2.1	25	1	A	PS( )25DS12
	15.0	1.7	25	1	A	PS( )25DS15
	24.0	1.1	25	1	A	PS( )25DS24
	28.0	0.9	25	1	A	PS( )25DS28
	5.0	10.0	50	1	B	PS( )50DS5
	12.0	4.2	50	1	B	PS( )50DS12
	15.0	3.4	50	1	B	PS( )50DS15
	24.0	2.0	50	1	B	PS( )50DS24
	28.0	2.0	50	1	B	PS( )50DS28
	±5.0	5.0	50	2	C	PS( )50DD5
	±12.0	2.1	50	2	C	PS( )50DD12
	±15.0	1.7	50	2	C	PS( )50DD15
16-36 vdc	5.0	15.0	75	1	D	PS( )75DS5
	12.0	6.3	75	1	D	PS( )75DS12
	15.0	5.0	75	1	D	PS( )75DS15
	28.0	2.7	75	1	D	PS( )75DS28
	±12.0	3.1	75	2	E	PS( )75DD12
	±15.0	2.5	75	2	E	PS( )75DD15
	5, ±12	10.0, 1.0	75	3	E	PS( )75DT5/12
	5, ±15	9.0, 1.0	75	3	E	PS( )75DT5/15
	5, 12, 28	8, 0.9, 0.5	75	4	E	PS( )75DQ5/12
	5, 15, 28	7, 0.9, 0.5	75	4	E	PS( )75DQ5/15
18-36 vdc	5.0	20.0	100	1	E	PS( )100DS5
(15 pin	12.0	8.4	100	1	E	PS( )100DS12
connector	15.0	6.7	100	1	E	PS( )100DS15
for 100W	24.0	4.2	100	1	E	PS( )100DS24
units)	29.0	3.6	100	1	E	PS( )100DS28
	12.0	12.5	150	1	F	PS( )150DS12
	15.0	10.0	150	1	F	PS( )150DS15
	24.0	6.3	150	1	F	PS( )150DS24
	28.0	5.4	150	1	F	PS( )150DS28
	±12.0	6.25	150	2	G	PS( )150DD12
	±15.0	5.0	150	2	G	PS( )150DD15
	5, ±12	20.0, 2.1	150	3	G	PS( )150DT5/12
	5, ±15	20.0, 1.7	150	3	G	PS( )150DT5/15
	5, 12, 28	20, 1, 1	150	4	G	PS( )150DQ5/12
	5, 15, 28	20, 1, 0.7	150	4	G	PS( )150DQ5/15

Enter model type X, M or I in parenthesis.

OUTPUT CHARACTERISTICS

LINE REGULATION: Within 0.1% for input change from low line to high line, at constant load. For single, dual and main outputs 100 mV maximum for auxiliary outputs.
LOAD REGULATION: 0.1% for 0-100% of rated load at nominal input line for single, dual and main outputs. 150 mV for auxiliary outputs with 20% minimum main load.
PARD (Noise and Ripple): 50 mV p-p typical, 100 mV p-p maximum for 5V outputs (20 MHz bandwidth). 1% of the output voltage, with a maximum of 200 mV p-p, for all other outputs (20 MHz bandwidth).
CURRENT LIMITING: Constant current, limited to 130% of rated setting for single, dual and main outputs. And 160% of rated auxiliary outputs. (typical)
INRUSH CURRENT: Limited to 800% of nominal input current.
LOAD TRANSIENT RECOVERY TIME: Output voltage returns to regulation limits within 0.5 mSec from half load to full load.
LOAD TRANSIENT OVER/UNDER SHOOT: 0.5 volt maximum from nominal output voltage set point.
SHORT CIRCUIT PROTECTION: Under any short circuit condition, output voltage drops to less than one volt, with automatic recovery.
HOLD UP TIME (AC/DC only): 16mSec at DC to 67Hz, 2.5mSec above 380Hz.
REMOTE ERROR SENSING: Sensing pins compensate for up to 0.5 volt drop on output leads.
AUXILIARY OUTPUT CROSS REGULATION: 1.0% maximum deviation when main output load changes from half load to full load.
OVERVOLTAGE PROTECTION: Automatic electronic shutdown if voltage exceeds 30% of single and triple (main) output.
AUXILIARY OUTPUT TRACKING: Within 2%.
EMI/RFI CHARACTERISTICS: Designed to conform to the requirements of MIL-STD 461C. Meets most requirements when tested IAW MIL-STD462.
REMOTE TURN ON/OFF (TTL INHIBIT): Provides for remote on/off control. A TTL (logic 1) sign will inhibit the output.

*** PSX, PSM, PSI, PSC** are Fit/Form/Function Interchangeable.
PSX = Mil Spec components where available. Others are screened to applicable portions of MIL STD 883B. • All semi-conductors are herm sealed where available. • Mil PC boards. • Operating temp. -55°C to +100°C.
PSM = Components are screened to applicable portions of MIL STD 883B. • Mil PC boards. • Operating temp. -55°C to +100°C.
PSI = Industrial grade components. • Commercial PC boards. • Operating temp. -40°C to +85°C.
PSC = All Commercial components. • Commercial PC boards. • Operating temp. -20°C to +70°C.
INPUT TRANSIENT PROTECTION: Per MIL-STD-704A

ISOLATION: 1000 vdc input to output & case. 200 vdc, output to case.
TEMPERATURE COEFFICIENT: 0.01% per °C.
INSULATION RESISTANCE: 50 Megohms at 50 vdc.
EFFICIENCY: 70% to 83% depending on number of outputs and levels.
VIBRATION: Per MIL-STD-810C Method 514.2 Procedure 1A.
SHOCK: 30 g's ea. axis per MIL-STD-810C Method 516.2 Procedure 1. Hammer shock per MIL-STD-901C.
ACCELERATION: 6 g's per MIL-STD-810C Method 513.2, Procedure 11 & 14 g's per Procedure 1.
ENCLOSURE: Aluminum housing/baseplate.

HUMIDITY: 95% at 71°C per MIL-STD-810C, Method 507.1.
ALTITUDE: To 40,000 ft per MIL-STD-810C, Method 504.1, category 6 equipment.
SALT FOG: Per MIL-STD-810C, Method 509.1.
SAND, DUST, FUNGUS: Per MIL-STD-810C.
QUALITY: MIL-STD-45208.

See our MC Series DC-DC Converters in Volume D, pages D.2005, 2008

See Page D•1670 for Case Dimensions and Pinouts.

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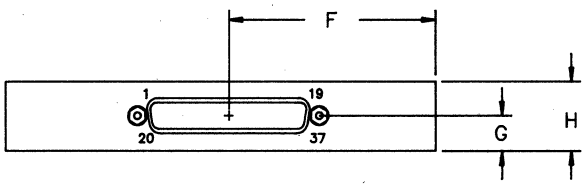
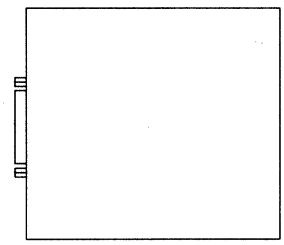
DC/DC Power Supplies
PS Series
Case Styles & Pinouts

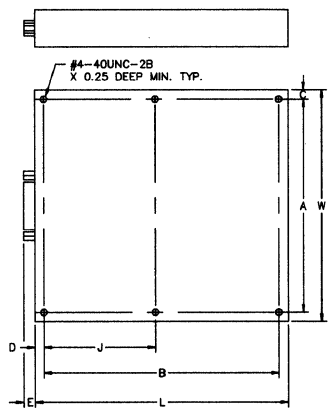




CASE DIMENSIONS

STYLE	W	L	H	A	B	F	J	
A	2.20	2.80	0.8	1.850	2.450	1.10		Inches
	55.9	71.1	20.3	46.99	62.13	27.9		mm
B	2.50	3.50	0.8	2.100	3.100	1.25		Inches
	63.5	88.9	20.3	53.34	78.74	31.8		mm
C	3.00	3.85	0.8	2.600	3.450	1.50		Inches
	76.20	97.79	20.32	66.04	87.63	38.10		mm
D	3.00	3.85	0.8	2.60	3.45	1.5		Inches
	76.2	97.8	20.3	66.04	87.63	38.1		mm
E	3.25	4.25	0.8	2.850	3.850	1.63		Inches
	82.6	108.0	20.3	72.39	97.79	41.3		mm
F	3.50	4.50	0.8	3.100	4.100	1.75		Inches
	88.9	114.3	20.3	78.74	104.14	44.5		mm
G	4.25	5.50	0.8	3.850	5.100	2.13	2.550	Inches
	108.0	139.7	20.3	97.79	129.54	54.0	64.77	mm

Dim C&D = 0.2", 5.1mm Dim. G = 0.455", 11.56mm. Dim E = 0.23", 5.84mm.



PINOUTS

	25 Watt		50 Watt		75 Watt				100 Watt	150 Watt			
	Single	Dual	Single	Dual	Single	Dual	Triple	Quad	Single	Single	Dual	Triple	Quad
1.	–Input		–Input	–Input	–Input	–Input	+Input	+Input	–Input	+Input	+Input	+Input	+Input
2.	–TTL		NC	NC	NC	NC	+Input	+Input	NC	+Input	+Input	+Input	+Input
3.	+TTL		–TTL	–TTL	–TTL	–TTL	NC	NC	–TTL	+Input	+Input	+Input	+Input
4.	+Sense		+TTL	+TTL	+TTL	+TTL	–TTL	–TTL	+TTL	+NC	NC	+TTL	+TTL
5.	+Output		NC	+Sense 1	NC	+Sense 1	+TTL	+TTL	+Sense	+NC	NC	–TTL	–TTL
6.	+Input		+Sense	+Output 1	+Sense	+Output 1	+AUX	+AUX	+Output	+Output	+TTL	+AUX	+AUX
7.	Ground		+Output	+Sense 2	+Output	+Sense 2	+AUX CM	+AUX CM	+Output	+Output	–TTL	+AUX CM	+AUX CM
8.	–Sense		+Output	+Output 2	+Output	+Output 2	-AUX CM	-AUX CM	+Output	+Output	+Output 1	–AUX CM	-AUX CM
9.	–Output		+Input	+Input	+Input	+Input	–AUX	–AUX	+Input	+Output	+Output 1	–AUX	–AUX
10.			NC	NC	NC	NC	+Sense	+Sense	NC	+Output	+Sense 1	+Sense	+Sense
11.			Ground	Ground	Ground	Ground	+Output	+Output	Ground	–Output	–Sense 1	+Output	+Output
12.			NC	–Sense 1	NC	–Sense 1	+Output	+Output	–Sense	–Output	–Output 1	+Output	+Output
13.			–Sense	–Output 1	–Sense	–Output	+Output	+Output	–Output	–Sense	–Output 1	+Output	+Output
14.			–Output	–Sense 2	–Output	–Sense 2	–Input	–Input	–Output	–Input	–Input	–Input	–Input
15.			–Output	–Output 2	–Output	–Output 2	–Input	–Input	–Output	–Input	–Input	–Input	–Input
16.							NC	NC		–Input	–Input	–Input	–Input
17.							Ground	Ground		Ground	Ground	Ground	Ground
18.							NC	NC		–TTL	NC	–Output	–Output
19.							NC	+AUX Q		+TTL	+Output 2	–Output	–Output
20.							NC	–AUX Q		+Output	+Output 2	–Output	–Output
21.							NC	NC		+Sense	+Sense 2	–Output	–Output
22.							–Sense	–Sense		–Output	–Sense 2	–Output	–Sense
23.							–Output	–Output		–Output	–Output 2	–Sense	-AUX Q
24.							–Output	–Output		–Output	–Output 2	+Output	+AUX Q
25.							–Output	–Output		–Output	NC	+Output	+Output

CONNECTOR SPECIFICATION

	25 Watt (Single)	50 Watt (Single & Dual)	75 Watt (Single & Dual)	75 Watt (Triple & Quad)	100 Watt (Single)	150 Watt (Single, Dual, Triple & Quad)
CONNECTOR:	DEMME9PR	DAMME15PR	DBMME15PR	DBMME25PR	DBMME15PR	DBMME25PR
MATE:	DEMM9S	DAMM15S	DBMM15S	DBMM25S	DBMM15S	DBMM25S

See our MC Series DC-DC Converters in Volume D, pages D.2005, 2008

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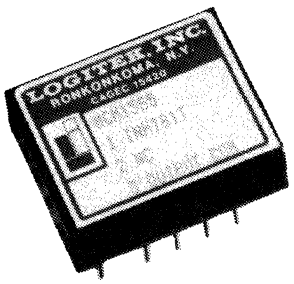
DC/DC Converters MC Series

PCB Mount 5, 15 and 30 Watts EMI COMPLIANT: MIL-STD-461C



GENERAL

The MC series converter is ideally suited for PC board mount applications offering up to 30 watts of output power at 28 vdc over its specified temperature range without derating. These units deliver efficiencies of up to 83% depending on the number of outputs and voltage levels. Design and construction of the MC series power modules utilizes Surface Mount Technology (SMT).

FEATURES

- *FULL MIL * MIL SPEC * INDUSTRIAL*
- *SINGLE * DUAL * TRIPLE OUTPUTS*
- *NAV MAT P-4855 48 Hr Burn-In/Vibration/Derating*
- *CURRENT LIMITING & SHORT CIRCUIT PROTECTION*
- *REMOTE POWER INHIBIT*
- *3 YEAR WARRANTY*
- *EMI COMPLIANT, MIL-STD-461C: CEO1, CEO3, CEO7, CS01, CS02, CS06 (Add "E" to end of part number for built in EMI filter)*

SPECIFICATIONS

Vin Volts	Vout Amps	Iout	Watts Outputs	No. Size	Case	Model	With EMI
	5	1	5	1	A	MC( )5S5	MC( )5S5E
	12	0.4	5	1	A	MC( )5S12	MC( )5S12E
	15	0.333	5	1	A	MC( )5S15	MC( )5S15E
	5	3.0	15	1	A	MC( )15S5	MC( )15S5E
	12	1.25	15	1	A	MC( )15S12	MC( )15S12E
	15	1.0	15	1	A	MC( )15S15	MC( )15S15E
	±5	1.5/1.5	15	2	A	MC( )15D5	MC( )15D5E
16-36	±12	0.63/0.63	15	2	A	MC( )15D12	MC( )15D12E
vdc	±15	0.5/0.5	15	2	A	MC( )15D15	MC( )15D15E
	5	6.0	30	1	B	MC( )30S5	MC( )30S5E
	12	2.5	30	1	B	MC( )30S12	MC( )30S12E
	15	2.0	30	1	B	MC( )30S15	MC( )30S15E
	±12	1.25/1.25	30	2	B	MC( )30D12	MC( )30D12E
	±15	1.0/1.0	30	2	B	MC( )30D15	MC( )30D15E
	5 & ±12	4 & ±0.4	30	3	B	MC( )30T5/12	MC( )30T5/12E
	5 & ±15	4 & ±0.33	30	3	B	MC( )30T5/15	MC( )30T5/15E

Enter model type X, M, or I in parenthesis.

OUTPUT CHARACTERISTICS

LINE REGULATION: Within 0.5% for input change from low line to high line, at constant load for single, dual and main outputs. 100 mV maximum for auxiliary outputs.
LOAD REGULATION: Main Output ±0.5% no load to full load. (MCI 20% to full load) Aux outputs ±2% for 20-100% of rated load.
CROSS REGULATION: (AUXILIARY OUTPUTS): 1.0% maximum deviation when main output load changes from half load to full load.
PARD (Noise and Ripple): 50 mV p-p typical, 100 mV p-p maximum for 5V outputs. 1% of the output voltage, with a maximum of 200 mV p-p, for all other outputs.
SHORT CIRCUIT PROTECTION: Under any short circuit condition, output voltage drops to less than one volt, with automatic recovery.

SPECIFICATIONS

*** MCX, MCM, MCI** are Fit/Form/Function Interchangeable
MCX = Full Mil (–55°C to 85°C) Screened to MIL-STD-883B and Mil PC boards.
MCM = Mil Spec (–55°C to 85°C) Factory screened MIL-STD-883B components and industrial PC boards.
MCI = Industrial Grade (–20°C to 71°C) Industrial grade components and PC boards.
INPUT TRANSIENT PROTECTION: Per MIL-STD-704D
ISOLATION: 1000 VRMS Terminal to case.
EFFICIENCY: 75% to 83% depending on number of outputs and levels.
VIBRATION: Per MIL-STD-810C Method 514.2 Procedure 1A.
SHOCK: 30 g's ea. axis per MIL-STD-810C Method 516.2 Procedure 1. Hammer shock per MIL-STD-901C.
ACCELERATION: 6 g's per MIL-STD-810C Method 513.2, Procedure 11 & 14 g's per Procedure 1.
ENCLOSURE: Aluminum housing/baseplate.
HUMIDITY: 95% at 71°C per MIL-STD-810C, Method 507.1.
ALTITUDE: To 70,000 ft per MIL-STD-810C, Method 504.1, category 6 equipment.
SALT FOG: Per MIL-STD-810C, Method 509.1.
SAND, DUST, FUNGUS: Per MIL-STD-810C.
QUALITY: MIL-STD-45208, MIL-STD-2000 available.

See our MC Series DC-DC Converters in Volume D, pages D.2005, 2008

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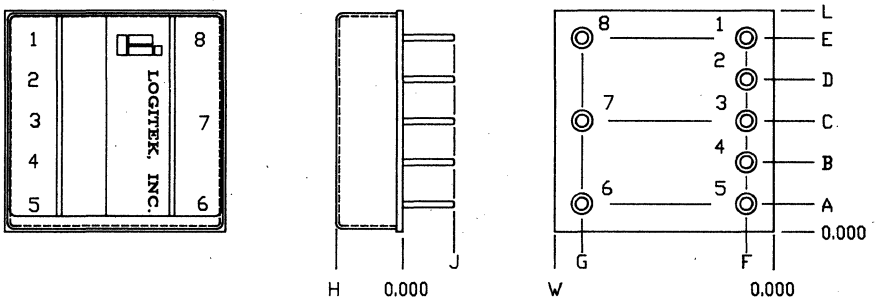
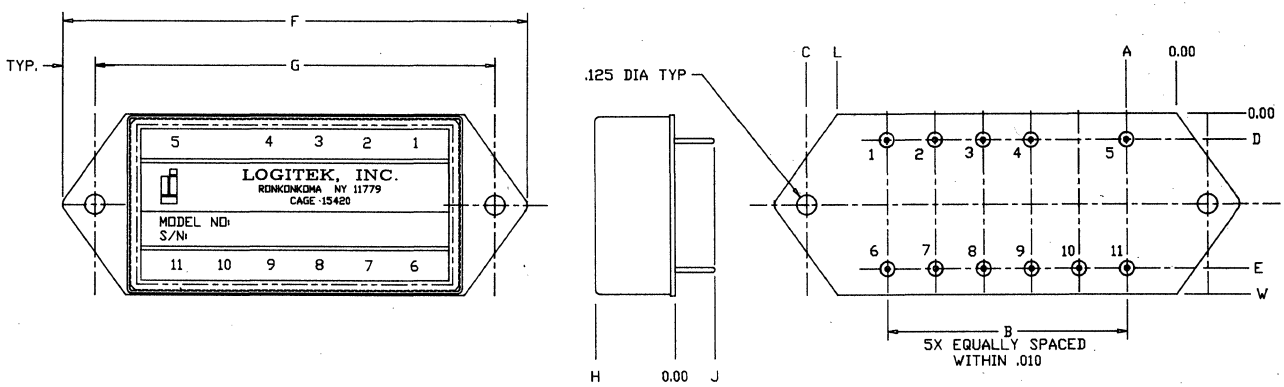
MC Series DC/DC Converter
Case Styles & Pinouts

CASE STYLE A



CASE STYLE B



CASE DIMENSIONS

5 Watt	Output	W	L	H	A	B	C	D	E	F	G	J	
Case	Single	1.065	1.065	0.325	.133	.333	.533	.733	.933	.133	.933	0.205	inches
Style		27.05	27.05	8.26	3.37	8.45	1.353	18.62	23.70	3.37	23.70	5.20	mm
A	Dual	1.065	1.065	0.500	.133	.333	.533	.733	.933	.133	.933	0.205	inches
		27.05	27.05	12.70	3.37	8.45	1.353	18.62	23.70	3.37	23.70	5.20	mm
15 Watt	**Output**	**W**	**L**	**H**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**J**	
Case	Single	1.12	1.43	0.325	0.205	0.505	0.705	0.905	1.105	0.160	0.960	0.250	inches
Style		28.45	36.32	8.26	5.21	12.83	17.91	23.00	28.07	4.06	24.38	6.35	mm
A	Dual	1.12	1.43	0.500	0.205	0.505	0.705	0.905	1.105	0.160	0.960	0.250	inches
		28.45	36.32	12.70	5.21	12.83	17.91	23.00	28.07	4.06	24.38	6.35	mm
30 Watt	**Output**	**W**	**L**	**H**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**J**	
Case	Single/	1.12	2.12	0.50	0.31	1.500	2.31	0.16	0.96	2.90	2.50	0.25	inches
Style	Dual	28.5	53.8	12.7	7.9	38.1	58.7	4.1	24.4	73.66	63.5	6.4	mm
B	Triple	1.35	2.70	0.50	0.35	2.000	2.85	0.18	1.18	3.40	3.00	0.25	inches
		34.3	68.6	12.7	8.9	50.80	72.4	4.6	30.0	86.4	76.2	6.4	mm

PIN DESIGNATIONS

	1	2	3	4	5	6	7	8	9	10	11
5 Watt Single	Positive Output	Output Common			Inhibit	Positive Input	Input Common	Case Ground			
15 Watt Single	Inhibit	NC	Output Common	Positive Output	NC	Case Ground	Input Common	Input Positive			
15 Watt Dual	Inhibit	Positive Output	Output Common	Negative Output	NC	Case Ground	Input Common	Input Positive			
30 Watt Single	Input Positive	Input Positive	Input Common	Input Common	Case Ground	+Sense	Positive Output	Output Common	-Sense	NC (+ trim)	NC
30 Watt Dual	Input Positive	Input Positive	Input Common	Input Common	Case Ground	Positive Output	+Output Common	NC (+ trim)	Negative Output	-Output Common	NC (+ trim)
30 Watt Triple	Input Positive	Input Positive	Input Common	Input Common	Case Ground	Positive Output	+Output Common	+Aux.	±Aux Ret.	-Aux.	NC

See our MC Series DC-DC Converters in Volume D, pages D.2005-2008

NOMOGRAPH VOLTAGE DROP

NOMOGRAPH OF VOLTAGE DROP ACROSS LOAD SUPPLY LEADS
(as a function of wire size and load current)

THIS NOMOGRAPH CAN BE USED TO FIND:

Maximum current carrying capacity recommended for any standard wire size.*

1) With a straight edge, connect from the wire size on Scale 2 to the point "A" on Scale 3.
2) Read I_{max} on Scale 1.

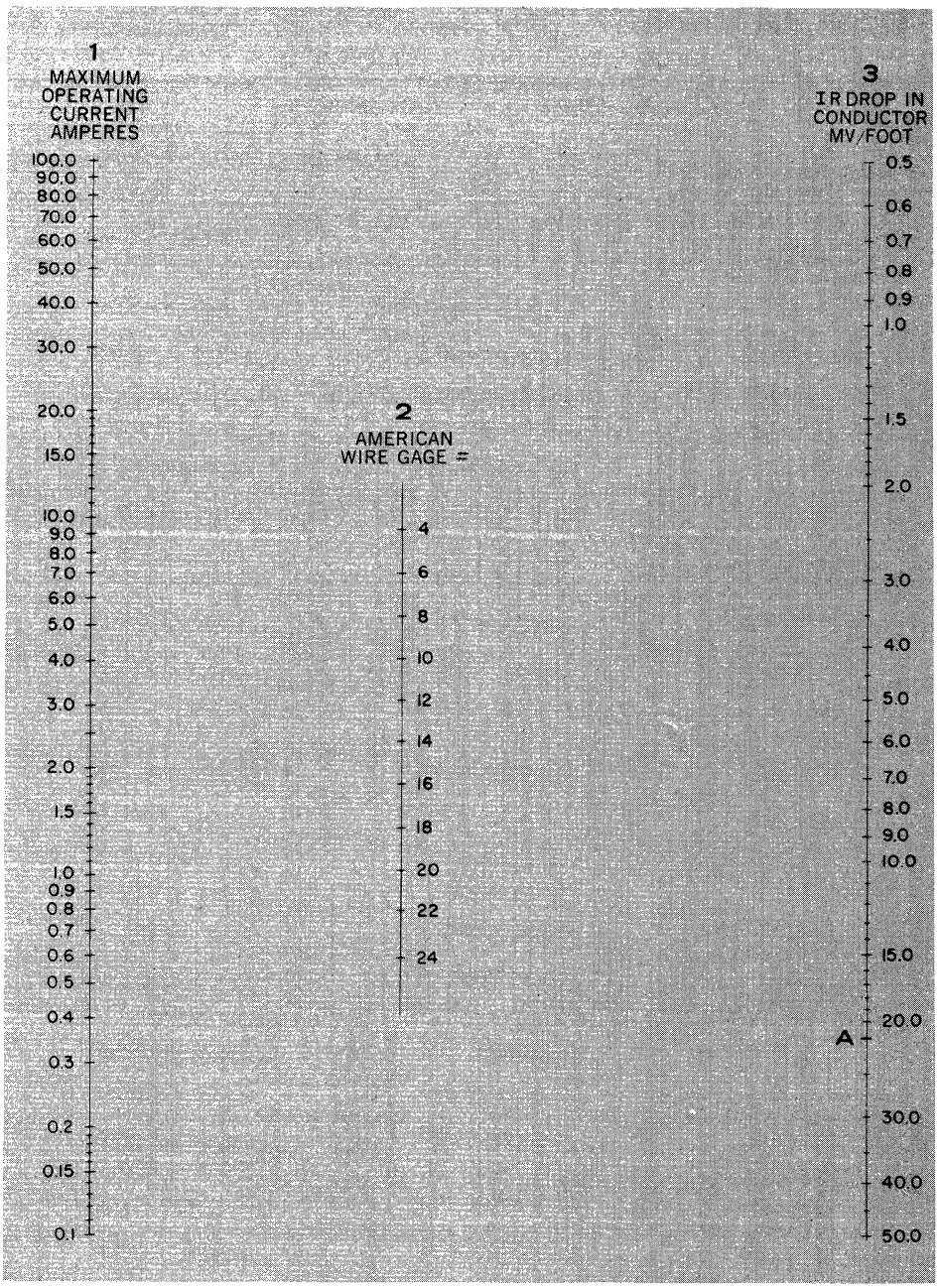
Voltage drop in millivolts per foot for known wire size and operating current.

1) With a straight edge, connect the known current on Scale 1 and the wire size on Scale 2.
2) Read voltage drop on Scale 3.

Wire size required for known operating current and known maximum tolerable voltage drop across supply leads.

1) Determine maximum tolerable drop in millivolts **per foot** of lead (sum of positive and negative leads).
2) Connect the value on Scale 3 (as determined in step 1) to the known current on Scale 1.
3) Read wire size on Scale 2.

* *Based on an arbitrary minimum 500 circular mils per ampere. High-temperature class insulation will safely allow higher currents.*



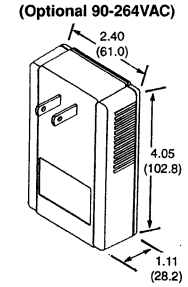
NOTE: A voltage stabilized Power Supply controls the voltage across its output terminals. Hence, the wire conductors used to connect the load must be considered as part of the load. At high load currents, the voltage drop across the supply leads may appreciably degrade stablization at the load. Kepco models equipped with the *remote error sensing* feature can automatically compensate for voltage drops of up to 500 mV across each load supply lead.

"VULCAN" 10 WATT SERIES SWITCHING POWER SUPPLIES

MEDICAL

CONFIGURATION

90VAC-132VAC
(Optional 90-264VAC)

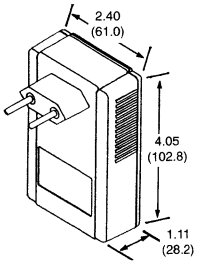


NORTH AMERICA, JAPAN

NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZASN01000	**+3.3V*** **	0-2.4A	8.6W
	LZASN01001	+5V	0-2.2A	11W
	LZASN01002	+9V	0-1.2A	10.8W
	LZASN01003	+12V	0-0.94A	11.3W
	LZASN01004	+15V	0-0.8A	12W
	LZASN01005	+18V	0-0.65A	12.6W
	LZASN01006	+24V	0-0.5A	12W
	LZASN01007 *(Pending)*	+48V	0-0.25A	12W
DUAL	LZASN01021	+5V +12V	0-1.4A** 0-0.4A	11W
TRIPLE	LZASN01031	+5V +12V -12V	0-1.4A** 0-0.4A 0-0.4A	11W
	LZASN01032	+5V +15V -15V	0-1.4A** 0-0.3A 0-0.3A	11W
	LZASN01033	+5V +12V -5V	0-1.4A** 0-0.4A 0-0.4A	11W

CONFIGURATION

180VAC-264VAC
(Optional 90-264VAC)

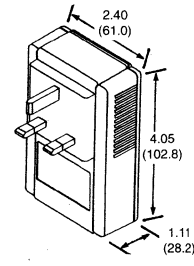


CONTINENTAL EUROPE

NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZESL01000	**+3.3V*** **	0-2.4A	8.6W
	LZESL01001	+5V	0-2.2A	11W
	LZESL01002	+9V	0-1.2A	10.8W
	LZESL01003	+12V	0-0.94A	11.3W
	LZESL01004	+15V	0-0.8A	12W
	LZESL01005	+18V	0-0.65A	12.6W
	LZESL01006	+24V	0-0.5A	12W
	LZESL01007 *(Pending)*	+48V	0-0.25A	12W
DUAL	LZESL01021	+5V +12V	0-1.4A** 0-0.4A	11W
TRIPLE	LZESL01031	+5V +12V -12V	0-1.4A** 0-0.4A 0-0.4A	11W
	LZESL01032	+5V +15V -15V	0-1.4A** 0-0.3A 0-0.3A	11W
	LZESL01033	+5V +12V -5V	0-1.4A** 0-0.4A 0-0.4A	11W

CONFIGURATION

180VAC-264VAC
(Optional 90-264VAC)

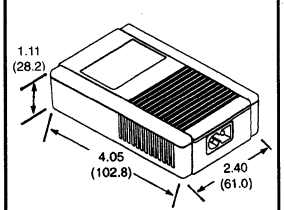


UNITED KINGDOM

NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZESK01000	**+3.3V*** **	0-2.4A	7.9W
	LZESK01001	+5V	0-2.2A	11W
	LZESK01002	+9V	0-1.2A	10.8W
	LZESK01003	+12V	0-0.94A	11.3W
	LZESK01004	+15V	0-0.8A	12W
	LZESK01005	+18V	0-0.65A	11.7W
	LZESK01006	+24V	0-0.5A	12W
	LZESK01007 *(Pending)*	+48V	0-0.25A	12W
DUAL	LZESK01021	+5V +12V	0-1.4A** 0-0.4A	11W
TRIPLE	LZESK01031	+5V +12V -12V	0-1.4A** 0-0.4A 0-0.4A	11W
	LZESK01032	+5V +15V -15V	0-1.4A** 0-0.3A 0-0.3A	11W
	LZESK01033	+5V +12V -5V	0-1.4A** 0-0.4A 0-0.4A	11W

CONFIGURATION

90VAC-264VAC



UNIVERSAL DESKTOP
WITH 2 PIN AC CONNECTOR

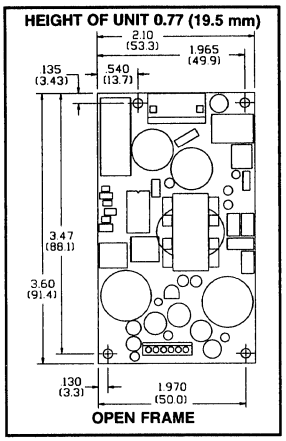
NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZUSW01000	**+3.3V*** **	0-2.4A	7.9W
	LZUSW01001	+5V	0-2A	10W
	LZUSW01002	+9V	0-1.1A	9.9W
	LZUSW01003	+12V	0-0.85A	10.2W
	LZUSW01004	+15V	0-0.7A	10.5W
	LZUSW01005	+18V	0-0.6A	10.8W
	LZUSW01006	+24V	0-0.45A	10.8W
	LZUSW01007 *(Pending)*	+48V	0-0.23A	10.8W
DUAL	LZUSW01021	+5V +12V	0-1.4A** 0-0.4A	10W
TRIPLE	LZUSW01031	+5V +12V -12V	0-1.4A** 0-0.4A 0-0.4A	10W
	LZUSW01032	+5V +15V -15V	0-1.4A ** 0-0.3A 0-0.3A	10W
	LZUSW01033	+5V +12V -5V	0-1.4A** 0-0.4A 0-0.4A	10W

Single output units are available from 3.3V up to 48.0V in 0.1V increments. Product specifications are on page D•1677.

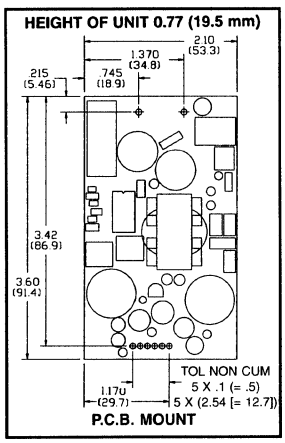
LZRelectronics,inc. 8051 Cessna Ave., Gaithersburg, MD 20879
Telephone (301) 921-4600 Fax (301) 670-0436 LZR

"VULCAN" 10 WATT SERIES SWITCHING POWER SUPPLIES

MEDICAL



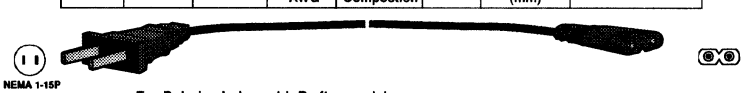
NO OF OUTPUTS	90VAC-264VAC UNIVERSAL	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)*
SINGLE (1)	LZUSP01000	**+3.3V *****	0-2.4A	7.9W
	LZUSP01001	+5V	0-2A	10W
	LZUSP01002	+9V	0-1.1A	9.9W
	LZUSP01003	+12V	0-0.85A	10.2W
	LZUSP01004	+15V	0-0.7A	10.5W
	LZUSP01005	+18V	0-0.6A	10.8W
	LZUSP01006	+24V	0-0.45A	10.8W
	LZUSP01007	+48V	0-0.23A	10.8W
DUAL	LZUSP01021	+5V +12V	0-1.4A ** 0-0.4A	10W
TRIPLE	LZUSP01031	+5V +12V -12V	0-1.4A ** 0-0.4A 0-0.4A	10W
	LZUSP01032	+5V +15V -15V	0-1.4A ** 0-0.3A 0-0.3A	10W
	LZUSP01033	+5V +12V -5V	0-1.4A ** 0-0.4A 0-0.4A	10W



NO OF OUTPUTS	90VAC-264VAC UNIVERSAL	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)*
SINGLE (1)	LZUSE01000	**+3.3V *****	0-2.4A	7.9W
	LZUSE01001	+5V	0-2A	10W
	LZUSE01002	+9V	0-1.1A	9.9W
	LZUSE01003	+12V	0-0.85A	10.2W
	LZUSE01004	+15V	0-0.7A	10.5W
	LZUSE01005	+18V	0-0.6A	10.8W
	LZUSE01006	+24V	0-0.45A	10.8W
	LZUSE01007	+48V	0-0.23A	10.8W
DUAL	LZUSE01021	+5V +12V	0-1.4A ** 0-0.4A	10W
TRIPLE	LZUSE01031	+5V +12V -12V	0-1.4A ** 0-0.4A 0-0.4A	10W
	LZUSE01032	+5V +15V -15V	0-1.4A ** 0-0.3A 0-0.3A	10W
	LZUSE01033	+5V +12V -5V	0-1.4A ** 0-0.4A 0-0.4A	10W

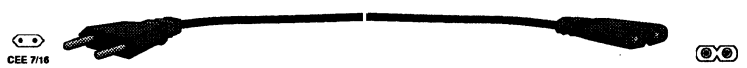
"VULCAN" SERIES AC POWER CORDS (10 WATT)

STANDARD LENGTH: 6 FT.



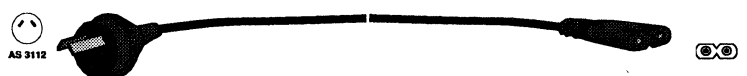
For Polarized plug add -P after model no.

Approval	Model No.	Rating	Size of Conductor AWG	Size of Conductor Compostion	Cord	Nominal O.D. (mm)	Temperature Rating
	Z701	125 V 7A	18	41/0.16	SPT-2	3.5 X 6.9	60°C
	Z702	125 V 7A	0.75 mm²	50/0.18	VFF	3.1 X 6.2	75°C



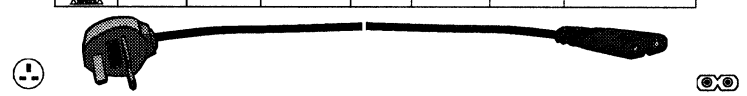
Continental Europe Cord Set

	Z703	250 V 2.5A	2 X 0.75 mm²	42/0.15	H03VVH2-F	3.7 X 5.8	60°C



Australia Plug, 2 Prong

	Z704	250 V 2.5A	2 X 0.75 mm²	42/0.15	H03VVH2-F	3.7 X 5.8	60°C



United Kingdom Cord Set

	Z705	250 V 2.5A	2 X 0.75 mm²	42/0.15	H03VVH2-F	3.7 X 5.8	60°C

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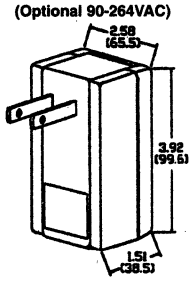
"VULCAN" 20 WATT SERIES SWITCHING POWER SUPPLIES

CONFIGURATION

90VAC-132VAC
(Optional 90-264VAC)

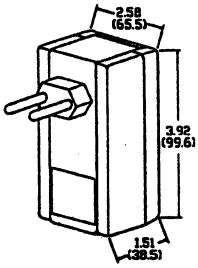


NORTH AMERICA JAPAN

NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZASN02000	**+3.3V*** **	0-4.2A	13.8W
	LZASN02001	+5V	0-3.8A	19.0W
	LZASN02002	+9V	0-2.2A	19.8W
	LZASN02003	+12V	0-1.7A	20.4W
	LZASN02004	+15V	0-1.35A	20.0W
	LZASN02005	+18V	0-1.2A	21.6W
	LZASN02006	+24V	0-.90A	21.6W
	LZASN02007 *(UL Only)*	+48V	0-.45A	21.6W
DUAL	LZASN02021	+5V +12V	0-2.5A** 0-0.9A	19.5W
TRIPLE	LZASN02031	+5V +12V -12V	0-2.5A** 0-0.9A 0-0.3A	19.5W
	LZASN02032	+5V +15V -15V	0-2.5A** 0-0.7A 0-0.3A	19.5W
	LZASN02033	+5V +12V -5V	0-2.5A** 0-0.9A 0-0.3A	19.5W

CONFIGURATION

180VAC-264VAC
(Optional 90-264VAC)

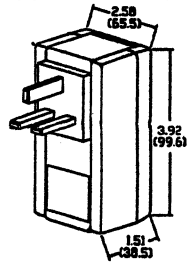


CONTINENTAL EUROPE

NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZESL02000	**+3.3V*** **	0-4.2A	13.8W
	LZESL02001	+5V	0-3.8A	19.0W
	LZESL02002	+9V	0-2.2A	19.8W
	LZESL02003	+12V	0-1.7A	20.4W
	LZESL02004	+15V	0-1.35A	20.0W
	LZESL02005	+18V	0-1.2A	21.6W
	LZESL02006	+24V	0-.90A	21.6W
	LZESL02007	+48V	0-.45A	21.6W
DUAL	LZESL02021	+5V +12V	0-2.5A** 0-0.9A	19.5W
TRIPLE	LZESL02031	+5V +12V -12V	0-2.5A** 0-0.9A 0-0.3A	19.5W
	LZESL02032	+5V +15V -15V	0-2.5A** 0-0.7A 0-0.3A	19.5W
	LZESL02033	+5V +12V -5V	0-2.5A** 0-0.9A 0-0.3A	19.5W

CONFIGURATION

180VAC-264VAC
(Optional 90-264VAC)

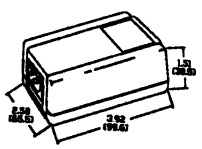


UNITED KINGDOM

NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZESK02000	**+3.3V*** **	0-4.2A	13.8W
	LZESK02001	+5V	0-3.8A	19.0W
	LZESK02002	+9V	0-2.2A	19.8W
	LZESK02003	+12V	0-1.7A	20.4W
	LZESK02004	+15V	0-1.35A	20.0W
	LZESK02005	+18V	0-1.2A	21.6W
	LZESK02006	+24V	0-.90A	21.6W
	LZESK02007	+48V	0-.45A	21.6W
DUAL	LZESK02021	+5V +12V	0-2.5A** 0-0.9A	19.5W
TRIPLE	LZESK02031	+5V +12V -12V	0-2.5A** 0-0.9A 0-0.3A	19.5W
	LZESK02032	+5V +15V -15V	0-2.5A** 0-0.9A 0-0.3A	19.5W
	LZESK02033	+5V +12V -5V	0-2.5A** 0-0.9A 0-0.3A	19.5W

CONFIGURATION

90VAC-264VAC



INCH
(mm)

UNIVERSAL DESKTOP
WITH IEC 320 CONNECTOR

NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZUSD02000	**+3.3V*** **	0-3.8A	12.5W
	LZUSD02001	+5V	0-3.3A	16.5W
	LZUSD02002	+9V	0-1.9A	17.1W
	LZUSD02003	+12V	0-1.5A	18.0W
	LZUSD02004	+15V	0-1.2A	18.0W
	LZUSD02005	+18V	0-1.0A	18.0W
	LZUSD02006	+24V	0-.75A	18.0W
	LZUSD02007 *(UL Only)*	+48V	0-0.38A	18.0W
DUAL	LZUSD02021	+5V +12V	0-2.5A** 0-0.9A	17.2W
TRIPLE	LZUSD02031	+5V +12V -12V	0-2.5A** 0-0.9A 0-0.3A	17.2W
	LZUSD02032	+5V +15V -15V	0-2.5A** 0-0.7A 0-0.3A	17.2W
	LZUSD02033	+5V +12V -5V	0-2.5A** 0-0.9A 0-0.3A	17.2W

Single output units are available from 3.3V up to 25.0V in 0.1V increments. Product specifications are on page D•1677.

LZR electronics, inc. 8051 Cessna Ave., Gaithersburg, MD 20879
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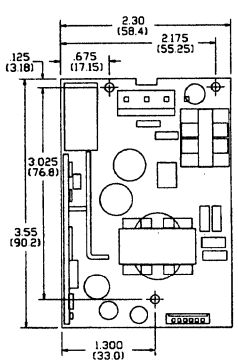
"VULCAN" 20 WATT SERIES SWITCHING POWER SUPPLIES

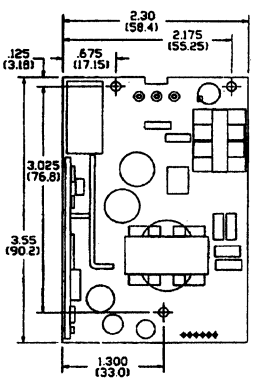
HEIGHT OF UNIT 1.20 (30.5mm)



OPEN FRAME

NO OF OUTPUTS	90VAC-264VAC UNIVERSAL	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)*
SINGLE (1)	LZUSP02000	**+3.3V** ***	0-3.8A	12.5W
	LZUSP02001	+5V	0-3.3A	16.5W
	LZUSP02002	+9V	0-1.9A	17.1W
	LZUSP02003	+12V	0-1.5A	18W
	LZUSP02004	+15V	0-1.2A	18W
	LZUSP02005	+18V	0-1.0A	18W
	LZUSP02006	+24V	0-.75A	18W
	LZUSP02007 (UL Only)	+48V	0-.38A	18W
DUAL	LZUSP02021	+5V +12V	0-2.5A ** 0-0.9A	17.2W
TRIPLE	LZUSP02031	+5V +12V -12V	0-2.5A ** 0-0.9A 0-0.3A	17.2W

HEIGHT OF UNIT 1.20 (30.5mm)



PC BOARD MOUNTED

NO OF OUTPUTS	90VAC-264VAC UNIVERSAL	OUTPUT VOLTAGE (DC)	OUTPUT CURRENT	OUTPUT POWER (RATED)*
SINGLE (1)	LZUSE02000	**+3.3V** ***	0-3.8A	12.5W
	LZUSE02001	+5V	0-3.3A	16.5W
	LZUSE02002	+9V	0-1.9A	17.1W
	LZUSE02003	+12V	0-1.5A	18W
	LZUSE02004	+15V	0-1.2A	18W
	LZUSE02005	+18V	0-1.0A	18W
	LZUSE02006	+24V	0-.75A	18W
	LZUSE02007 (UL Only)	+48V	0-.38A	18W
DUAL	LZUSE02021	+5V +12V	0-2.5A ** 0-0.9A	17.2W
TRIPLE	LZUSE02031	+5V +12V -12V	0-2.5A ** 0-0.9A 0-0.3A	17.2W

GENERAL SPECIFICATIONS: 10-20 WATT "VULCAN" SERIES

Input Voltage: 90 VAC to 132 VAC for North American units, 180 VAC to 264 VAC for European units, 90 VAC to 264 VAC for Universal units.

Input Frequency: 47 Hz to 63 Hz for all units.

Input Current: Less than 1.0 Amps for all units.

Output Current: No load to full load (no minimum load required).

Output Regulation (line/load): for single output units: ±5%; for multiple output units: ±5% for main output, ±5% for second output, and ±10%**** for third and fourth output (measured at the end of the output connector).

Output Ripple/noise (Peak-to-Peak): 1% or 100mV, whichever is smaller, except for +3.3V units which are 50mV maximum.

Turn on/Turn off Overshoot: 5% maximum for all units.

Turn-on Delay: 0.5 seconds maximum for all units.

Hold-up Time: 20 ms typical at nominal line (120 VAC) for all units.

Inrush Current: Less than 20 A peak for North American units, less than 40A peak for European and Universal units at cold start.

Efficiency: 85% single output/75% multi-output, typical at full load, nominal line.

Switching Frequency: 100KHz typical.

Over-voltage Protection: Basic protection limits the output voltages below 130% of the nominal voltage. Other options available. See options section.

Over-current / Short-circuit Protection: Hiccup, automatic recovery.

Other Protection: Input fusing, thermal shutdown.

Safety- Complies with:

IEC 950 MODEL: UL 1950, CSA TO 22.2 #234, 950 (JAPAN) T-MARK TO IEC 950. VDE, SEMKO, FINKO, DEMKO TO EN60950.

IEC 601 MODELS: UL 2601, 544, CSA TO 22.2 #601, 125, VDE, SEMKO, FINKO, DEMKO TO IEC 601.

IEC 1010 MODELS: UL 3101-1, 3111-1, CSA TO 22.2 #1010, VDE, SEMKO, FINKO, DEMKO TO IEC 1010.

Line Surge: IEC 801-5 level 4.

EMI: Complies with EN55022, EN55011 Class B and FCC Part 15 Class B when tested with a resistive load. Both conducted and radiated.

CE Mark: Tested to comply with EN50082-1 including IEC-801-2, IEC 801-3, IEC 801-4, IEC 801-5, Level 4, Unit is eligible for CE Mark.

MTBF: Greater than 50,000 hours calculated. **Operating Temperature:** 0° to 40° Centigrade.

Humidity: 0 to 90%. **Storage Temperature:** -40° to 80° Centigrade.

* Output current (power) shown for the open frame and PCB mount units are for the universal input models. Output power for the North American and European models will be 10% to 15% higher.

** Each output current can vary within it's designated range as long as the rated output power is not exceeded.

*** Remote sensing is required to achieve specified output regulation. Standard output ripple/noise is 50mV P-P. Lower ripple/noise available upon request.

**** ±5% of regulation for the second output and ±10% for the third and fourth output can be achieved with a 10% minimum load on the main output.

OPTIONS:

Remote Sensing: Provides regulation for main output within 2% of the nominal voltage.

Overvoltage:

a) Shut down without latching. The units will shut down when overvoltage protection is activated at 130% of the nominal value, and automatically recover when the fault is removed.

b) Shut down and latched - The units will shut down when overvoltage protection is activated at 130% of the nominal value, and remain shut down even if the fault is removed. The units can only be reset by cycling the input power.

NOTES:

1. Single output units are available from 3.3V up to 48.0V in 0.1V increments.
2. Standard color of housings and output cords is light gray, PMS #413C. Other colors are subject to minimum order quantity.
3. Molded ferrite beads on the output cords are available upon request.
4. You may select optional output cords at an additional cost.
5. All single output models except +3.3V are provided with "02" output cord. All dual, triple and +3.3V output models are provided with "07" output cords.
6. Custom output cords and connectors are available upon request. See page D•1682.
7. Earth ground connectors are also available upon request.

LZR electronics, inc. 8051 Cessna Ave., Gaithersburg, MD 20879 Telephone (301) 921-4600 Fax (301) 670-0436 LZR

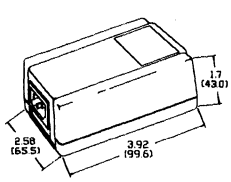
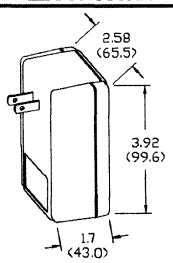
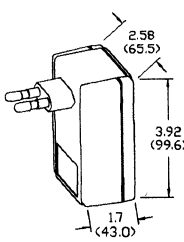
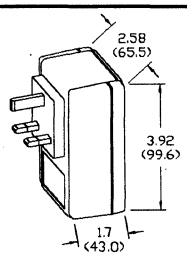
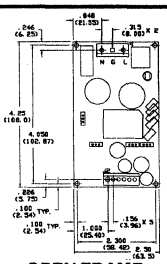
"VULCAN" 35 WATT SERIES SWITCHING POWER SUPPLIES

IEC950 **IEC601** **IEC1010**

NO OF OUTPUTS	DESKTOP MODEL NUMBER	OPEN FRAME MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT * CURRENT	OUTPUT POWER (RATED)
SINGLE	LZUSD03500	LZUSP03500	+3.3V	0-7A	24 WATTS
	LZUSD03501	LZUSP03501	+5V	0-7A	35 WATTS
	LZUSD03502	LZUSP03502	+9V	0-3.8A	35 WATTS
	LZUSD03503	LZUSP03503	+12V	0-2.9A	35 WATTS
	LZUSD03504	LZUSP03504	+15V	0-2.3A	35 WATTS
	LZUSD03505	LZUSP03505	+18V	0-1.95A	35 WATTS
	LZUSD03506	LZUSP03506	+24V	0-1.45A	35 WATTS
	LZUSD03507	LZUSP03507	+48V	0-.73A	35 WATTS
DUAL	LZUSD03521	LZUSP035321	+5V +12V	0-3.8A 0-1.5A	35 WATTS
	LZUSD03522	LZUSP03522	+3.3V +5V	0-3.8A 0-3.8A	30 WATTS
	LZUSD03523	LZUSP03523	+3.3V +12V	0-3.8A 0-1.5A	30 WATTS
	LZUSD03524	LZUSP03524	+5V +15V	0-3.8A 0-1.2A	35 WATTS
	LZUSD03525	LZUSP03525	+3.3V +15V	0-3.8A 0-1.2A	30 WATTS
TRIPLE	LZUSD03531	LZUSP03531	+5V +12V -12V	0-3.8A 0-1.5A 0-0.5A	35 WATTS
	LZUSD03532	LZUSP03532	+5V +15V -15V	0-3.8A 0-1.2A 0-0.5A	35 WATTS
	LZUSD03533	LZUSP03533	+3.3V +12V -12V	0-3.8A 0-1.5A 0-0.5A	30 WATTS
	LZUSD03534	LZUSP03534	+3.3V +15V -15V	0-3.8A 0-1.2A 0-0.5A	30 WATTS
	LZUSD03535	LZUSP03535	+3.3V +5V -12V	0-3.8A 0-3.8A 0-0.5A	30 WATTS
	LZUS03536	LZUSP03536	+3.3V +5V -12V	0-3.8A 0-3.8A 0-0.5A	30 WATTS

Single output units are available from 3.3V up to 48V in 0.1V increments.
For unit size & output plug options please refer to page D•1765.
*** Each output current can be varied within its designated range as long as the rated output power is not exceeded.**

PACKAGING CONFIGURATIONS

MODEL PREFIX LZUSD035XX	MODEL PREFIX LZUSN035XX	MODEL PREFIX LZUSL035XX	MODEL PREFIX LZUSK035XX	MODEL PREFIX LZUSP035XX
				
UNIVERSAL DESKTOP WITH IEC 320 CONNECTOR	N. AMERICA/JAPAN	CONTINENTAL EUROPE	UNITED KINGDOM	OPEN FRAME 1.25" HIGH

GENERAL SPECIFICATIONS FOR 35 WATT VULCAN:

(Refer to 10-20 Watt (page D1757) for Common Specifications)
Input Current: Less than 0.75 Amps for all units.
Efficiency: 75% typical at full load, nominal line.

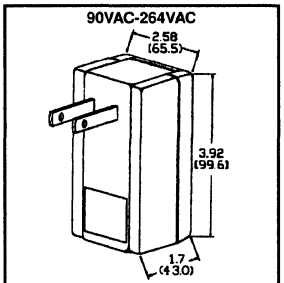
Safety: **IEC 950 MODEL:** UL 1950, C-UL to CSA 22.2 #950, EN60950.
IEC 601 MODELS: UL 2601, C-UL to CSA 22.2 #601, EN60110.

"VULCAN" 50 WATT SINGLE OUTPUT SERIES SWITCHING POWER SUPPLIES

INPUT VOLTAGE, ALL MODELS
90-264 VAC, 47-63 Hz

IEC950 **IEC601** **IEC1010**

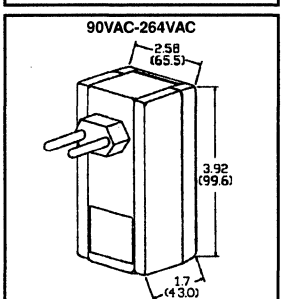
CONFIGURATION



NORTH AMERICA JAPAN

NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE	LZUSN05000	+3.3V	0-8A	40W
	LZUSN05001	+5V	0-8A	40W
	LZUSN05002	+9V	0-5A	45W
	LZUSN05003	+12V	0-4.1A	50W
	LZUSN05004	+15V	0-3.3A	50W
	LZUSN05005	+18V	0-2.8A	50W
	LZUSN05006	+24V	0-2.1A	50W
	LZUSN05007	+48V	0-1.1A	50W

CONFIGURATION

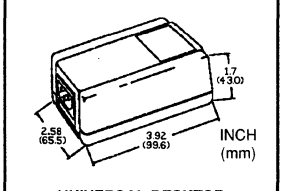


CONTINENTAL EUROPE

NO OF OUTPUTS	MODEL NO.①	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE	LZUSL05000	+3.3V	0-8A	40W
	LZUSK05000			
	LZUSL05001	+5V	0-8A	40W
	LZUSK05001			
	LZUSL05002	+9V	0-5A	45W
	LZUSK05002			
	LZUSL05003	+12V	0-4.1A	50W
	LZUSK05003			
	LZUSL05004	+15V	0-3.3A	50W
	LZUSK05004			
	LZUSL05005	+18V	0-2.8A	50W
	LZUSK05005			
	LZUSL05006	+24V	0-2.1A	50W
	LZUSK05006			
	LZUSL05007	+48V	0-1.1A	50W
	LZUSK05007			

① Note: USL = Euro Wall Mount; USK = British Wall Mount (Not Shown)

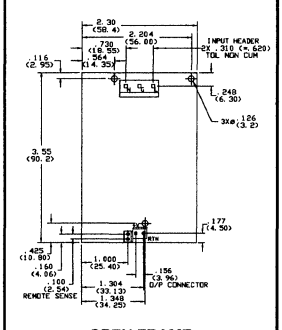
CONFIGURATION



UNIVERSAL DESKTOP
WITH IEC 320 CONNECTOR

NO OF OUTPUTS	MODEL NO.	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE	LZUSD05000	+3.3V	0-8A	40W
	LZUSD05001	+5V	0-8A	40W
	LZUSD05002	+9V	0-5A	45W
	LZUSD05003	+12V	0-4.1A	50W
	LZUSD05004	+15V	0-3.3A	50W
	LZUSD05005	+18V	0-2.8A	50W
	LZUSD05006	+24V	0-2.1A	50W
	LZUSD05007	+48V	0-1.1A	50W

HEIGHT OF UNIT 1.25" (31.7mm)



OPEN FRAME

NO OF OUTPUTS	MODEL NO.②	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE	LZUSP05000	+3.3V	0-8A	40W
	LZUSE05000			
	LZUSP05001	+5V	0-8A	40W
	LZUSE05001			
	LZUSP05002	+9V	0-5A	45W
	LZUSE05002			
	LZUSP05003	+12V	0-4.1A	50W
	LZUSE05003			
	LZUSP05004	+15V	0-3.3A	50W
	LZUSE05004			
	LZUSP05005	+18V	0-2.8A	50W
	LZUSE05005			
	LZUSP05006	+24V	0-2.1A	50W
	LZUSE05006			
	LZUSP05007	+48V	0-1.1A	50W
	LZUSE05007			

Note: Voltage can be adjusted from 3.3V up to 48.0V in 0.1 V increments.

② Note: USP = Open Frame; USE = PC Board Mounted

GENERAL SPECIFICATIONS FOR 50 WATT VULCAN:

(Refer to 10-20 Watt (page D1757) for Common Specifications)
Input Current: Less than 1.0 Amps for all units.
Output Regulation (line/load): for single output units: ±5%
Efficiency: 85% single output, typical at full load, nominal line.

LZR electronics, inc. 8051 Cessna Ave., Gaithersburg, MD 20879
Telephone (301) 921-4600 Fax (301) 670-0436 LZR

"VULCAN" 75 WATT SERIES SWITCHING POWER SUPPLIES

MEDICAL

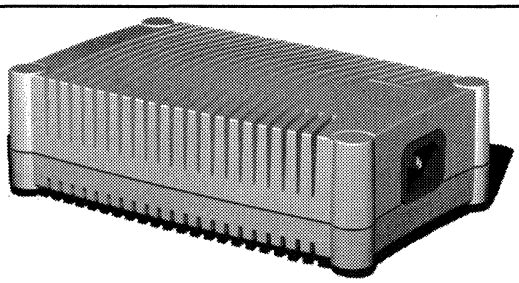
UNIVERSAL INPUT: 90 - 264VAC, 47 - 63Hz

IEC950 **IEC601** **IEC1010**

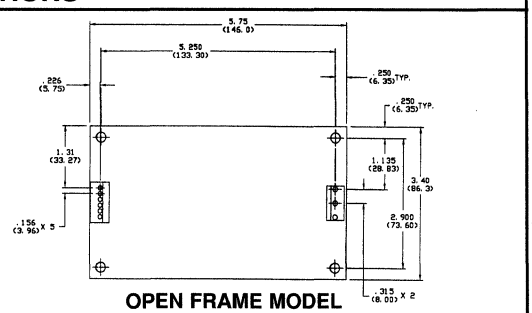
NO OF OUTPUTS	DESKTOP MODEL NUMBER	OPEN FRAME MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE	LZUSD07500	LZUSP07500	+3.3V	0-12A	40 WATTS
	LZUSD07501	LZUSP07501	+5V	0-12A	60 WATTS
	LZUSD07502	LZUSP07502	+9V	0-8.3A	75 WATTS
	LZUSD07503	LZUSP07503	+12V	0-6.2A	75 WATTS
	LZUSD07504	LZUSP07504	+15V	0-5.0A	75 WATTS
	LZUSD07505	LZUSP07505	+18V	0-4.2A	75 WATTS
	LZUSD07506	LZUSP07506	+24V	0-3.1A	75 WATTS
	LZUSD07507	LZUSP07507	+48V	0-1.6A	75 WATTS
DUAL	LZUSD07521	LZUSP07521	+5V +12V	0-8A 0-3.0A	65 WATTS
	LZUSD07522	LZUSP07522	+3.3V +5V	0-8A 0-8A	60 WATTS
	LZUSD07523	LZUSP07523	+3.3V +12V	0-8A 0-3.0A	60 WATTS
	LZUSD07524	LZUSP07524	+5V +15V	0-8A 0-2.4A	70 WATTS
	LZUSD07525	LZUSP07525	+3.3V +15V	0-8A 0-2.4A	65 WATTS
TRIPLE	LZUSD07531	LZUSP07531	+5V +12V -12V	0-8A 0-3.0A 0-0.5A	75 WATTS
	LZUSD07532	LZUSP07532	+5V +15V -15V	0-8A 0-2.4A 0-0.5A	75 WATTS
	LZUSD07533	LZUSP07533	+3.3V +12V -12V	0-8A 0-3.0A 0-0.5A	65 WATTS
	LZUSD07534	LZUSP07534	+3.3V +15V -15V	0-8A 0-2.4A 0-0.5A	65 WATTS
	LZUSD07535	LZUSP07535	+3.3V +5V +12V	0-8A 0-8A 0-0.5A	65 WATTS
	LZUSD07536	LZUSP07536	+3.3V +5V -12V	0-8A 0-8A 0-0.5A	65 WATTS

Single output units are available from 3.3V up to 48V in 0.1V increments.

PACKING CONFIGURATIONS



UNIVERSAL DESKTOP WITH IEC 320 CONNECTOR
SIZE: 6.4"L x 3.9"W x 2.0"H



OPEN FRAME MODEL
UNIT HEIGHT: 1.25"

GENERAL SPECIFICATIONS FOR 75 WATT VULCAN:

(Refer to 10-20 Watt (page Dxxxx) for Common Specifications)
Input Current: Less than 1.5 Amps for all units.
Efficiency: 75% typical at full load, nominal line.
Safety: **IEC 950 MODEL:** UL 1950, C-UL to CSA 22.2 #950, EN60950.
IEC 601 MODELS: UL 2601, C-UL to CSA 22.2 #601, EN60110.

MECHANICAL SPECIFICATIONS:
USW: Universal Desktop w/IEC 320 2 PIN AC Connector
USD: Universal Desktop w/IEC 320 3 PIN AC Connector
USP: Universal Open Frame
USE: Universal Printed Circuit Board Mount

LZRelectronics,inc. 8051 Cessna Ave., Gaithersburg, MD 20879
Telephone (301) 921-4600 Fax (301) 670-0436 LZR

100 WATT ENCLOSED AND OPEN FRAME SWITCHER FAMILY

MEDICAL

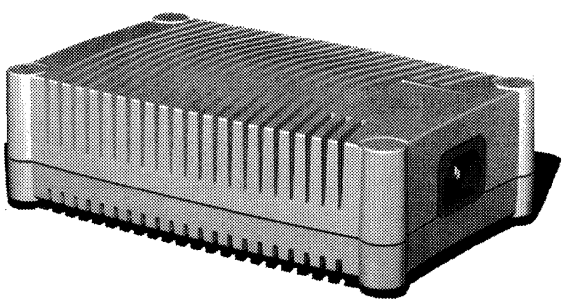
UNIVERSAL INPUT: 90 - 264VAC, 47 - 63Hz

IEC950 **IEC601** **IEC1010**

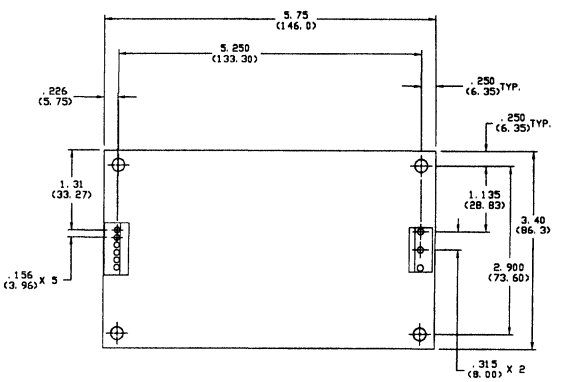
NO OF OUTPUTS	DESKTOP MODEL NUMBER	OPEN FRAME MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE	LZUSD10000	LZUSP10000	+3.3V	0-20A	66 WATTS
	LZUSD10001	LZUSP10001	+5V	0-20A	100 WATTS
	LZUSD10002	LZUSP10002	+9V	0-11.0A	99.9 WATTS
	LZUSD10003	LZUSP10003	+12V	0-8.3A	99.6 WATTS
	LZUSD10004	LZUSP10004	+15V	0-6.7A	100.5 WATTS
	LZUSD10005	LZUSP10005	+18V	0-5.6A	100.8 WATTS
	LZUSD10006	LZUSP10006	+24V	0-4.2A	100.8 WATTS
	LZUSD10007	LZUSP10007	+48V	0-2.1A	100.8 WATTS

Single output units are available from 3.3V up to 48V in 0.1V increments.

PACKING CONFIGURATIONS



UNIVERSAL DESKTOP WITH IEC 320 CONNECTOR
SIZE: 6.4"L x 3.9"W x 2.0"H



OPEN FRAME MODEL
UNIT HEIGHT: 1.3"

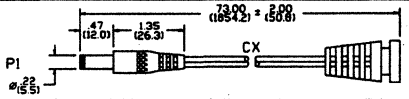
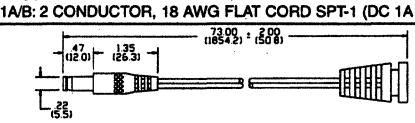
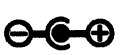
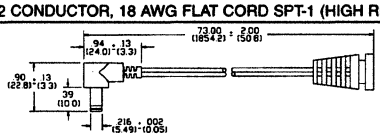
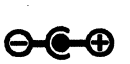
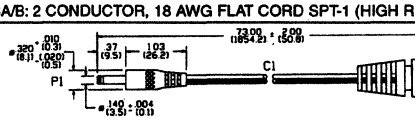
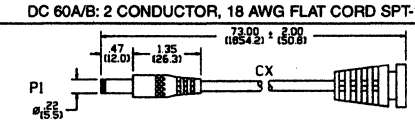
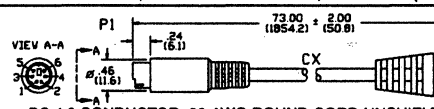
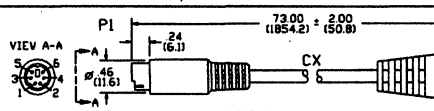
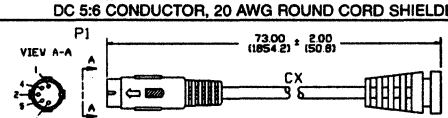
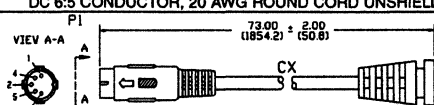
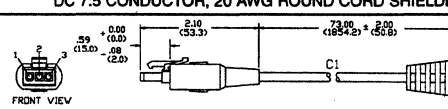
GENERAL SPECIFICATIONS FOR 100 WATT VULCAN:

(Refer to 10-20 Watt (page Dxxxx) for Common Specifications)
Input Current: Less than 1.5 Amps for all units.
Efficiency: 75% typical at full load, nominal line.

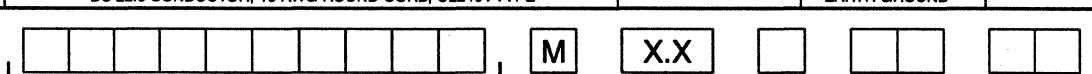
Safety: **IEC 950 MODEL:** UL 1950, C-UL to CSA 22.2 #950, EN60950.
IEC 601 MODELS: UL 2601, C-UL to CSA 22.2 #601, EN60110.

LZRelectronics,inc. 8051 Cessna Ave., Gaithersburg, MD 20879
Telephone (301) 921-4600 Fax (301) 670-0436 LZR

"VULCAN" SERIES OPTIONAL OUTPUT CORDS

OPTION NO.	DIMENSIONS	OUTPUT PLUG	WIRING	MATING CONNECTOR
01-DC1A 02-DC1B	 DC 1A/B: 2 CONDUCTOR, 18 AWG FLAT CORD SPT-1 (DC 1A SHOWN)	DC POWER A = 2.1mm I.D. B = 2.5mm I.D.		LZR P/N RL30A - 2.1mm RL30B - 2.5mm
19-DC19A 20-DC19B	 DC 19A/B: 2 CONDUCTOR, 18 AWG FLAT CORD SPT-1 (HIGH RETENTION)	DC POWER HIGH RETENTION A = 2.1mm I.D. B = 2.5mm I.D.		LZR P/N RL30A - 2.1mm RL30B - 2.5mm
73-DC19A 91-DC19B	 DC 73A/B: 2 CONDUCTOR, 18 AWG FLAT CORD SPT-1 (HIGH RETENTION)	DC POWER HIGH RETENTION A = 2.1mm I.D. B = 2.5mm I.D.		LZR P/N RL30A - 2.1mm RL30B - 2.5mm
60-DC60	 DC 60A/B: 2 CONDUCTOR, 18 AWG FLAT CORD SPT-1	DC POWER HIGH RETENTION 1.3mm I.D.		LZR P/N RL13 - 1.3mm
05-DC3A 06-DC3B	 DC 3A/B: 2 CONDUCTOR, 18 AWG ROUND CORD, SHIELDED (DC 3A SHOWN)	DC POWER SHIELDED CORD A = 2.1mm I.D. B = 2.5mm I.D.		LZR P/N RL30A - 2.1mm RL30B - 2.5mm
07-DC4	 DC 4:6 CONDUCTOR, 20 AWG ROUND CORD UNSHIELDED	6 PIN MINI-DIN	PIN 1 +5V PIN 2 -12V PIN 3 COM PIN 4 +12V PIN 5 +5V PIN 6 COM	LZR P/N MDJ6P, MDJ6PS
08-DC5	 DC 5:6 CONDUCTOR, 20 AWG ROUND CORD SHIELDED	6 PIN MINI-DIN SHIELDED CORD	PIN 1 +5V PIN 2 -12V PIN 3 COM PIN 4 +12V PIN 5 +5V PIN 6 COM **SHELL TO SHIELD**	LZR P/N MDJ6P, MDJ6PS
09-DC6	 DC 6:5 CONDUCTOR, 20 AWG ROUND CORD UNSHIELDED	5 PIN STD DIN	PIN 1 COM PIN 2 COM PIN 3 +5V PIN 4 -12V PIN 5 +12V	LZR P/N DJ006, DJ0215P
10-DC7	 DC 7:5 CONDUCTOR, 20 AWG ROUND CORD SHIELDED	5 PIN STD DIN SHIELDED CORD	PIN 1 COM PIN 2 COM PIN 3 +5V PIN 4 -12V PIN 5 +12V **SHELL TO SHIELD**	LZR P/N DJ006, DJ0215P, DJ0215PS
22-DC22	 DC 22:3 CONDUCTOR, 16 AWG ROUND CORD, UL2464 TYPE	3 POSITION LOCKING PLUG MOLEX P/N 39-01-4031	PIN 1 +3.3V PIN 2 COM PIN 3 (NC) *OPTIONAL:* CONNECT PIN 3 TO EARTH GROUND	MOLEX SERIES 5559, 5566, 5569

ORDERING SYSTEM



LZR Model No.

Unit Classification
NONE - IEC 950 UNIT (INFORMATION TECHNOLOGY)
T - IEC 1010 UNIT (TEST AND MEASUREMENT)
M - IEC 601 UNIT (MEDICAL)

Optional, For specifying Output Voltage Deviation
SUBTRAC X.X VOLTS FROM STANDARD OUTPUT VOLTAGE

Enclosure Color
A - STANDARD LZR COLOR - LIGHT, GRAY, PMS #413C,
B - BLACK (MINIMUM QUANTITY ORDER MAY APPLY)
C - CUSTOM COLOR (MINIMUM QUANTITY ORDER APPLIES)

Output Cord/Plug Option No.
01, 02, 05, 06, 07, 08, 09, 10, 19, 20, 22, 60, 73, 91

Label
00 - STANDARD LZR LABEL
XX - CUSTOM LABEL

LZRelectronics,inc. 8051 Cessna Ave., Gaithersburg, MD 20879
Telephone (301) 921-4600 Fax (301) 670-0436 LZR

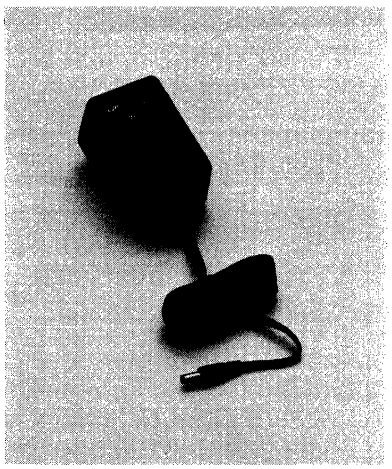
DC REGULATED POWER SUPPLIES

NORTH AMERICA

General Specifications

Input Voltage: 105V to 129V (117V ± 10%)
Input Frequency: 57 to 63 Hz
Voltage Regulation: over all ±5%
Ripple Voltage: 50mV P-P max. at full load, low line
Dielectric Strength: 1500 Vrms
Overload Protection: Thermal shutdown

Storage Temperature: -20°C to +85°C
Operating Temperature: 0C to +50°C
Humidity: 10% to 90%
Burn-In: 8 hours
Safety: UL 1310, UL 1012, and CSA C22.2 No 223
Ground Pin: is optional on most models



WALL MOUNT HOUSING: 3.3" x 2.2" x 1.9"

Single Output, U.S. Version

MODEL No.	OUTPUT	UNIT SIZE L" x W" x H"	APPROVAL	
			UL	CSA
AD0520R	5 VDC 0.2A	2.3 x 2 x 1.6 Wall Mount	✔	✔
AD0540R	5 VDC 0.4A	3.0 x 1.9 x 1.8 Wall Mount	✔	✔
AD0580R	5 VDC 0.8A	3.3 x 2.2 x 1.9 Wall Mount	✔	✔
AD051AR	5 VDC 1.0A	3.2 x 2.2 x 1.9 Wall Type	✔	✔
AD051ARD	5 VDC 1.0A	3.8 x 2.6 x 2.0 Desk Type	✔	✔
LZ515T	5 VDC 1.5A	4.7 x 3 x 2.2 Desk Type	✔	✔
AD0670R	6 VDC 0.7A	3.3 x 2.2 x 1.9 Wall Mount	✔	✔
AD0960R	9 VDC 0.6A	3.3 x 2.2 x 1.9 Wall Mount	✔	✔
AD1250R	12 VDC 0.5A	3.3 x 2.2 x 1.9 Wall Mount	✔	✔
AD1212AR	12 VDC 1.2A	4.7 x 3 x 2.2 Wall Mount	✔	
AD1212ARD	12 VDC 0.2A	4.7 x 3 x 2.2 Desk Type	✔	✔
AD2430RR	24 VDC 0.3A	3.3 x 2.2 x 1.9 Wall Mount	✔	✔

EUROPEAN & BRITISH POWER SUPPLIES

Input: 230-240VAC ±10%, 47-53 Hz • DC Regulated Outputs, 5%

ALL MODELS ARE VDE OR TUV APPROVED

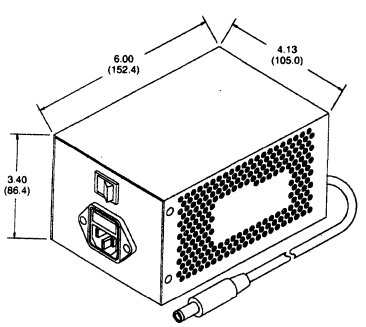
Single Output, Desk Type

MODEL	OUTPUT	SIZE L" x W" x H"
AD051ARBD	5 VDC @ 1000 mA	3.4 x 2.7 x 2 Desk Type
AD051ARB	5 VDC @ 1000 mA	3.4 x 2.7 x 2 Wall Type
E0515RD	5 VDC @ 1500 mA	4.1 x 2.6 x 2.1 Desk Type (IEC Connector)
AD1250RBD	12 VDC @ 500 mA	3.3 x 2.2 x 2 Desk Type
AD1212RBD	12 VDC @ 1200 mA	4.7 x 3 x 2 Desk Type
LZ5512120EU	5 VDC @ 500 mA • 12 VDC @ 120 mA • 12 VDC @ 120 mA	Wall Mount, Euro Plug
AD051ARUK	5 VDC @ 1000 mA Regulated	Wall Mount, UK Plug
LZ5512120UK	5 VDC @ 500 mA • 12 VDC @ 120 mA • 12 VDC @ 120 mA Regulated	Wall Mount, UK Plug

SWITCHING POWER SUPPLIES

UNIVERSAL INPUT WITH IEC CONNECTOR, EXTERNAL, 100 WATTS

General Specifications:
- Input Voltage: 90-264VAC. 47-63Hz
- EMI: Meets FCC Part 15 Class B EN55022 Class B, tested using resistive load.
- Safety: IEC - 1950 - ITE Products IEC - 1010 - Instruments



MODEL No.	OUTPUT VOLTAGE VDC	LOAD-AMP			RIPPLE NOISE pk-pk	REGULATION %
		MIN.	RATED	PEAK		
LZBD002	48	0	2.1	5.0	150	2

- **Input current:** Less than 2.5 Amps.
- **Output Current:** No load to full load (no minimum load required).
- **Turn on/turn off Overshoot:** 5% maximum.
- **Turn on/turn Delay:** 0.5 seconds maximum.
- **Hold-up time:** 20 minimum at normal line (120 VAC) for all units.
- **Inrush current:** Less than 35 A peak.
- **Efficiency:** 75% typical at full load, nominal line.
- **Switching Frequency:** 100KHz typical.
- **Over-voltage Protection:** Basic protection limits the output voltages below 130% of the nominal voltage. Other options available. See below.
- **Over-current / Short-circuit Protection:** Hiccup, automatic recovery. (Peak over-current protection allows overloading 5A maximum for 15-18 seconds; auto inhibited thereafter.)
- **Other Protection:** Input fusing in both current carrying conductors.
- **Line Surge:** IEC 801-5, level 4.
- **Operating Temperature:** 0° to 40° Centergrade.
- **Humidity:** 5% to 95%.
- **MTBF:** Greater than 50,000 hrs. calculated.
- **Storage Temperature:** 40° to 80° centigrade.

CUSTOM MADE POWER SUPPLIES & CHARGERS

Our Engineering team specializes in custom designs per customer specifications. We welcome your inquiries for power ranges from 10 - 500 watts including power factor corrected circuits.

LZR electronics, inc. 8051 Cessna Ave., Gaithersburg, MD 20879
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AC ADAPTORS FOR NORTH AMERICA AND JAPAN

DC Output, Wall Plug-in and Desk-Top

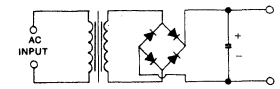
General Specifications

Input Voltage: 120VAC/60 Hz for North American models.
Input Voltage: 100VAC/50 - 60 Hz for Japan models.
Output Tolerance: ±5% at full load.
Operating Temperature: 0° - 40°C.
Storage Temperature: -20°C - 70°C.
Dielectric Strength: 1500VAC for 1 min.
Enclosure: Black Noryl, UL94V-0.
Output Cord: 6 ft, 20 - 24AWG, Black.
Safety: UL Listed per 1310 std. for wall mount units.
UL Listed per 1012 std. for desk top units.
CSA Certified to CSA std. 22.2 #107 or #223.

Options

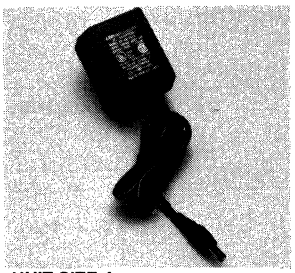
1. Other outputs or custom design per customer specifications are available.
2. UL/CSA approvals for custom designed units.
3. Earth ground PIN on primary and/or secondary. For selected models.

SCHEMATIC DIAGRAM



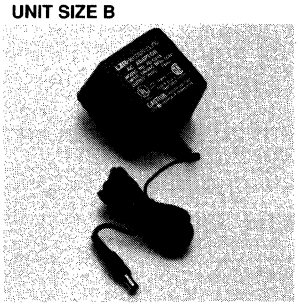
REMARK: STANDARD CAPACITOR = 1000 MFD
HIGHER RATINGS ARE AVAILABLE ON SPECIAL ORDER.

MODEL NO.	OUTPUT (VDC)	CURRENT (MA)	UNIT SIZE	APPROVAL CODE
AD0310	3.0	100	A	UCJ
AD0350	3.0	500	A	UCJ
AD0410	4.5	100	A	UCJ
AD0450	4.5	500	B	UCJ
AD041A	4.5	1000	E	UJC
AD0540	5.0	400	E	UCJ
AD0560	5.0	600	E	UC
AD052A	5.0	2000	K	UL
AD0610	6.0	100	A	UCJ
AD0620	6.0	200	A	UCJ
AD0630M	6.0	300	A	UCJ
AD0630	6.0	300	B	UCJ
AD0640	6.0	400	B	UCJ
AD0650	6.0	500	B	UCJ
AD0660	6.0	600	B	UCJ
AD0670	6.0	700	B	UCJ
AD0680	6.0	800	B	UCJ
AD0690	6.0	900	C	UCJ
AD061A	6.0	1000	C	UCJ
AD0615D	6.0	1500	P	UC
AD0617A	6.0	1500	M	UCJ
AD0623A	6.0	2000	N	UC
AD0710	7.5	100	A	UCJ
AD0720	7.5	200	A	UCJ
AD0730	7.5	300	B	UCJ
AD0740	7.5	400	B	UCJ
AD0780	7.5	800	C	UCJ
AD0790	7.5	900	C	UCJ
AD071A(1)	7.5	1000	C	UCJ
AD0715A	7.5	1500	K	UJC
AD0715D	7.5	1500	P	UC
AD0723A	7.5	2300	N	UC
AD0830	8.0	300	E	UL
AD0880	8.0	800	D	UC
AD0811A	8.0	1100	D	UL
AD0910(1)	9.0	100	A	UCJ
AD0920M	9.0	200	A	UCJ
AD0930(1)	9.0	300	B	UCJ
AD0940	9.0	400	B	UCJ
AD0950(1)	9.0	500	B	UCJ
AD0960	9.0	600	B	UCJ
AD0970	9.0	700	C	UCJ
AD0980	9.0	800	C	UCJ
AD0990	9.0	900	C	UCJ
LZ0990	9.0	900	H	UC
AD091A(1)	9.0	1000	C	UCJ
AD0911	9.0	1100	D	UL
AD0912AD	9.0	1200	P	UJC
AD0915A	9.0	1500	M	UJC
AD0915AD	9.0	1500	P	UC
AD092A	9.0	2000	N	UC
AD1045	10.5	450	E	UL
AD1060	10.0	600	D	UC
AD1095	10.5	950	Desk Top	UC
AD1015	10.5	1500	M	UCJ
AD1210(1)	12.0	100	A	UCJ

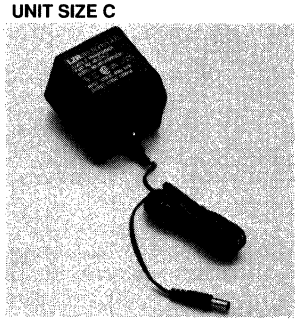


UNIT SIZE A

UNIT SIZE B



UNIT SIZE C



UNIT SIZE D

MODEL NO.	OUTPUT (VDC)	CURRENT (MA)	UNIT SIZE	APPROVAL CODE
AD1220M	12.0	200	B	UCJ
AD1230(1)	12.0	300	B	UCJ
AD1240	12.0	400	B	UCJ
AD1250(1)	12.0	500	B	UCJ
AD1260	12.0	600	C	UCJ
AD1270	12.0	700	C	UCJ
AD1280(1)	12.0	800	C	UCJM
AD121A(1)	12.0	1000	D	UJC
AD121AD	12.0	1000	P	UJC
AD1211	12.0	1100	D	UL
AD1213A	12.0	1300	N	UJC
AD1215A	12.0	1500	K	UJC
AD1217A	12.0	1700	N	UJC
AD122A	12.0	2000	Desk	UC
AD141AD	14.0	1000	P	UC
AD1417A	14.0	1700	K	UC
AD1515	15.0	150	B	UCJ
AD1520	15.0	200	B	UCJ
AD1530	15.0	300	B	UCJ
AD1540(1)	15.0	400	B	UCJ
AD1550	15.0	500	C	UCJ
AD1560(1)	15.0	600	C	UCJ
AD1580	15.0	800	D	UL
AD1590(1)	15.0	900	D	UC
AD151A	15.0	1000	M	UCJ
AD151AD	15.0	1000	P	UC
AD1515A	15.0	1500	N	UC
AD1610	16.0	100	A	UCJ
AD1620	16.0	200	B	UCJ
AD1630	16.0	300	B	UCJ
AD1645	16.0	450	C	UCJ
AD1650	16.0	500	C	UCJ
AD1670	16.0	700	D	UL
AD1690	16.0	900	D	UL
AD161A	16.0	1000	M	UCJ
AD171A	17.0	1000	M	UCJ
AD1815	18.0	150	B	UCJ
AD1820(1)	18.0	200	B	UCJ
AD1830	18.0	300	B	UCJ
AD1840	18.0	400	C	UCJ
AD1850(1)	18.0	500	C	UCJ
AD1860	18.0	600	D	UL
AD1880(1)	18.0	800	D	UJC
AD1880D	18.0	800	P	UC
AD181AD	18.0	1000	P	UC
AD1813A	18.0	1300	N	UC
AD2010	20.0	100	B	UCJ
AD2020	20.0	200	B	UCJ
AD2030	20.0	300	B	UCJ
AD2040	20.0	400	C	UCJ
AD2060	20.0	600	D	UL
AD2070	20.0	700	D	UL
AD2080	20.0	800	M	UCJ
AD201AD	20.0	1000	P	UC
AD2230	22.0	300	C	UCJ
AD2240	22.0	400	C	UCJ
AD2280D	22.0	800	P	UC
AD2410	24.0	100	B	UCJ
AD2420	24.0	200	B	UJC
AD2430	24.0	300	C	UCJ
AD2435(1)	24.0	350	C	UCJ
AD2450(1)	24.0	500	D	UL
AD2460	24.0	600	D	UL/C-UL
AD2460S	24.0	600	M	UCJ

Many models also available in desktop version.

NOTES:
1. Models with suffix (1) are readily available from LZR or distributor stock
2. For Japanese models add "J" after the Model No.
3. For unit size and output plug options please refer to page D•1687

APPROVAL CODES:
UL LISTED = U or UL
CSA APPROVAL = C
JIS APPROVED = J
MEDICAL APPROVED = M

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AC ADAPTERS

AC output, U.S. version, wall plug-in type

INPUT: 120VAC, 50/60 Hz. ALL MODELS ARE UL LISTED.

EI 35 SERIES, SIZE E

MODEL NO.	OUTPUT
A0410	4V AC 100 mA
A0420	4V AC 200 mA
A0430	4V AC 300 mA
A0440	4V AC 400 mA
A0450	4V AC 500 mA
A0460	4V AC 600 mA
A0470	4V AC 700 mA
A0480	4V AC 800 mA
A0490	4V AC 900 mA
A0510	5V AC 100 mA
A0520	5V AC 200 mA
A0530	5V AC 300 mA
A0540	5V AC 400 mA
A0550	5V AC 500 mA
A0560	5V AC 600 mA
A0570	5V AC 700 mA
A0610	6V AC 100 mA
A0620	6V AC 200 mA
A0630	6V AC 300 mA
A0640	6V AC 400 mA
A0650	6V AC 500 mA
A0660	6V AC 600 mA
A0670	6V AC 700 mA
A0710	7V AC 100 mA
A0720	7V AC 200 mA
A0730	7V AC 300 mA
A0740	7V AC 400 mA
A0750	7V AC 500 mA
A0810	8V AC 100 mA
A0820	8V AC 200 mA
A0830	8V AC 300 mA
A0840	8V AC 400 mA
A0850	8V AC 500 mA
A0910	9V AC 100 mA
A0920	9V AC 200 mA
A0930	9V AC 300 mA
A0940	9V AC 400 mA
A1010	10V AC 100 mA
A1020	10V AC 200 mA
A1030	10V AC 300 mA
A1040	10V AC 400 mA
A1210	12V AC 100 mA *
A1220	12V AC 200 mA
A1230	12V AC 300 mA
A1240	12V AC 400 mA
A1510	15V AC 100 mA
A1520	15V AC 200 mA
A1530	15V AC 300 mA
A1610	16V AC 100 mA
A1620	16V AC 200 mA
A1630	16V AC 300 mA
A1810	18V AC 100 mA
A1820	18V AC 200 mA
A2010	20V AC 100 mA
A2020	20V AC 200 mA
A2210	22V AC 100 mA
A2220	22V AC 200 mA
A2410	24V AC 100 mA
A2420	24V AC 200 mA
A2710	27V AC 100 mA

E1 57 Series, Size K, L

AC output U.S. version wall plug-in or desk top

All models UL listed with optional ground & center-tap.

MODEL NO.	OUTPUT		SIZE
AA0728	7 VAC	2.85 A	K
AA083A	8 VAC	3.0 A	K
AA0874A*	8.7 VAC	4.0 A	L
AA102A*	10 VAC	2.0 A	K
AA122A*	12 VAC	2.0 A	K
AA123A*	12 VAC	3.0 A	K
AA1614*	16.5 VAC	1.45 A	K
AA1816*	18 VAC	1.67 A	K
AA1822	18 VAC	2.2 A	L
AA1984*	19 VAC	0.84 A	K
AA1912*	19 VAC	1.26 A	K
AA2215	22 VAC	1.5 A	L
AA2412*	24 VAC	1.25 A	K
AA2416	24 VAC	1.67 A	L
AA2619	26 VAC	1.9 A	L
AA2622A	26 VAC	2.2 A	Desk
AA281A	28 VAC	1.0 A	K

EI 41 SERIES, SIZE F WITH GROUND PIN SIZE G

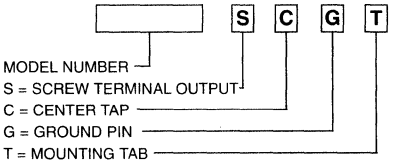
MODEL NO.	OUTPUT
A048041	4V AC 800 mA
A049041	4V AC 900 mA
A041A	4V AC 1 Amp
A056041	5V AC 600 mA
A057041	5V AC 700 mA
A0580	5V AC 800 mA
A0590	5V AC 900 mA
A051A	5V AC 1000 mA
A065041	6V AC 500 mA
A066041	6V AC 600 mA
A067041	6V AC 700 mA
A0680	6V AC 800 mA
A0690	6V AC 900 mA
A061A	6V AC 1000 mA
A0612A	6V AC 1200 mA
A075041	7V AC 500 mA
A0760	7V AC 600 mA
A0770	7V AC 700 mA
A0780	7V AC 800 mA
A0790	7V AC 900 mA
A071A	7V AC 1000 mA
A084041	8V AC 400 mA
A085041	8V AC 500 mA
A0860	8V AC 600 mA
A0870	8V AC 700 mA *
A0880	8V AC 800 mA
A0890	8V AC 900 mA
A081A	8V AC 1000 mA*
A094041	9V AC 400 mA
A0950	9V AC 500 mA
A0960	9V AC 600 mA
A0970	9V AC 700 mA
A0980	9V AC 800 mA
A0990	9V AC 900 mA
A091A	9V AC 1000 mA*
A103041	10V AC 300 mA
A104041	10V AC 400 mA
A1050	10V AC 500 mA*
A1060	10V AC 600 mA
A1070	10V AC 700 mA
A1080	10V AC 800 mA
A1090	10V AC 900 mA
A101A	10V AC 1000 mA
A123041	12V AC 300 mA
A124041	12V AC 400 mA
A1250	12V AC 500 mA*
A1260	12V AC 600 mA
A1270	12V AC 700 mA
A1280	12V AC 800 mA*
A1290	12V AC 900 mA
A121A	12V AC 1000 mA
A152041	15V AC 200 mA
A153041	15V AC 300 mA
A1540	15V AC 400 mA
A1550	15V AC 500 mA
A1560	15V AC 600 mA
A1570	15V AC 700 mA
A1580	15V AC 800 mA
A182041	18V AC 200 mA
A1830	18V AC 300 mA*
A1850	18V AC 500 mA
A1860	18V AC 600 mA
A1880	18V AC 800 mA
A202041	20V AC 200 mA
A2030	20V AC 300 mA
A2040	20V AC 400 mA*
A2050	20V AC 500 mA
A2060	20V AC 600 mA
A222041	22V AC 200 mA
A2230	22V AC 300 mA
A2240	22V AC 400 mA
A2250	22V AC 500 mA
A242041	24V AC 200 mA*
A2430	24V AC 300 mA
A2440	24V AC 400 mA
A2450	24V AC 500 mA
A2720	27V AC 200 mA
A2730	27V AC 300 mA
A2740	27V AC 400 mA

*CSA Approved.

EI 48 SERIES, SIZE D WITH GROUND PIN, SIZE H

MODEL NO.	OUTPUT
A0614	6V AC 1400 mA
A0615	6V AC 1500 mA
A062A	6V AC 2000 mA
A0625	6V AC 2500 mA
A063A	6V AC 3000 mA
A0712	7V AC 1200 mA
A0714	7V AC 1400 mA
A0715	7V AC 1500 mA*
A072A	7V AC 2000 mA
A0725	7V AC 2500 mA
A0812	8V AC 1200 mA
A0814	8V AC 1400 mA
A0815	8V AC 1500 mA
A0817	8V AC 1700 mA
A082A	8V AC 2000 mA *
A0824	8V AC 2400 mA
A0912	9V AC 1200 mA *
A0914	9V AC 1400 mA
A0915	9V AC 1500 mA
A0917	9V AC 1700 mA
A092A	9V AC 2000 mA
A1012	10V AC 1200 mA
A1014	10V AC 1400 mA
A1016	10V AC 1600 mA
A1018	10V AC 1800 mA
A1212	12V AC 1200 mA
A1214	12V AC 1400 mA
A1215	12V AC 1500 mA
A1216	12V AC 1600 mA
A1590	15V AC 900 mA
A151A	15V AC 1000 mA
A1512	15V AC 1200 mA
A1650	16V AC 500 mA
A1660	16V AC 600 mA
A1670	16V AC 700 mA
A1680	16V AC 800 mA
A1690	16V AC 900 mA
A161A	16V AC 1000 mA
A1612	16V AC 1200 mA*
A1890	18V AC 900 mA
A181A	18V AC 1000 mA
AA1912C	19V AC 1200 mA
A2070	20V AC 700 mA *
A2080	20V AC 800 mA
A2090	20V AC 900 mA *
AA201A	20V AC 1000 mA *
A2260	22V AC 600 mA
A2270	22V AC 700 mA
A2280	22V AC 800 mA
A2290	22V AC 900 mA
A2460	24V AC 600 mA*
A2470	24V AC 700 mA
A2480	24V AC 800 mA
AA2640	26V AC 400 mA *
A2750	27V AC 500 mA
A2760	27V AC 600 mA
A2770	27V AC 700 mA
AA281ACT	28V AC 1000 mA*

OPTION NUMBERING SYSTEM EXCEPT EI-35 SERIES



Example 1: A101AC: 10VAC at 1A std. enclosure & center tap.

Example 2: A151ASCGT: 15VAC at 1A screw terminal enclosure with center-tap, ground & mounting tab.

NOTES:

1. **See page D•1687 for unit sizes and optional output plugs.**
2. ***CSA Approved with standard enclosure only and no options.**
3. **Most models have a minimum purchase of 500 units. Lead time: 12 wks. A.R.O. non-standard outputs are available upon request.**

EUROPEAN POWER SUPPLIES

Ⓝ Ⓢ Ⓕ Ⓓ CB—CERTIFICATE

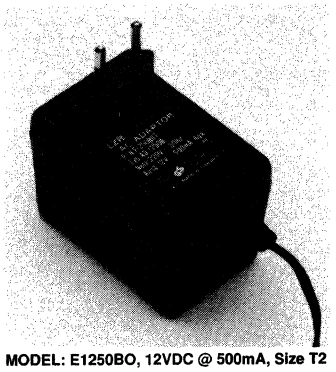
CE

INPUT: 220-230 VAC/50 Hz

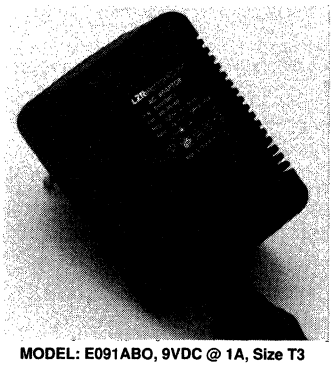
DC OUTPUT

MODEL NO.	OUTPUT VOLTAGE VDC	CURRENT OUTPUT mA	UNIT SIZE
E0330BO	3.0	300	T1
E0360BO	3.0	600	T2
E0410BT	4.5	100	T4
E0430BO	4.5	300	T1
E0460BO	4.5	600	T2
E0610BT	6.0	100	T4
E0630BL	6.0	300	T5
E0650BL	6.0	500	T5
E0660BO	6.0	600	T2
E061ABT	6.0	1000	T6
E0612ABO	6.0	1200	T3
E0615AB	6.0	1500	T9
E0730BO	7.5	300	T1
E0740BL	7.5	400	T5
E0760BO	7.5	600	T2
E071ABO	7.5	1000	T3
E0715AB	7.5	1500	T9
E0910BT	9.0	100	T4
E0930BL	9.0	300	T5
E0950BL(1)	9.0	500	T5
E0960BO	9.0	600	T2
E0980BL	9.0	800	T7
E091AB0(1)	9.0	1000	T3
E091ABL	9.0	1000	T7
AD091ABD7(1)	9.0	1000	DESK
E0913AB	9.0	1300	T9
E1012AB	10.0	1200	T9
E1220BO	12.0	200	T1
E1230BOI	12.0	300	T1
E1230BL	12.0	500	T2
E1250BO(1)	12.0	500	T5
E1250BL	12.0	500	T5
E1280BO(1)	12.0	800	T3
E1280BL	12.0	800	T7
E121ABL	12.0	1000	T8
AD121AUK	12.0	1000	WALL
AD121ABD(1)	12.0	1000	DESK
E1215ABL	12.0	1400	WALL
E131ABDV	13.0	1000	DESK
AD1215AUK	12.0	1400	WALL
E1480BT	14.0	800	T6
E1515BO	15.0	150	T1
E1530BL	15.0	300	T5
E1540BO	15.0	400	T2
E1560BO(1)	15.0	600	T3
E1560BS	15.0	600	T9
E151ABL	15.0	1000	T8
E1655BT	16.0	550	T6
E1670BT	16.0	700	T6
E1680B	16.0	800	T9
E1820BO	18.0	200	T1
E1850BO	18.0	500	T3
E1860BT	18.0	600	T6
E1880BDT	18.0	800	DESK
E181ABDT	18.0	1000	DESK
E2010BO	20.0	100	T1
E2030BO	20.0	300	T2
E2240BT	22.0	400	T6
E2410BO	24.0	100	T1
E2425BO	24.0	250	T2
E2440BO	24.0	400	T3
E2455B	24.0	550	T9

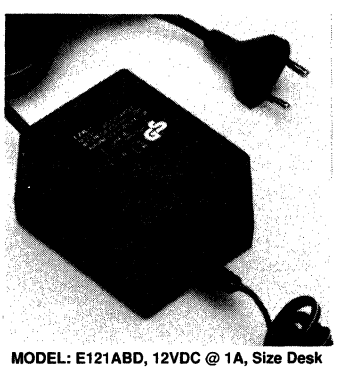
(1) Stock Models



MODEL: E1250BO, 12VDC @ 500mA, Size T2



MODEL: E091ABO, 9VDC @ 1A, Size T3

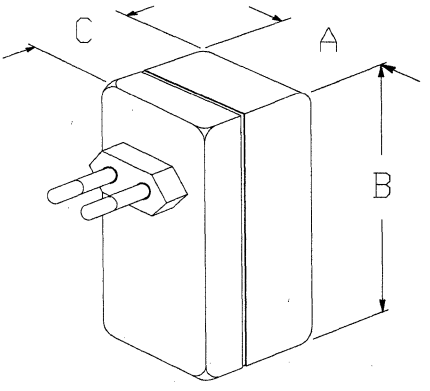


MODEL: E121ABD, 12VDC @ 1A, Size Desk

SIZE	DIMENSIONS (mm)		
	A	B	C
T1	50	59.3	41
T2	50	80	54.5
T3	58	90	54.5
T4	43.5	56.5	37
T5	51	60	41.3
T6	55.5	69.5	47.5
T7	56	82	48
T8	65	85	55
T9	58.6	66.5	45.5

AC OUTPUT

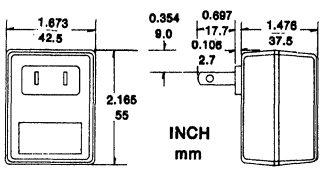
MODEL NO.	OUTPUT VOLTAGE VDC	CURRENT OUTPUT mA	UNIT SIZE
A0330BO	3.0	300	T1
A0360BO	3.0	600	T2
A0430BO	4.5	300	T1
A0460BO	4.5	600	T2
A0630BO	6.0	300	T1
A0660BO	6.0	600	T2
A0612BO	6.0	1200	T3
A0730BO	7.5	300	T1
A0760BO	7.5	600	T2
A071ABO	7.5	1000	T3
A0930BL	9.0	300	T1
A0950BL	9.0	500	T5
A0960BO	9.0	600	T2
A091ABL	9.0	1000	T7
A093ABDV	9.0	3000	DESK
A094ABT	9.0	4000	DESK
A1230BL	12.0	300	T5
A1250BL	12.0	500	T5
A1280BO	12.0	800	T3
A121ABL	12.0	1000	T7
A1216ABL	12.0	1600	T8
A1530BL	15.0	300	T5
A1540BO	15.0	400	T5
A1560BO	15.0	600	T3
A161ABL	16.0	1000	T8
AA1619AB7	16.0	1900	DESK
A1830BO	18.0	300	T1
A1850BO	18.0	500	T3
A181ABDCT	18.0	1000	DESK
A1811ABL	18.0	1100	T8
A2030BO	20.0	300	T2
A2040BL	20.0	400	T7
A2425BO	24.0	250	T2
A2440BL	24.0	400	T3
A2460BL	24.0	600	T7
A2412BDV	24.0	1200	DESK
AA2622AEU	26.0	2200	DESK



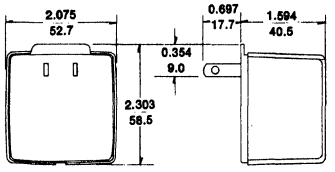
AC ADAPTERS

Enclosure dimensions: unit size inch (mm)

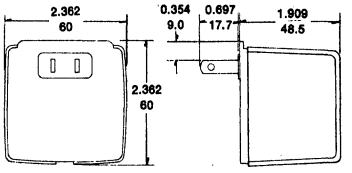
SIZE A



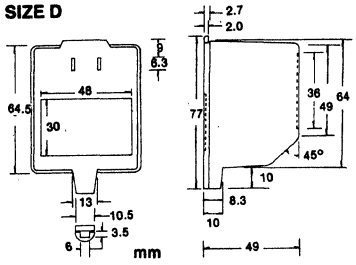
SIZE B



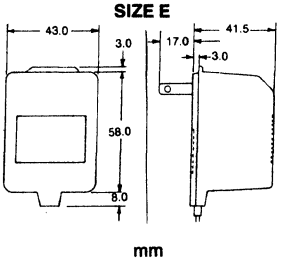
SIZE C



SIZE D



SIZE E



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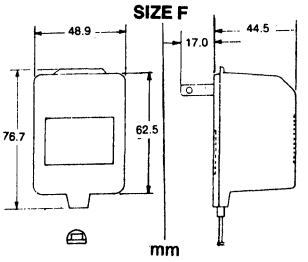
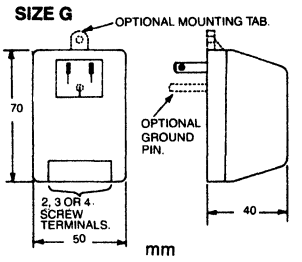
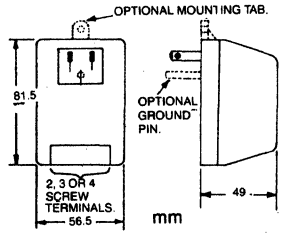


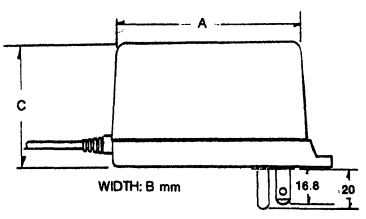
SIZE G



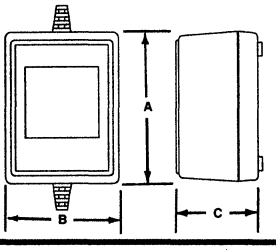
SIZE H



SIZE K & P



SIZE M & N



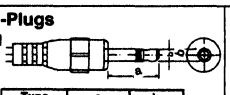
SIZE	DIMENSIONS (mm)		
	A	B	C
M	90	61	47
N	92	62	52
K	85	65	55
P	85	68	55

WALL MOUNT:
L = 97mm
W = 76mm
H = 62mm

OUTPUT PLUGS

Mini-Plugs

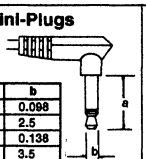
INCH
mm



Type	a	b
OP-01	0.453	0.098
	11.5	2.5
OP-02	0.571	0.138
	14.5	3.5

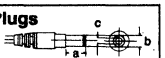
Right Angle Mini-Plugs

MIN: 500 pcs



Type	a	b
OP-03	0.492	0.098
	12.5	2.5
OP-04	0.571	0.138
	14.5	3.5

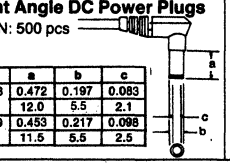
DC Power Plugs



Type	a	b	c
OP-05	0.472	0.197	0.083
	12.0	5.5	2.1
OP-07	0.472	0.217	0.098
	12.0	5.5	2.5

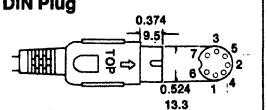
Right Angle DC Power Plugs

MIN: 500 pcs



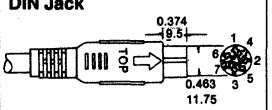
Type	a	b	c
OP-08	0.472	0.197	0.083
	12.0	5.5	2.1
OP-09	0.453	0.217	0.098
	11.5	5.5	2.5

DIN Plug



3 to 8 Pins
SD30–SD80

DIN Jack



3 to 8 Pins
SD30J–SD80J

MATING DC POWER JACKS

See page C•1282 Section 2100

RL32
Panel Mount
Pin Diameter: A = 2.1 mm

RL30
PCB Mount
B = 2.5 mm

RL31
PCB Mount

3.5ϕ JACKS

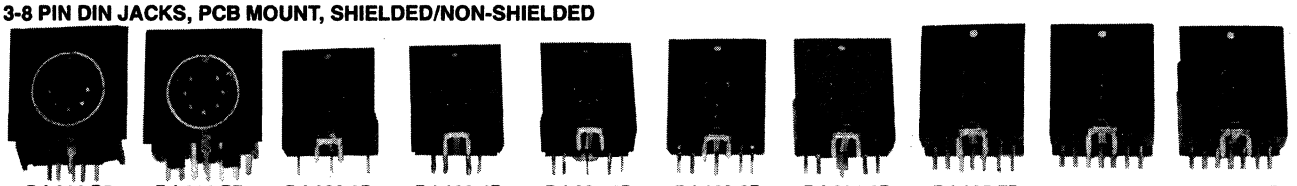
FOR DETAILED INFORMATION REFER TO pages C•1283-1284 Section 2100.

SJ-360

SJ-362

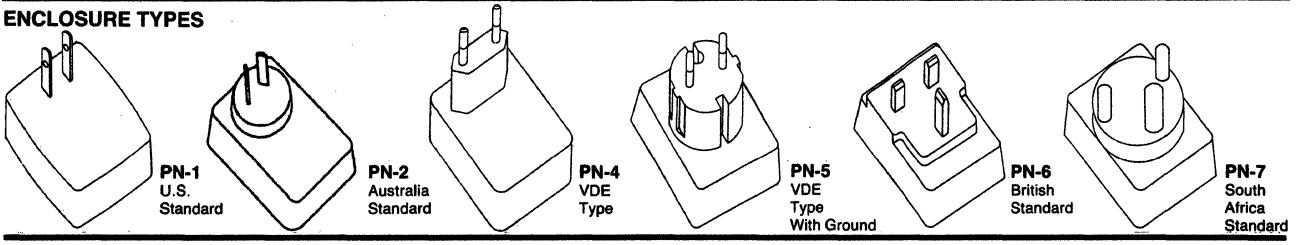
SJ-370

3-8 PIN DIN JACKS, PCB MOUNT, SHIELDED/NON-SHIELDED



DJ-014-P5 (5P 180°)
DJ-014-P7 (7P 270°)
DJ-020-3P (3P 180°)
DJ-022-4P (4P 210°)
DJ-021-5P (5P 180°)
DJ-023-6P (5P 240°)
DJ-024-6P (6P 240°)
DJ-025-7P (7P 270°)
DJ-026-8P (8P 270°)
DJ-027-8P (8P 262°)

ENCLOSURE TYPES



PN-1 U.S. Standard
PN-2 Australia Standard
PN-4 VDE Type
PN-5 VDE Type With Ground
PN-6 British Standard
PN-7 South Africa Standard

LZRelectronics,inc. 8051 Cessna Ave., Gaithersburg, MD 20879
Telephone (301) 921-4600 Fax (301) 670-0436 **LZR**

PQ SERIES

RUGGED MFL TECHNOLOGY

3.3 KW, 6.6 KW, 10 KW DC POWER SUPPLIES

MODELS AND RATINGS

MODEL	VOLTS Vdc	AMPS Adc	RIPPLE mVrms	POWER kW
PQ10-300	0-10	0-300	50	
PQ16-200	0-16	0-200	50	
PQ20-165	0-20	0-165	45	
PQ32-100	0-32	0-100	30	
PQ40-82	0-40	0-82	35	3.3
PQ50-65	0-50	0-65	40	
PQ80-41	0-80	0-41	50	
PQ100-33	0-100	0-33	55	
PQ125-26	0-125	0-26	60	
PQ160-20	0-160	0-20	70	
PQ200-16	0-200	0-16	80	
PQ250-13	0-250	0-13	90	
PQ375-8	0-375	0-8	100	
PQ500-6	0-500	0-6	130	
PQ625-5	0-625	0-5	150	
PQ10-600	0-10	0-600	50	
PQ16-400	0-16	0-400	50	
PQ20-330	0-20	0-330	45	
PQ32-200	0-32	0-200	30	
PQ40-165	0-40	0-165	35	
PQ50-130	0-50	0-130	40	
PQ80-82	0-80	0-82	50	
PQ100-66	0-100	0-66	55	6.6
PQ125-53	0-125	0-53	60	
PQ160-41	0-160	0-41	70	
PQ200-33	0-200	0-33	80	
PQ250-26	0-250	0-26	90	
PQ375-17	0-375	0-17	100	
PQ500-13	0-500	0-13	130	
PQ625-10	0-625	0-10	150	
PQ16-600	0-16	0-600	50	
PQ20-500	0-20	0-500	45	
PQ32-300	0-32	0-300	30	
PQ40-250	0-40	0-250	35	
PQ50-200	0-50	0-200	40	10
PQ80-125	0-80	0-125	50	
PQ100-100	0-100	0-100	55	
PQ125-80	0-125	0-80	60	
PQ160-62	0-160	0-62	70	
PQ200-50	0-200	0-50	80	
PQ250-40	0-250	0-40	90	
PQ375-27	0-375	0-27	100	
PQ500-20	0-500	0-20	130	
PQ625-16	0-625	0-16	150	

OPTIONS

SCR Crowbar
Custom input voltage
Custom output voltage
EMI Filter
IEEE-488 Interface

FEATURES

- 44 Models: 10 to 625 Vdc, 5 to 600 Adc
- Series and parallel master/slave operation
- High dielectric withstand: 2500 Vac
- Optional EMI suppression meets VDE 871A
- Digital control lines optically isolated
- Exclusive control loop diagnostics
- OVP and OCP shutdown standard, SCR crowbar optional
- Automatic V/I crossover
- Digital meters standard

- Programming resistors isolated from output
- Optional IEEE-488 programming
- Air exhaust in rear of cabinet
- User friendly controls and indicators
- High power factor

SPECIFICATIONS:

Input voltage: 208/240 Vac, 50-60 Hz, 3-phase standard;440/480 Vac, 50-60 Hz, 3-phase optional
Regulation line and load combined: 0.10%
Stability: 0.10% for 8 hours after 30 minute warm up
Transient response: 10 ms to recover within 2% of regulated output with a 30% step load change.
Ambient Temperature: 0 to 50°C
Programming resistors: 1K full scale for output voltage, output current, over voltage, and over current shutdown
Temperature coefficient: 0.04%/°C of maximum output current
Size: 5¼" H x 19" W x 24" D
Weight: 110 lbs for 10 kW models, 90 lbs for 6.6 kW models, and 70 lbs for 3.3 kW models

NOTES:
1. Specifications subject to change without notice.
2. Other options consult factory.

MAGNA-POWER ELECTRONICS, INC.
85 Fulton Street, Boonton, NJ 07005
(973) 263-0017 FAX: (973) 263-1928
http://www.magna-power.com

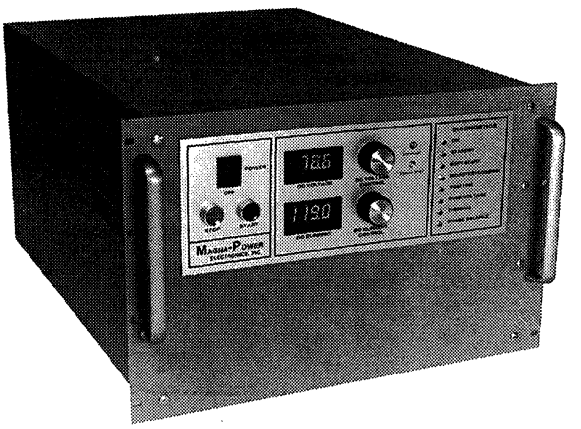
PX SERIES
10 KW DC POWER SUPPLIES

FAST DELIVERY
Stock to 4 Weeks

FEATURES
- 15 Models: 16 to 800 Vdc, 12 to 600 Adc
- Series and parallel master/slave operation
- High dielectric withstand: 2500 Vac
- Optional EMI suppression meets VDE 871A
- Digital control lines optically isolated
- Exclusive control loop diagnostics
- Enhanced transient response with electronic damping circuit
- Benchtop or 19" rack mountable
- Power factor corrected for low AC input current
- OVP shutdown standard, SCR crowbar optional
- Automatic V/I crossover
- Digital meters standard
- Programming resistors isolated from output
- Optional IEEE488/RS232 programming
- Air exhaust in rear of cabinet

MODELS AND RATINGS

MODEL	VOLTS Vdc	AMPS Adc	RIPPLE mVrms
PX16-600*	0-16	0-600	50
PX20-500	0-20	0-500	45
PX32-300*	0-32	0-300	30
PX40-250	0-40	0-250	35
PX50-200	0-50	0-200	40
PX80-125*	0-80	0-125	50
PX100-100	0-100	0-100	55
PX125-80*	0-125	0-80	60
PX160-62	0-160	0-62	70
PX200-50	0-200	0-50	80
PX250-40*	0-250	0-40	90
PX375-27	0-375	0-27	100
PX500-20*	0-500	0-20	130
PX625-16	0-625	0-16	150
PX800-12	0-800	0-12	175



APPLICATIONS
Aging racks
Battery charging
Capacitor forming
Cryogenic magnets
CW lasers
DC motors and relays
Electroplating
General electronics

SPECIFICATIONS:
Input voltage: 208/240 Vac, 50-60 Hz, 3-phase standard; 440/480 Vac, 50-60 Hz, 3-phase optional
Regulation line and load combined: 0.10%
Stability: 0.10% for 8 hours after 30 minute warm up
Transient response: 75 ms to recover within 2% of regulated output with 50% to 100% or 100% to 50% load change; 75 ms to recover within 10% of regulated output with 0% to 50% or 50% to 0% load change with Electronic Damping Circuit.
Ambient Temperature: 0 to 50°C
Programming resistors: 1K full scale for output voltage, output current, and over voltage shutdown
Temperature coefficient: 0.04%/°C of maximum output current
Size: 12¼" H x 19" W x 24" D
Weight: 260 lbs

OPTIONS
SCR Crowbar
EMI Filter
Electronic Damping Circuit
440/480 Vac input
Custom input voltage
Custom output voltage
IEEE488/RS232 Interface
Other options: consult factory

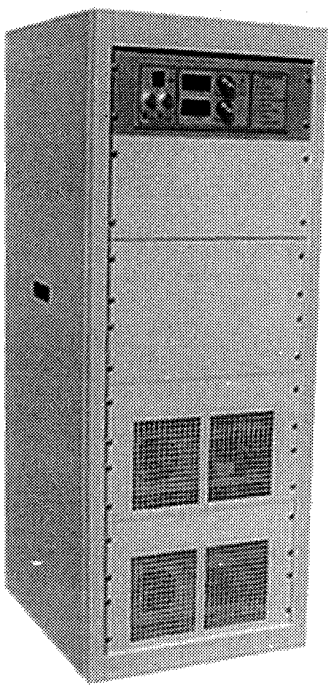
NOTES:
1. * indicate quick ship models.
2. Specifications subject to change without notice.

MAGNA-POWER ELECTRONICS, INC.
85 Fulton Street, Boonton, NJ 07005
(973) 263-0017 FAX: (973) 263-1928
http://www.magna-power.com

SX SERIES
20 TO 50 KW DC SYSTEMS

MODULAR
Engineered Assemblies

FEATURES
- 40 Models: 16 to 800 Vdc, 24 to 3000 Adc
- Can be specified with any of the PX Series features
- Or'd diagnostic functions for detection of module conditions
- Dedicated master control panel with digital control lines optically isolated
- Modules share currents equally



SPECIFICATIONS:
Input voltage: 208/240 Vac, 50-60 Hz, 3-phase standard; 440/480 Vac, 50-60 Hz, 3-phase optional
Regulation line and load combined: 0.10%
Stability: 0.10% for 8 hours after 30 minute warm up
Transient response: 75 ms to recover within 2% of regulated output with 50% to 100% or 100% to 50% load change; 75 ms to recover within 10% of regulated output with 0% to 50% or 50% to 0% load change with Electronic Damping Circuit.
Ambient Temperature: 0 to 50°C
Programming resistors: 1K full scale for output voltage, output current, and over voltage shutdown
Temperature coefficient: 0.04%/°C of maximum output current

Notes:
1) Specifications subject to change without notice.
2) Consult factory for options.

MODELS AND RATINGS

MODEL	VOLTS Vdc	AMPS Adc	RIPPLE mVrms	POWER kW
SX16-1200	0-16	0-1200	50	
SX32-600	0-32	0-600	30	
SX50-400	0-50	0-400	40	20
SX80-250	0-80	0-250	50	
SX125-160	0-125	0-160	60	
SX200-100	0-200	0-100	80	
SX250-80	0-250	0-80	90	
SX375-54	0-375	0-54	100	
SX500-40	0-500	0-40	130	
SX800-24	0-800	0-24	175	
SX16-1800	0-16	0-1800	50	
SX32-900	0-32	0-900	30	30
SX50-600	0-50	0-600	40	
SX80-375	0-80	0-375	50	
SX125-240	0-125	0-240	60	
SX200-150	0-200	0-150	80	
SX250-120	0-250	0-120	90	
SX375-81	0-375	0-81	100	
SX500-60	0-500	0-60	130	
SX800-36	0-800	0-36	175	
SX16-2400	0-16	0-2400	50	
SX32-1200	0-32	0-1200	30	
SX50-800	0-50	0-800	40	40
SX80-500	0-80	0-500	50	
SX125-320	0-125	0-320	60	
SX200-200	0-200	0-200	80	
SX250-160	0-250	0-160	90	
SX375-108	0-375	0-108	100	
SX500-80	0-500	0-80	130	
SX800-48	0-800	0-48	175	
SX16-3000	0-16	0-3000	50	
SX32-1500	0-32	0-1500	30	50
SX50-1000	0-50	0-1000	40	
SX80-625	0-80	0-625	50	
SX125-400	0-125	0-400	60	
SX200-250	0-200	0-250	80	
SX250-200	0-250	0-200	90	
SX375-135	0-375	0-135	100	
SX500-100	0-500	0-100	130	
SX800-60	0-800	0-60	175	

SIZE MATRIX

POWER	SIZE (H"xW"xD")	WEIGHT
20	49x22x29	600
30	59½x22x29	875
40	68½x22x29	1150
50	59½x44x29	1425

MAGNA-POWER ELECTRONICS, INC.
85 Fulton Street, Boonton, NJ 07005
(973) 263-0017 FAX: (973) 263-1928
http://www.magna-power.com

TQ SERIES

100 KW TO 750 KW DC POWER SUPPLIES

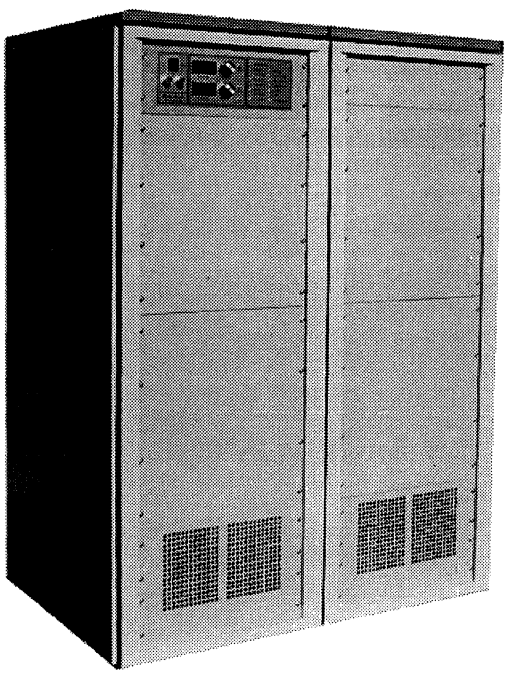
FAST DELIVERY

FEATURES

- 31 Models: 16 to 1000 Vdc, 100 to 7500 Adc
- 100 kW and 150 kW standardized models
- Up to 750 kW with 5 modules
- Series and parallel master/slave operation
- High dielectric withstand: 2500 Vac
- Optional EMI suppression meets VDE 871A
- Digital control lines optically isolated
- Exclusive control loop diagnostics
- Power factor corrected for low AC input current
- OVP shutdown standard, SCR crowbar optional
- Automatic V/I crossover
- Digital meters standard
- Programming resistors isolated from output
- Optional IEEE-488 programming
- Air exhaust in front of cabinet
- Enhanced transient response with electronic damping circuit

MODELS AND RATINGS

MODEL	VOLTAGE Vdc	CURRENT Adc	RIPPLE mVrms
100 KW MODELS			
TQ16-6000	0-16	0-6000	50
TQ20-5000	0-20	0-5000	45
TQ32-3000	0-32	0-3000	30
TQ40-2500	0-40	0-2500	35
TQ50-2000	0-50	0-2000	40
TQ80-1250	0-80	0-1250	50
TQ100-1000	0-100	0-1000	55
TQ125-800	0-125	0-800	60
TQ160-620	0-160	0-620	70
TQ200-500	0-200	0-500	80
TQ250-400	0-250	0-400	90
TQ375-270	0-375	0-270	100
TQ500-200	0-500	0-200	130
TQ625-160	0-625	0-160	150
TQ800-120	0-800	0-120	175
TQ1000-100	0-1000	0-100	225
150 KW MODELS			
TQ20-7500	0-20	0-7500	45
TQ32-4500	0-32	0-4500	30
TQ40-3750	0-40	0-3750	35
TQ50-3000	0-50	0-3000	40
TQ80-1850	0-80	0-1850	50
TQ100-1500	0-100	0-1500	55
TQ125-1200	0-125	0-1200	60
TQ160-900	0-160	0-900	70
TQ200-750	0-200	0-750	80
TQ250-600	0-250	0-600	90
TQ375-400	0-375	0-400	100
TQ500-300	0-500	0-300	130
TQ625-240	0-625	0-240	150
TQ800-180	0-800	0-180	175
TQ1000-150	0-1000	0-150	225



SPECIFICATIONS:

Input voltage: 440/480 Vac, 50-60 Hz, 3-phase
Regulation line and load combined: 0.10%
Stability: 0.10% for 8 hours after 30 minute warm up
Transient response: 75 ms to recover within 2% of regulated output with 50% to 100% or 100% to 50% load change; 75 ms to recover within 10% of regulated output with 0% to 50% or 50% to 0% load change with Electronic Damping Circuit
Ambient Temperature: 0 to 50°C
Programming resistors: 1K full scale for output voltage, output current, and over voltage shutdown
Temperature coefficient: 0.04%/°C of maximum output current
Size: 64¼" H x 47¼" W x 24¾" D
Weight: 1600 lbs for 100 kW models and 2100 lbs for 150 kW models

OPTIONS

SCR Crowbar
Electronic Damping Circuit
Custom output voltage
EMI Filter
Custom input voltage
IEEE-488 Interface

NOTES:

1. Specifications subject to change without notice.
2. Other options consult factory.

MAGNA-POWER ELECTRONICS, INC.

85 Fulton Street, Boonton, NJ 07005
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SBC488 IEEE488/RS232 INTERFACE

COMPUTER CONTROL FOR PX, PQ, SX, AND TQ SERIES SUPPLIES

HARDWARE FEATURES

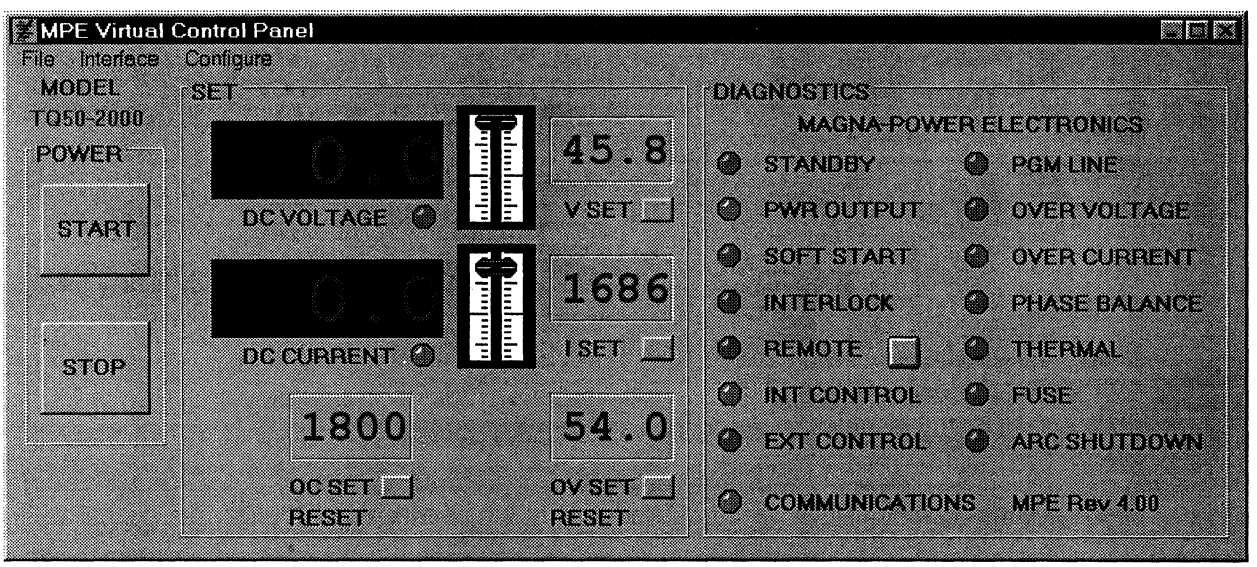
- Advanced control for advanced power supplies
- 4 independent channel outputs for setting voltage, current, and trip levels
- 2 independent channel inputs for sensing output voltage and current
- 24 digital inputs and outputs for programming and sensing all diagnostic functions
- Communications bus and power supply are optically isolated
- High dielectric withstand: 2500 Vac
- Internal/external switch for simple enabling of computer control
- Mounts internal to all PX, SX, and TQ Supplies
- Operates with both IEEE488 and RS232 communication pathways
- 12-bit resolution

APPLICATIONS

- Automatic test equipment
- Motor controls
- Process controls

SPECIFICATIONS:

Input Voltage: 120 Vac
Interface: IEEE488.1, and IEEE488.2, and RS232
Address capability: 0-30 (IEEE488)
Digital Ports: 24 input and output
Analog Channels: 11 input, 4 output
Resolution: 12 bit



SOFTWARE FEATURES

- Compatible with Windows 3.1 and Windows 95
- Includes Virtual Control software for interfacing to PX, PQ, SX, and TQ Series supplies
- Automatic detection of communications eliminates power up procedures
- Configurations support all standard and custom power supplies
- Compatible with IOtech interface cards and drivers

Total Error: ±3.5 LSB input, ±2 LSB output
Temp coefficient: ±100 ppm/°C
Temp range: 0 to 70°C
Size: 1⅛"Hx5"Wx9"L

Note: Specifications subject to change without notice.

SPECIFY: *SBC488 Internal*

MAGNA-POWER ELECTRONICS, INC.
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MATSUSADA Precision Inc.

High Voltage Power Supplies

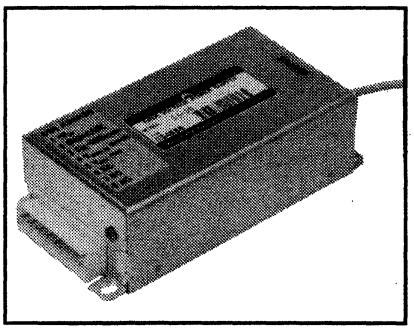
Compact Modular type

S1 series 1.5W *S15 series 15W*
S3 series 3W *S30 series 30W*
S6 series 6W

Since 1972, Matsusada Precision, Inc. has been the leading Japanese manufacturer of high performance, high quality, cost effective high voltage power supplies for OEM and laboratory applications.

Matsusada is always ready to deliver both standard as well as fully customized units. We have a highly qualified and experienced staff that will meet all of our customers' requirements, and our power supplies provide significant performance advantages over competitive units.

Regulated Modular HV Power Supplies



S1, S3, S6, S10, & S30 series

■ APPLICATIONS

- Photomultiplier tubes
- Scintillators
- Electron beam deflection
- Ion guns
- CRT's
- Electrophoresis
- Ion Pumps
- Flocking
- Scanning Electron
- Microscopes
- Ink Jet Printers
- Capacitor charging
- Electro static chuck
- Image Intensifiers
- X-ray Image Intensifiers

■ FEATURES

- High precision, High stability, well regulated
- Compact size, Lightweight
- Wide range of output voltage — starting from 0V
- Low ripple
- High reliability achieved through carefully designed protective circuits
- Operated by external potentiometer or external control voltage
- Arc, short circuit, and input reverse connection protected

■ GENERAL SPECIFICATIONS

Input voltage/current:

S1:	12Vdc±1V	370mA TYP
S3:	24Vdc±10%	330mA TYP
S6:	24Vdc±5%	500mA TYP
S15:	24Vdc±5%	1A TYP
S30:	24Vdc±5%	2A TYP

Output voltage control:
By external variable resistor 5k Ω or by external control voltage (Vcon-in)
S1, S3, S6: Vcon-in 0 to 6 Vdc
S15, S30: Vcon-in 0 to 3 Vdc
Input impedance: Over 30k Ω
Withstand voltage: 30Vdc max.

Linearity: External control voltage/output voltage proportional within ±0.5%
When Vcon-in is zero, residual voltage is within 0.3% of rated output

Protection: All units are protected against reverse connection and intermittent short circuits.

Resettability: ±1% (at the maximum)

Temperature coefficient: 80 PPM/°C

Momentary Maximum input voltage:
S1: 16 Vdc max.
S3, S6: 27 Vdc max.
S15: 27 Vdc max.
S30: 27 Vdc max.

Input Output terminals: Output: 50cm high voltage lead wire
Input: 8 Pin connector

Temperature range: Operating: 0 to 50°C
Storage: -20 to 60°C

Relative humidity: 0 to 98% RH

■ SPECIFICATIONS

Output voltage (kVdc)	Output current (mA)	Model		Ripple (%p-p)	Regulation (%)	
		Positive polar output	Negative polar output		Load 0-100%	Input ±10%±5%±1V
0 – 0.6	2.5	S1-0.6P	S1-0.6N	0.008	0.005	±0.005
	5	S3-0.6P	S3-0.6N			
	10	S6-0.6P	S6-0.6N			
	25	S15-0.6P	S15-0.6N	0.2	0.05	±0.03
	50	S30-0.6P	S30-0.6N			
0 – 1.1	1.4	S1-1.1P	S1-1.1N	0.005	0.005	±0.005
	2.75	S3-1.1P	S3-1.1N			
	5.5	S6-1.1P	S6-1.1N	0.008		
	12	S15-1.1P	S15-1.1N	0.01	0.02	±0.03
	25	S30-1.1P	S30-1.1N	0.03		
0 – 1.5	1	S1-1.5P	S1-1.5N	0.005	0.005	±0.005
	2	S3-1.5P	S3-1.5N			
	4	S6-1.5P	S6-1.5N	0.008		
	10	S15-1.5P	S15-1.5N	0.01	0.02	±0.03
	20	S30-1.5P	S30-1.5N	0.03		
0 – 2	0.75	S1-2P	S1-2N	0.005	0.005	±0.005
	1.5	S3-2P	S3-2N			
	3	S6-2P	S6-2N	0.008		
	7.5	S15-2P	S15-2N	0.01	0.02	±0.03
	15	S30-2P	S30-2N	0.03		
0 – 3	0.5	S1-3P	S1-3N	0.005	0.005	±0.005
	1	S3-3P	S3-3N			
	2	S6-3P	S6-3N	0.008		
	5	S15-3P	S15-3N	0.01	0.02	±0.03
	10	S30-3P	S30-3N	0.03		
0 – 5	0.3	S1-5P	S1-5N	0.005	0.005	±0.005
	0.6	S3-5P	S3-5N			
	1.2	S6-5P	S6-5N	0.008		
	3	S15-5P	S15-5N	0.01	0.02	±0.03
	6	S30-5P	S30-5N	0.03		
0 – 6	0.25	S1-6P	S1-6N	0.005	0.005	±0.005
	0.5	S3-6P	S3-6N			
	1	S6-6P	S6-6N	0.008		
	2.5	S15-6P	S15-6N	0.01	0.02	±0.03
	5	S30-6P	S30-6N	0.03		
0 – 10	0.15	S1-10P	S1-10N	0.01	0.01	±0.01
	0.3	S3-10P	S3-10N	0.03		
	0.6	S6-10P	S6-10N			
	1.5	S15-10P	S15-10N	0.01	0.02	±0.03
	3	S30-10P	S30-10N	0.03		
0 – 12	0.12	S1-12P	S1-12N	0.01	0.01	±0.01
	0.24	S3-12P	S3-12N	0.03		
	0.46	S6-12P	S6-12N			
	1.2	S15-12P	S15-12N	0.01	0.02	±0.03
	2.5	S30-12P	S30-12N	0.03		
0 – 15	0.2	S3-15P	S3-15N	0.03	0.01	±0.01
	0.36	S6-15P	S6-15N			
	1	S15-15P	S15-15N	0.01	0.02	±0.03
	2	S30-15P	S30-15N	0.03		
0 – 18	0.15	S3-18P	S3-18N	0.03	0.01	±0.01
	0.3	S6-18P	S6-18N			
	0.75	S15-18P	S15-18N	0.01	0.02	±0.03
	1.5	S30-18P	S30-18N	0.03		
0 – 20	0.13	S3-20P	S3-20N	0.03	0.01	±0.01
	0.26	S6-20P	S6-20N			
	0.75	S15-20P	S15-20N	0.01	0.02	±0.03
	1.5	S30-20P	S30-20N	0.03		
0 – 25	0.1	S3-25P	S3-25N	0.03	0.01	±0.01
	0.2	S6-25P	S6-25N			
	0.6	S15-25P	S15-25N	0.01	0.02	±0.03
	1.2	S30-25P	S30-25N	0.03		
0 – 30	0.08	S3-30P	S3-30N	0.03	0.01	±0.01
	0.16	S6-30P	S6-30N			
	0.5	S15-30P	S15-30N	0.01	0.02	±0.03
	1	S30-30P	S30-30N	0.03		

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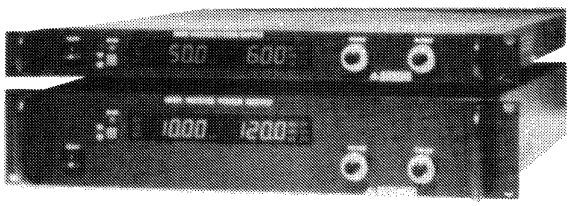
MATSUSADA Precision Inc.

High Voltage Power Supplies

Rack Mountable
AU series 1KV to 120KV
30W to 1200W

Low Profile Rack Mountable HV Power Supplies



AU series

MATSUSADA redefines the "state of the art" in Au Series high voltage power supplies, incorporating advanced switching technology with a highly reliable design and low profile standard rack-mount package. These features are the results of MATSUSADA's 25 years of leadership as an expert in high voltage technology.

■ APPLICATIONS

- CRT testing
- X-ray tube
- Capacitor charging
- Electron beams
- Ion implantation
- Insulator testing
- High-voltage testing

■ FEATURES

- Low profile and light weight
- Extensive local and remote operation
- Adjustable overload trip level
- Remote and front panel monitoring of DC output voltage and current
- Protection against overload, short circuit and arc.
- Greater than 85% efficiency
- GP-IB interface option

■ GENERAL SPECIFICATIONS

Input voltage: 30W-300W type: AC 90V-132V, 1ø (option 180-264V, 1ø)
600W-1.2kW type: AC 180V-264V, 1ø (option 90-132V, 1ø)
Output voltage control: Local mode: via front panel 10-turn potentiometer
Remote mode: via external voltage source 0 to 10Vdc
Voltage Regulation: Line: ±0.005% of maximum voltage for ±10% input line change
Load: 0.005% of maximum voltage for full load change
Ripple: Less than 0.1%p-p
Stability: 0.01%/H
Temperature coefficient: 0.01%/°C
Overload Trip Level Adjust: 10%-100% of maximum output current
Output Polarity: Positive, negative or reversible with respect to chassis ground.
Metering: 3 1/2-digit voltage and current meters, 1% accuracy
Monitor Output: Voltage monitor 0 to10V, 1% accuracy
Current monitor 0 to10V, 1% accuracy
Protection: Over voltage, over current, short circuit, arc
Remote Functions: Remote HV ON/OFF; External Interlock; Remote Reset
Output Cable: 2.5m of shielded high voltage cable
Temperature: Operating: 0 to +50°C Storage: -40 to +85°C
Dimensions: 30W to 300W. 1kV to 60kV models:
44Hx482Dx482W (mm)
80kV to 120kV models:
89Hx610Dx482W (mm)
600W to 1.2kW 1kV to 60kV models: 89Hx482Dx482W (mm)
80kV to 120kV models: 89Hx610Dx482W (mm)

■ SPECIFICATIONS

Output voltage	Output current	Output power	Model: Positive polar output	Model: Negative polar output	Model: Reversible polar output
1kV	30mA	30W	Au-1P30	Au-1N30	Au-1R30
	60mA	60W	Au-1P60	Au-1N60	Au-1R60
	100mA	100W	Au-1P100	Au-1N100	Au-1R100
	150mA	150W	Au-1P150	Au-1N150	Au-1R150
	300mA	300W	Au-1P300	Au-1N300	Au-1R300
	600mA	600W	Au-1P600	Au-1N600	Au-1R600
	1200mA	1200W	Au-1P1200	Au-1N1200	Au-1R1200
2kV	15mA	30W	Au-2P15	Au-2N15	Au-2R15
	30mA	60W	Au-2P30	Au-2N30	Au-2R30
	50mA	100W	Au-2P50	Au-2N50	Au-2R50
	75mA	150W	Au-2P75	Au-2N75	Au-2R75
	150mA	300W	Au-2P150	Au-2N150	Au-2R150
	300mA	600W	Au-2P300	Au-2N300	Au-2R300
	600mA	1200W	Au-2P600	Au-2N600	Au-2R600
3kV	10mA	30W	Au-3P10	Au-3N10	Au-3R10
	20mA	60W	Au-3P20	Au-3N20	Au-3R20
	33mA	100W	Au-3P33	Au-3N33	Au-3R33
	50mA	150W	Au-3P50	Au-3N50	Au-3R50
	100mA	300W	Au-3P100	Au-3N100	Au-3R100
	200mA	600W	Au-3P200	Au-3N200	Au-3R200
	400mA	1200W	Au-3P400	Au-3N400	Au-3R400
5kV	6mA	30W	Au-5P6	Au-5N6	Au-5R6
	12mA	60W	Au-5P12	Au-5N12	Au-5R12
	20mA	100W	Au-5P20	Au-5N20	Au-5R20
	30mA	150W	Au-5P30	Au-5N30	Au-5R30
	60mA	300W	Au-5P60	Au-5N60	Au-5R60
	120mA	600W	Au-5P120	Au-5N120	Au-5R120
	240mA	1200W	Au-5P240	Au-5N240	Au-5R240
6kV	5mA	30W	Au-6P5	Au-6N5	Au-6R5
	10mA	60W	Au-6P10	Au-6N10	Au-6R10
	16mA	100W	Au-6P16	Au-6N16	Au-6R16
	25mA	150W	Au-6P25	Au-6N25	Au-6R25
	50mA	300W	Au-6P50	Au-6N50	Au-6R50
	100mA	600W	Au-6P100	Au-6N100	Au-6R100
	200mA	1200W	Au-6P200	Au-6N200	Au-6R200
10kV	3mA	30W	Au-10P3	Au-10N3	Au-10R3
	6mA	60W	Au-10P6	Au-10N6	Au-10R6
	10mA	100W	Au-10P10	Au-10N10	Au-10R10
	15mA	150W	Au-10P15	Au-10N15	Au-10R15
	30mA	300W	Au-10P30	Au-10N30	Au-10R30
	60mA	600W	Au-10P60	Au-10N60	Au-10R60
	120mA	1200W	Au-10P120	Au-10N120	Au-10R120
15kV	2mA	30W	Au-15P2	Au-15N2	Au-15R2
	4mA	60W	Au-15P4	Au-15N4	Au-15R4
	6.6mA	100W	Au-15P6.6	Au-15N6.6	Au-15R6.6
	10mA	150W	Au-15P10	Au-15N10	Au-15R10
	20mA	300W	Au-15P20	Au-15N20	Au-15R20
	40mA	600W	Au-15P40	Au-15N40	Au-15R40
	80mA	1200W	Au-15P80	Au-15N80	Au-15R80

Output voltage	Output current	Output power	Model: Positive polar output	Model: Negative polar output	Model: Reversible polar output
20kV	1.5mA	30W	Au-20P1.5	Au-20N1.5	Au-20R1.5
	3mA	60W	Au-20P3	Au-20N3	Au-20R3
	5mA	100W	Au-20P5	Au-20N5	Au-20R5
	7.5mA	150W	Au-20P7.5	Au-20N7.5	Au-20R7.5
	15mA	300W	Au-20P15	Au-20N15	Au-20R15
	30mA	600W	Au-20P30	Au-20N30	Au-20R30
	60mA	1200W	Au-20P60	Au-20N60	Au-20R60
30kV	1mA	30W	Au-30P1	Au-30N1	Au-30R1
	2mA	60W	Au-30P2	Au-30N2	Au-30R2
	3.3mA	100W	Au-30P3.3	Au-30N3.3	Au-30R3.3
	5mA	150W	Au-30P5	Au-30N5	Au-30R5
	10mA	300W	Au-30P10	Au-30N10	Au-30R10
	20mA	600W	Au-30P20	Au-30N20	Au-30R20
	40mA	1200W	Au-30P40	Au-30N40	Au-30R40
40kV	0.75mA	30W	Au-40P0.75	Au-40N0.75	Au-40R0.75
	1.5mA	60W	Au-40P1.5	Au-40N1.5	Au-40R1.5
	2.5mA	100W	Au-40P2.5	Au-40N2.5	Au-40R2.5
	3.75mA	150W	Au-40P3.75	Au-40N3.75	Au-40R3.75
	7.5mA	300W	Au-40P7.5	Au-40N7.5	Au-40R7.5
	15mA	600W	Au-40P15	Au-40N15	Au-40R15
	30mA	1200W	Au-40P30	Au-40N30	Au-40R30
50kV	0.6mA	30W	Au-50P0.6	Au-50N0.6	Au-50R0.6
	1.2mA	60W	Au-50P1.2	Au-50N1.2	Au-50R1.2
	2mA	100W	Au-50P2	Au-50N2	Au-50R2
	3mA	150W	Au-50P3	Au-50N3	Au-50R3
	6mA	300W	Au-50P6	Au-50N6	Au-50R6
	12mA	600W	Au-50P12	Au-50N12	Au-50R12
	24mA	1200W	Au-50P24	Au-50N24	Au-50R24
60kV	0.5mA	30W	Au-60P0.5	Au-60N0.5	Au-60R0.5
	1mA	60W	Au-60P1	Au-60N1	Au-60R1
	1.6mA	100W	Au-60P1.6	Au-60N1.6	Au-60R1.6
	2.5mA	150W	Au-60P2.5	Au-60N2.5	Au-60R2.5
	5mA	300W	Au-60P5	Au-60N5	Au-60R5
	10mA	600W	Au-60P10	Au-60N10	Au-60R10
	20mA	1200W	Au-60P20	Au-60N20	Au-60R20
80kV	0.37mA	30W	Au-80P0.37	Au-80N0.37	Au-80R0.37
	0.75mA	60W	Au-80P0.75	Au-80N0.75	Au-80R0.75
	1.25mA	100W	Au-80P1.25	Au-80N1.25	Au-80R1.25
	1.87mA	150W	Au-80P1.87	Au-80N1.87	Au-80R1.87
	3.75mA	300W	Au-80P3.75	Au-80N3.75	Au-80R3.75
	7.5mA	600W	Au-80P7.5	Au-80N7.5	Au-80R7.5
	15mA	1200W	Au-80P15	Au-80N15	Au-80R15
100kV	0.3mA	30W	Au-100P0.3	Au-100N0.3	Au-100R0.3
	0.6mA	60W	Au-100P0.6	Au-100N0.6	Au-100R0.6
	1mA	100W	Au-100P1	Au-100N1	Au-100R1
	1.5mA	150W	Au-100P1.5	Au-100N1.5	Au-100R1.5
	3mA	300W	Au-100P3	Au-100N3	Au-100R3
	6mA	600W	Au-100P6	Au-100N6	Au-100R6
	12mA	1200W	Au-100P12	Au-100N12	Au-100R12

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MATSUSADA Precision Inc.

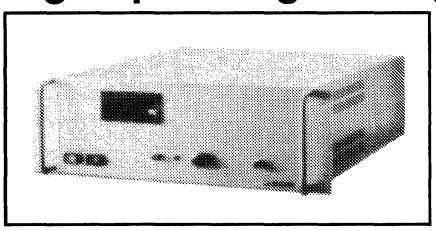
High Voltage Power Supplies

High Speed HV Amplifier

HEOPT series ±0.6 to ± 20KV, 360V/μsec.

HOPS series ±0.3 to ± 3KV, 12V/μsec.

High Speed High Voltage Amplifier-Rack Mountable



HEOPT series

HEOPT series is a rack mountable, fast response high voltage operational amplifier. It gives quick response as fast as 200kHz and provides high voltage outputs in reference to its input wave forms such as Sine, Triangle, Saw Tooth, and Square Wave Forms.

■ GENERAL SPECIFICATIONS

Input voltage: 100Vac ±10% 50/60Hz, 1ø
Output control: External voltage control
Vcon-in 0~10V [-10~+10V] *
(input impedance: ≥10kΩ)
DC - BIAS: 10 turn potentiometer, 0~100% [-100~+100%]
Regulation: Line ±0.05% (±10% line change)
Load 0.05% (10~100% load change)
Ripple: 0.02% + 1V p-p
Stability: 0.016%/H TYP
Digital Panel Meter: 3-1/2 digit display (DC Output Voltage Monitor)
Voltage Monitor: 0~10V [-10~+10V] / 0~Max., [-Max.~+Max.]
BNC plug (output impedance 1kΩ)
Protection: Protection against overcurrent by cutting off HV output.
Output short circuit and over voltage. Arc discharge.
Disable HV output after AC power line recovery
Operating temperature: 0 ~ 40°C
Storage temperature: -20~60°C
Weight: 16~30kgs (typical)
Input/Output cable: Input AC code: 2.5m, Output cable: 1.5m Non shielded, HV cable

*Offset voltage: within 0.5% of rated output at Vcon-in=0V *[ ] shows bi-polar units specs.

■ APPLICATIONS

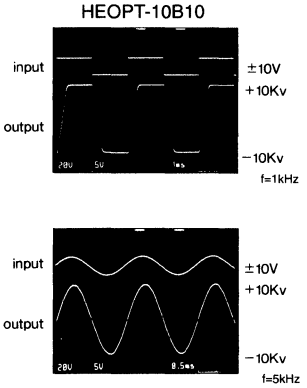
- Electron beam deflection
- Electron beam focusing
- Electrostatic applications
- Corona charge and discharge
- PZT actuator
- Pockets cell driver

■ FEATURES

- Outputs from ±600V ~ ±20kV
- High speed response ≥ 360V/μsec
- All solid state
- Various types of output wave forms according to the input wave
- DC bias function
- DC output voltage monitor, (3-1/2 digit meter)

■ RESPONSE

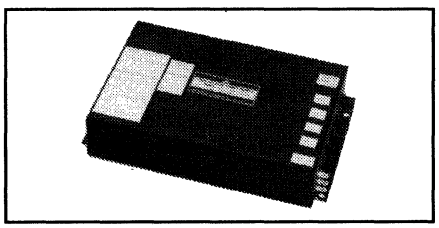
HEOPT-10B10



■ SPECIFICATIONS

Output voltage (Vdc)	Current (mA)	Model: Positve Polar	Model: Negative Polar	Model: Bi-Polar	Slew Rate (full scale)	Frequency Response (-3dB): full scale	Frequency Response (-3dB): 10% of full scale	Dimensions (mm)
0~600	100	HEOPT-0.6P100	HEOPT-0.6N100		125V/μs	DC~100KHZ	DC~200KHZ	150H x 482W x 423D
0~1k	60	HEOPT-1P60	HEOPT-1N60			DC~60KHZ	DC~150KHZ	
0~1.5k	40	HEOPT-1.5P40	HEOPT-1.5N40			DC~40KHZ	DC~100KHZ	
0~3k	20	HEOPT-3P20	HEOPT-3N20		180V/μs	DC~30KHZ	DC~80KHZ	
0~5k	20	HEOPT-5P20	HEOPT-5N20			DC~20KHZ	DC~50KHZ	
0~10k	10	HEOPT-10P10	HEOPT-10N10			DC~10KHZ	DC~30KHZ	
-600~+600	100			HEOPT-0.6B100	250V/μs	DC~100KHZ	DC~200KHZ	150H x 482W x 423D
-1k~+1k	60			HEOPT-1B60		DC~60KHZ	DC~150KHZ	
-1.5k~+1.5k	40			HEOPT-1.5B40		DC~40KHZ	DC~100KHZ	
-3k~+3k	20			HEOPT-3B20	360V/μs	DC~30KHZ	DC~80KHZ	150H x 482W x 523D
-5k~+5k	20			HEOPT-5B20		DC~20KHZ	DC~50KHZ	
-10k~+10k	10			HEOPT-10B10		DC~10KHZ	DC~30KHZ	
-20k~+20k	10			HEOPT-20B10	250V/μs	DC~5KHZ	DC~15KHZ	340H x 482W x 523D

High Speed High Voltage Amplifier-Modular type



HOPS series

HOPS series provides fast response time from 1.2kHz-25kHz and produces high voltage output in Sine Waves, Triangle Waves, Saw Tooth Waves, and Square Waves in proportion to the input wave type. 15 different models are available in this series as a standard unit. They are all solid state and provide 300V to 3kV output. We can also accommodate orders according to your applicational needs.

■ GENERAL SPECIFICATIONS

Input voltage/current: +24Vdc ±5%, 0.4A TYP
Output control: External voltage control
Vcon-in 0~10V [-10~+10V] *
(input impedance: ≥10kΩ)
Regulation: Line ±0.1% (±5% line change)
Load 0.1% (10~100% load change)
Ripple: ≤0.025%rms
Stability: 0.016%/H TYP
Protection: Protection against input reverse connection, and intermittent output short circuit
Operating temperature: 0 ~ 45°C
Storage temperature: -20~60°C
Input/Output terminals: Input/Pin terminal
Output/High voltage lead wire
(500 mm)

*Offset voltage: within 0.5% of rated output at Vcon-in=0V
*[ ] shows bi-polar units specs

■ APPLICATIONS

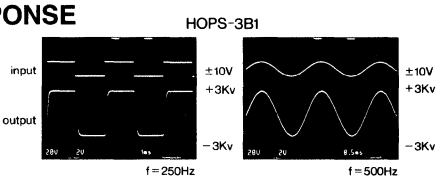
- Electron beam deflection
- Electron beam focusing
- Electrostatic applications
- High voltage biasing
- Corona charge and discharge
- PZT actuator
- Pockets cell driver

■ FEATURES

- Outputs from 300V ~ ±3kV
- High speed response ≥ 12V/μsec
- All solid state
- Various types of output wave forms according to the input wave
- Small module type best suited for the mounted system

■ RESPONSE

HOPS-3B1



■ SPECIFICATIONS

Output voltage (Vdc)	Current (mA)	Model: Positve Polar	Model: Negative Polar	Model: Bi-Polar	Slew Rate	Frequency Response (-3dB)	Case Number	Weight Approx. (g)
0~300V	10	HOPS-0.3P10	HOPS-0.3N10		12V/μsec	DC~25kHZ	C6A	1400
0~600V	5	HOPS-0.6P5	HOPS-0.6N5			DC~12kHZ		
0~1kV	3	HOPS-1P3	HOPS-1N3			DC~7kHZ		
0~1.5kV	2	HOPS-1.5P2	HOPS-1.5N2			DC~5kHZ		
0~3kV	1	HOPS-3P1	HOPS-3N1			DC~2.5kHZ	C6E	2100
-300~+300	10			HOPS-0.3B10	12V/μsec	DC~12kHZ	C6A	1400
-600~+600	5			HOPS-0.6B5		DC~6kHZ		
-1k~+1k	3			HOPS-1B3		DC~3.5kHZ	C6E	2100
-1.5k~+1.5k	2			HOPS-1.5B2		DC~2.5kHZ		
-3k~+3k	1			HOPS-3B1		DC~1.2kHZ	C7	2600

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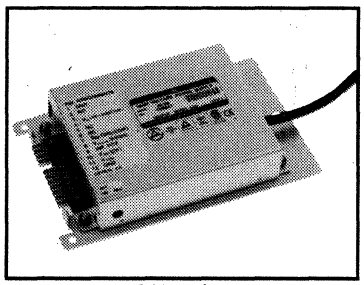
MATSUSADA Precision Inc.

High Voltage Power Supplies

Modular type
J4-LX series 0.5 to 5KV/4W
W1, W2, & W3 series
0.5 to 60KV/100W, 200W, & 350W

4W Precision HV Power Supplies

NRTL, TUV, CSA, CE approved



S10 series

■ FEATURES

- Exceptional low ripple and high stability
- Remote and local programming
- Fully protected against continuous short circuit
- Optional output connector

■ OPTION

L15 Vin ±12V~18V @ 400mA TYP
LMH MHV OUTPUT CONNECTOR
LSH SHV OUTPUT CONNECTOR

■ GENERAL SPECIFICATIONS

Input voltage:	24V~+30V @400mA TYP
Remote Programming:	External 5kΩ potentiometer or remote 0 to 9V source
Local Programming:	Internal multi-turn potentiometer
Regulation:	Line: 0.001% for ±1% input change Load: 0.001% for 0~100% load change
Stability:	0.005%/Hr 0.02%/8Hr
Temperature coef:	50ppm/°C
Protection:	Short circuit and arc protected
I/O terminal:	Input: 12 pin card edge connector Output: 1.6 feet (50cm) RG-59/u cable
Temperature Range:	Operating: 0 to 40°C

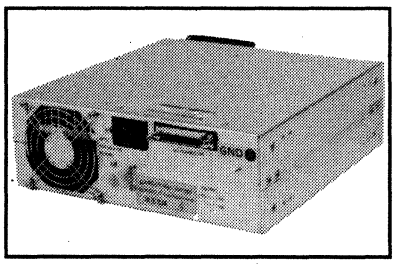
■ APPLICATIONS

- Photomultiplier tubes
- CRT's
- Electron guns
- Lens, bias supplies
- MCP, I.I
- Nuclear instruments
- X-ray tubes

■ SPECIFICATIONS

Output voltage (kVdc)	Output current (mA)	Model		Ripple (mVp-p)	Voltage Monitor	
		Positive output	Negative output		output(v)	impedance(Ω)
0~0.5	0~8	J4-0.5P-LX	J4-0.5N-LX	5	0~5	50K
0~1	0~4	J4-1P-LX	J4-1N-LX	2	0~1	10K
0~1.5	0~2.5	J4-1.5P-LX	J4-1.5N-LX	2	0~1.5	25K
0~2	0~2	J4-2P-LX	J4-2N-LX	2	0~2	25K
0~3	0~1	J4-3P-LX	J4-3N-LX	3	0~3	30K
0~5	0~0.5	J4-5P-LX	J4-5N-LX	10	0~5	100K

100W, 200W, & 350W Modular HV Power Supplies



W1, W2, W3 series

■ GENERAL SPECIFICATIONS

Input voltage:	AC100V or 115V or 220V±10% 50/60Hz *Specify at time of order
Output control:	Via external voltage source 0 to 10V or external 5kΩ potentiometer
Voltage Regulation:	Line: ±0.01% (of max voltage for Input ±10% change) Load: 0.1% (of max voltage for full load change)
Current Regulation:	Line: ±0.05% (of max current for Input ±10% change) Load: 0.1% (of max current for full voltage change)
Stability:	0.01%/H, 0.02%/8H (at voltage operation) 0.02%/H. 0.04%/8H (at current operation)
Temperature coefficient:	0.01%/°C (at voltage operation) 0.02%/°C (at current operation)

Monitor Output:	0 to 10V, ±0.5% (at max rated output)
Protection:	Protection against overvoltage, overcurrent, short circuit, arc and over temperature
High Voltage ON/OFF:	Short=HV ON, Open=HV OFF
Protection:	Protection against overvoltage, overcurrent, short circuit, arc and over temperature
Efficiency:	80% TYP
Temperature:	Operating: 0 to +50°C Storage: -40 to +85°C
HV Output Cable:	2.5m HV shielded cable
AC Input Cable:	2.5m 3-wire line cord

Signal Input Connector
Subminiature D-type Connector 25 pin
- Voltage, Current Program (0 to 10V, 0 to 5kΩ)
- Voltgage, Current Monitor (0 to 10V)
- HV ON/OFF
- Inter lock
- HV status
- 10.24V reference

■ APPLICATIONS

- CRT testing
- X-ray tube
- Capacitor charging
- Electron beams
- Ion implantation
- Insulator testing
- All kinds of high-voltage testing

■ FEATURES

- Voltage programming, 0 to 10V
- Current programming, 0 to 10V
- Voltage and current monitoring
- External HV ON/OFF
- Overvoltage, short circuit protection

■ SPECIFICATIONS

Output voltage (kVdc)	120W			200W			350W		
	Output Current (mA)	Model	Ripple	Output Current (mA)	Model	Ripple	Output Current (mA)	Model	Ripple
0-0.5	0~240	W1 - 0.5*	0.05% p-p	0~400	W2 - 0.5*	0.1% p-p	0~700	W3 - 0.5*	0.2% p-p
0 - 1	0~120	W1 - 1*1		0~200	W2 - 1*		0~350	W3 - 1*	
0 - 3	0~40	W1 - 3*		0~67	W2 - 3*		0~117	W3 - 3*	
0 - 5	0~24	W1 - 5*		0~40	W2 - 5*		0~70	W3 - 5*	
0 - 10	0~12	W1 - 10*		0~20	W2 - 10*		0~35	W3 - 10*	
0 - 20	0~6	W1 - 20*		0~10	W2 - 20*		0~17.5	W3 - 20*	
0 - 30	0~4	W1 - 30*		0~6.7	W2 - 30*		0~11.7	W3 - 30*	
0 - 40	0~3	W1 - 40*		0~5	W2 - 40*		0~8.7	W3 - 40*	
0 - 50	0~2.4	W1 - 50*	0.1% p-p	0~4	W2 - 50*		0~7	W3 - 50*	
0 - 60	0~2	W1 - 60*		0~3.3	W2 - 60*		0~5.8	W3 - 60*	
0 - 70	0~1.7	W1 - 70*		0~2.8	W2 - 70*		0~5	W3 - 70*	

* P for Positive, N for Negative Polarity

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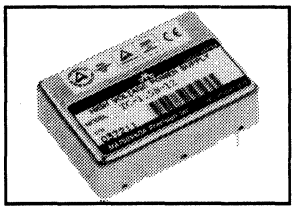
MATSUSADA Precision Inc.

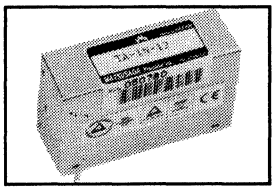
High Voltage Power Supplies

PCB Mountable type
TA, TC series 1 to 2KV, 1.5W
TM series 0.8 to 2KV, 1.5W
TS series 50 to 300V

Miniature, Precision HV Power Supplies for Photomultiplier Tubes



TC series



TA series

■ APPLICATIONS

- Photomultiplier tubes
- Scintillators
- Geiger Counters

■ FEATURES

- **NRTL, TUV, CSA, CE approved**
- Ultra-compact, PCB mountable
- Low Noise due to 6-sided metal shielding
- Well-regulated
- Remote programmable
- Arc and continuous short circuit protection

■ GENERAL SPECIFICATIONS

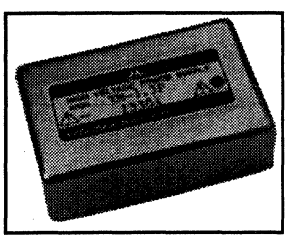
Input voltage/current:	+12Vdc ±10% at 230mA TYP (Add -12 to model number) +15Vdc ±10% at 180mA TYP
Output control:	By external 5k Ω potentiometer or external control voltage (Vcon-in) 0 to 6 Vdc
Regulation:	±0.02% (for input voltage ±10% change) 0.02% (for 0 to 100% load change)
Stability:	0.02%/H
Temperature coefficient:	0.007%/°C
Protection:	Input reverse connection, arc and continous output short circuit
Temperature range:	Operating: -10°C to +50°C Storage: -25 °C to +85°C
Size:	35.5W x 50.8L x 16.2H (mm) TC Series

■ SPECIFICATIONS

Output voltage (kVdc)	Output current (mA)	Model		Ripple (mVp-p)
		Positive polar output	Negative polar output	
0 to 1	1.5	T* - 1P	T* - 1N	5
0 to 1.5	1	T* - 1.5P	T* - 1.5N	7
0 to 2	0.7	T* - 2P	T* - 2N	10

*Note: Specify "C" for low profile, "A" for vertical standing

ULTRA Low Ripple HV Power Supplies for Photomultiplier Tubes



TM series

■ FEATURES

- PCB mountable
- Low ripple, high stability, and well-regulated output
- Low Noise due to 6-sided metal shielding
- A wide range of input voltage (+11 to +16 Vdc)
- A wide range of output voltage (from 0V output)
- Operated by external potentiometer or external control voltage
- Arc and continuous short circuit protection

■ GENERAL SPECIFICATIONS

Input voltage/current:	+11 to +16 Vdc 240 mA
Output control:	By external 5k Ω potentiometer or by external control voltage (Vcon-in) 0 to 6 Vdc
Regulation:	±0.01% (for INPUT ±12V ±1V) 0.01% (for 0 to 100% load change)
Stability:	0.01%/H
Temperature coefficient:	0.005%/°C
Protection:	Input reverse connection, arc and continuous output short circuit
Temperature range:	Operating: -10°C to +50°C Storage: -25°C to +85°C
Size:	40W x 60L x 19.5H (mm)

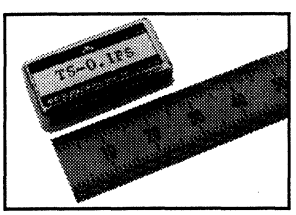
■ APPLICATIONS

- Photomultiplier tubes
- Scintillators
- Geiger Counters
- Nuclear instruments
- Micro channel plate (MCP)
- Electron multipliers

■ SPECIFICATIONS

Output voltage (kVdc)	Output current (mA)	Model		Ripple (mVp-p)
		Positive polar output	Negative polar output	
0 to 0.8	1	TM - 0.8P	TM - 0.8N	2
0 to 1.1	0.7	TM - 1.1P	TM - 1.1N	
0 to 1.5	0.5	TM - 1.5P	TM - 1.5N	3
0 to 2.0	0.4	TM - 2P	TM - 2N	7

Miniature Power Supplies for Avalanche Photo Diodes (APD)



TS series

■ FEATURES

- Miniature size, PCB mountable
- Low ripple, < 10mVp-p
- Remote voltage programming
- EMI/RFI shielded
- Continuous output short circuit protected

■ GENERAL SPECIFICATIONS

Input voltage Vcc:	12V ±1Vdc
Output control:	Remote voltage 0 to 10Vdc
Regulation:	Line: 0.3% of max voltage for VCC ±1V Load: 2% TYP of max voltage for load change of 10%
Protection:	Continuous output short circuit
Temperature range:	Operating: -10 ~ 60°C
Size:	15.2W x 30.2L x 8.5H (mm)

■ APPLICATIONS

- Avalanche Photo diodes (APD)
- PIN Photo diodes
- Detector Biasing

■ SPECIFICATIONS

Output voltage	Model		Rated load	Ripple	Input current
	Positive pola	Negative pola			
0 ~ +50Vdc	TS - 0.05P	TS - 0.05N	50k Ω	Less than 10mVp-p	40mA
0 ~ +100Vdc	TS - 0.1P	TS - 0.1N	100k Ω		50mA
0 ~ +200Vdc	TS - 0.2P	TS - 0.2N	400k Ω		50mA
0 ~ +250Vdc	TS - 0.25P	TS - 0.25N	500k Ω		70mA
0 ~ +300Vdc	TS - 0.3P	TS - 0.3N	600k Ω		70mA

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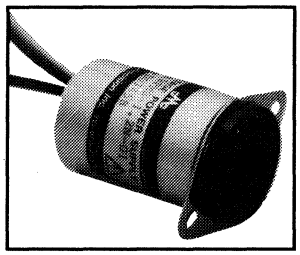
MATSUSADA Precision Inc.

High Voltage Power Supplies

PMT Socket Type
X-Ray Power Supplies
Input/Output Proportional type

PMT Socket Type HV Power Supply for Photomultiplier Tubes



HPMS - 1N

■ FEATURES

- Socket with built-in HV Power Supply and voltage divider circuit
- No HV wiring, easy operation
- For 28mm (1-1/8in.) diameter side-on PMT
- External voltage programmable

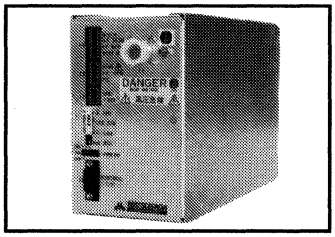
■ SUMMARY

HPMS - IN is a reliable, high performance power supply with a socket designed for 28mm ø (1-1/8in.) PMTs. Technological precision is achieved in this compact power supply with conventional bleeder circuitry.

■ SPECIFICATIONS

Input voltage	+ 15V DC ± 1V
Input Current:	200mA MAX
Output voltage:	0 ~ -1kV DC
Output Control:	By external 0~5V DC (Vcon-in)
Anode Current:	20 μ A AVG
Output Stability:	0.01%/hr
Temperature coefficient:	0.01%/°C
Bleeder Chain:	330k Ω x 10 stage
Operating Temperature:	0 to 50°C
Input/Output terminal:	
Input: Flying Leads 250mm	
Output: Socket 1-1/8in.	
Signal: 50 Ω Shielded Wire 250mm	

X-Ray Power Supplies 30kV, 50kV, 65kV, 50W



HXR series

■ FEATURES

- For grounded Cathode X-ray Tubes.
- 0.05% Emission current regulation.
- Remote and local emission control.
- Adjustable filament current.
- Safety interlock.
- Overvoltage and short circuit protection.

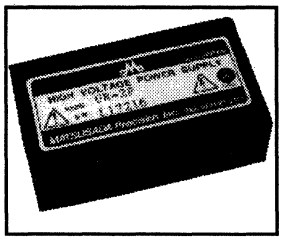
■ GENERAL SPECIFICATIONS

Input voltage/current:	24V±10%, 4.25A max
Voltage Control:	Local: via internal pot remote: via external 0 to 10V
Emission Control:	Local: via internal pot remote: via external 0 to 10V
Regulation:	±0.01% ±0.01%
Ripple:	0.2%p-p
Temperature Coef.:	0.01%/°C
Operating Temperature:	0°C to + 50°C
Monitor Ouptut:	Voltage monitor: 0 to 10V Current monitor: 0 to 10V
Filament Supply:	0.3~3.5Adc
Output cable:	58.5" cable with HV connector
Protection:	Over voltage, Over current, Arc, Short circuit
Dimensions:	10" x 3.9" x 6.3"

■ SPECIFICATIONS

Output voltage (kVdc)	Output current (mA)	Model
0~+30	1.67	HXR-35-50
0~+50	1	HXR-55-50
0~+65	0.77	HXR-65-50

Input/Output Proportional HV Power Supplies-PCB mountable



UR series

■ FEATURES

- Small size PCB mountable
- High performance, low ripple 0.5% TYP
- Input/Output proportional
- Input/Output isolation (on models up to 6KV)

■ GENERAL SPECIFICATIONS

Input voltage/current:	Up to 6kV 1.5~2Vdc/380mA TYP 10kV-15kV 2~12Vdc/400mA TYP
Output voltage:	Proportional to input voltage (See table)
Output power:	3W MAX
Ripple:	(See table)
Regulation:	5% TYP (50% ~ 100% load)
Protection:	All units are protected against input reverse connection and intermittent output short circuit
Temperature range:	Operating: -10 to +60°C Storage: -20 to +60°C
Dimensions:	1.5"x2.5"x0.75" (up to 6KV) 1.5"x2.5"x1.5" (10KV & 15KV)

■ SPECIFICATIONS

Max. output (kVdc)	Output voltage (kVdc)	Output current (mA)	Model: Positive polar output	Model: Negative polar output	Model: Reversible (I/O, insulation)	Rated load (KΩ-MΩ)	Ripple (%P-P)	Insulation input/output (Vdc)
0.3	0.03-0.3	10			UR-0.3PN	30KΩ	0.5%	2000
0.6	0.04-0.6	5			UR-0.6PN	120KΩ		
1.1	0.08-1.1	2.75			UR-1.1PN	400KΩ		
1.5	0.1-1.5	2			UR-1.5PN	750KΩ		
2	0.15-2	1.5			UR-2PN	1.3MΩ		
3	0.2-3	1			UR-3PN	3MΩ		3000
5	0.25-5	0.6			UR-5PN	8MΩ		5000
6	0.4-6	0.5			UR-6PN	12MΩ		6000
10	1-10	0.24	UR-10P	UR-10N		42MΩ	0.3%	
15	1.5-15	0.15	UR-15P	UR-15N		100MΩ		

■ APPLICATIONS

- Photomultiplier tubes
- Ionization chambers
- High voltage bias
- CRTs
- Ion pumps
- Electron multipliers

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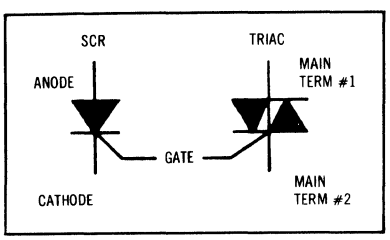
MINIGLOSSARY THYRISTORS/ HIGH POWER DIODES

THYRISTORS

A thyristor is a four-layer semiconductor (pnpn) that can be switched from an OFF to an ON state. This is usually done by a voltage or current pulse to the gate terminal. The device will then continue to conduct so long as the principal current of the device flows through the thyristor's two main terminals.

In many respects a thyristor is analogous to an electromechanical latching relay. In fact, thyristors have largely replaced these relays in newer equipment designs. But, misapplications and/or failure to fully understand the parameters of these and other solid state devices often leads to catastrophic field failures.

The terminology shown on this page has been condensed from common industry data books and is intended to be a guide for the engineer.



di/dt: *Critical rate of rise of ON state current* is the user's maximum design limit (Fig. 1).

di_R/dt: *Rate of decay of ON state current* (Fig. 1 & 2).

dv/dt (critical): *Rate of rise of OFF state voltage*. Lowest voltage rate of rise to cause a thyristor to turn ON.

dv/dt (reapplied) : *Rate of rise of reapplied OFF state voltage.*

I_{FSM}: *Nonrepetitive ON state surge current in diodes.* Maximum peak value of ½ cycles (60 Hz) a diode can withstand up to 100 times in its lifetime.

I_{TSM}: *Nonrepetitive ON state surge current in thyristors*. Maximum peak value of 60 Hz cycles a thyristor can withstand up to 100 times in its lifetime.

I_{DRM}/I_{RRM}: *Maximum peak forward/ reverse leakage current* at specified temperature and repetitive conditions.

I_{GDM}: *Continuous gate current not to trigger*. Highest dc gate current that will *not* cause thyristor to switch from OFF to ON at a specific temperature.

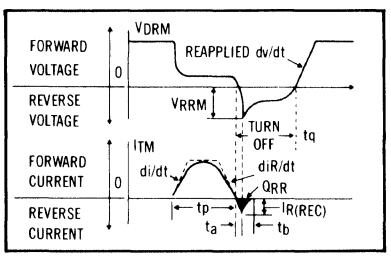


Fig. 1. Concurrent voltage and current waveforms

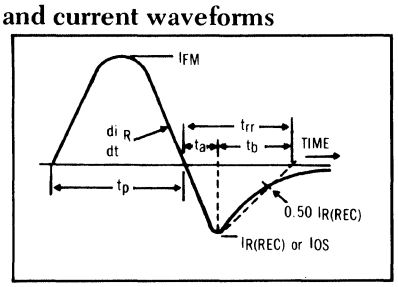


Fig. 2. Recovery current waveform

I_{GT}: *Continuous gate trigger current.* Absolute minimum gate current required to switch thyristor from OFF to ON.

I_H: *Holding Current*. Minimum current required to hold thyristor ON.

I_L: *Latching current*. Minimum current required to hold thyristor ON after removal of gate drive.

$I_{(REC)}$; *Recovery current*. Peak value of reverse current during recovery or turn OFF (Fig. 1 & 2).

I_{OS}: *Overshoot current*. See $I_{R(REC)}$.

I^2t: Maximum ON state, short time thermal capacity of the silicon element for operations less than ½ cycle of 180° conduction angle.

$I_{T(AV)}$: *Average ON state current* (max.)

Q_{RR}: *Reverse recovered charge* (Fig. 1).

$R_{\theta JC}$: *Junction-to-case thermal resistance* in degrees C per watt.

$T_{C(MAX)}$: *Max. allowable case temperature*.

$T_{J(MAX)}$: *Maximum allowable junction temp.*

t_d: *Delay time*. Interval between a specified point at beginning of gate pulse and the instant at which the principal voltage drops to a specified value. (OFF-ON) (Fig. 3)

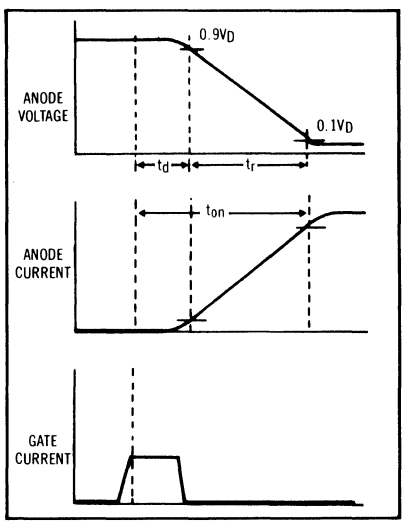


Fig. 3. Turn-on time waveforms

t_{on}: *Turn-on time*. The sum of delay time and rise time. (OFF-ON) (Fig. 3)

t_q: *Turn-off time.* Time between principal current reaching zero and the instant thyristor can block forward voltage without turning ON. (Fig. 1)

t_r: *Rise time*. Time between principal voltage dropping from one value to a second lower value when thyristor turns from OFF to ON. (Fig. 3)

t_{rr}: *Reverse recovery time*. (Fig. 2)

V_{DRM}/V_{RRM}: *Maximum repetitive peak OFF state/reverse voltage* excluding non-repetitive transients.

V_{DSM}/V_{RSM}: *Maximum nonrepetitive peak OFF state/reverse voltage*.

V_{FM}/V_{TM}: *Maximum forward voltage drop* at a specific forward current and case temp.

V_{GDM}: *Gate nontrigger voltage*. Highest dc voltage that will *not* cause thyristor to switch from OFF to ON.

V_{LATCH}: *Latching voltage*. Voltage required for thyristor to latch ON at a given gate current and junction temp.

$V_{TM(DYN)}$: *Dynamic ON state voltage*. Transient ON state voltage of thyristor when triggered into conduction for a given load and time.

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High Voltage Power Supplies for Pulsed Power and Lasers

Maxwell manufactures Charging supplies,High Voltage High Power DC Power Supplies and Arc Lamp Supplies for the Pulsed Power and Laser Markets.We take pride in our Power Supply solutions by focusing on two major benefits: Quality and Applications Support. By our dedication to these necessities, Maxwell offers the highest performance products today.

We offer:
- Factory and On-site application support for a complete Pulsed Power and Laser power solution
- The shortest repair turnaround time in the industry.
- Two Year Warranty.

Experience Maxwell Power Supply confidence for such applications as:

- Solid State Lasers
- Excimer Lasers (high regulation to 4kHz)
- TEA Lasers
- Accelerator Modulators
- Ion Implanters
- Magnetrons
- Precipitators
- High Energy Storage Capacitor Banks

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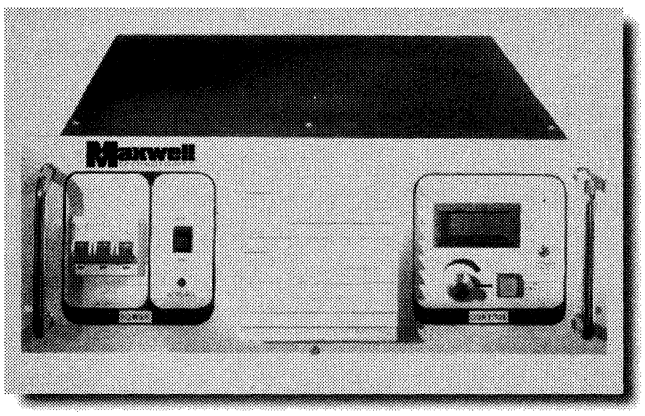
Series ALS Power Supplies NEW!

Arc Lamp Power Supplies for Laser Systems. 3kW to 20kW, up to 100 amps.



- High reliability. Compact design.
- *IgniteLite™* low energy Igniter (28kV) and Boost (900V) system starts any lamp.
- Controls isolated from input line voltages
- Active Power Factor Correction available on all single phase models to 6kW.
- CE Approvals on most standard models.
- Includes internal EMI filter and circuit breaker.
- Fully instrumented or blank front panel versions.
- Full remote control.
- Two-year warranty.

Electrical Specifications:

Line Input voltage	380 to 415 VAC ±10%, 3 phase 190 to 240 VAC ±10%, 3 phase 190 to 240 VAC ±10%, 1 phase (.98 active PFC)		
Frequency	47 to 63 HZ		
Power Factor	≥0.9		
	3 U case	4 U case	4 U case
Output Current	25A	40A	60A
Power	4500 watts	7000 watts	10,000 watts
Regulation	0.1% for a ±10% input line voltage change		
Ripple	0.3% peak to peak up to 1KHz		
Bandwidth	nominally 1 KHz with option to increase		
Stability	better than 0.1% over 8 hours for constant conditions		
Driff	typically better than 0.2% with nominal changes in voltage, load and temperature		
Efficiency	better than 90%		

Meets performance standards for:

EN 61010 (Safety)
EN-50081-1 (Conducted Emissions)
EN-50082-2 (EMC Immunity)

Physical Specifications:

Size	19″ rack mount 3 U — 5.25″ (133mm) 4 U — 7″ (176mm) Depth 12″ (305mm) for 4.5 kW unit. Depth 16″ (406mm) for 7 kW unit. Depth 20″ (508mm) for 10kW unit.
Weight	49 lbs. (22 Kg) 62 lbs. (28 Kg) 82 lbs. (37 Kg)
Cooling	Forced air, entering at the front via a graded filter, and existing at the rear.
Temperature	Continuous in an ambient of 0°C to 60°C, with appropriate derating above 35°C.
Warranty	2 years

Safety Features:

- All control circuitry and wiring has full galvanic isolation from the line and operate at low voltage.
- Should lamp fail to start, Ignition and Boost voltages are disconnected from the output terminals.
- Complies with EN 61010 and IEC601.
- Protection on live output provided by VDE rated circuit breaker.
- Output protection included in event of lamp failure or connection to earth.
- Protected against thermal overload and output current overload.

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Maxwell TECHNOLOGIES
Energy Products

Capacitor Charging Power Supplies

- *Output Power 2, 4, 6, 8, 10, 12 kJ/s.*
- *Output Voltages 1, 2, 3, 5, 10, 20, 30, 40, 50, 60, 65 kV.*
- *208, 400, 480 VAC 4 wire, no neutral available.*
- *220/240 VAC single phase to 6 kW available.*
- *2 year warranty.*

Specifications:

- Inrush current limit to ≤10 A
- Efficiency: ≥90%
- Power Factor ≥0.85, (single phase ≥0.6)
- Stability: 0.05% over 8 hours after 1.5 hour warmup
- Ambient Temperature: 0 to 45°C operating; -30 to 85°C storage
- Size:
  - * 3.5" (89mm) tall (2 kJ/s, 2kV, 220 1ø input), 482mm (19") rack mount, 508mm (20") Deep
  - * 7" (178mm) tall (≤4 kJ/s units), 482mm (19") rack mount, 508mm (20") deep
  - * 8.75" (22mm) tall (>4 kJ/s units), 482mm (19") rack mount, 508mm (20") deep
- Weight: 3.5" model, 15kg (33 lbs); 7" and 8.75" models <10kV, 19kG (42 lbs); 7" and 8.75" models 10-50kV, 29kg (64 lbs)
- Remote Control Interference: 25-pin D-type subminiature female socket type connector (Other interface configurations available).

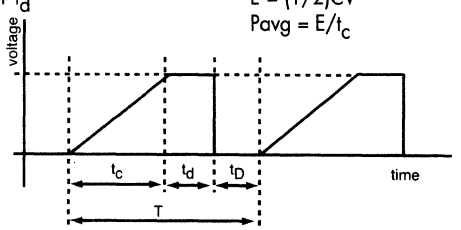
Features:

- High frequency, switchmode power supply, compact and light weight
- Simple parallel operation for higher power
- Constant current, linear charging profile
- Delay after discharge (DAD); preset PS off-time of ≈150µs after load discharge to assist HV switch recovery (factory tailorable)
- Positive or Negative polarity (factory set)
- Minimum stored energy to maximize safety of user personnel and equipment
- Self-protected
  - * Overvoltage/open circuit, ≥10 kV models:
  - * Overcurrent (inherent in topology)
  - * Overtemperature
- Viewset: LCD display of programmed voltage set point
- External interlock control loop
- EMI filter; minimizes interference on AC power line
- 24,000 hour MTBF calculated by the DoE (Mil-217 for 8kJ/s, 30 kV with VAC input)
- Full power at low AC line rating
- Forced air cooling

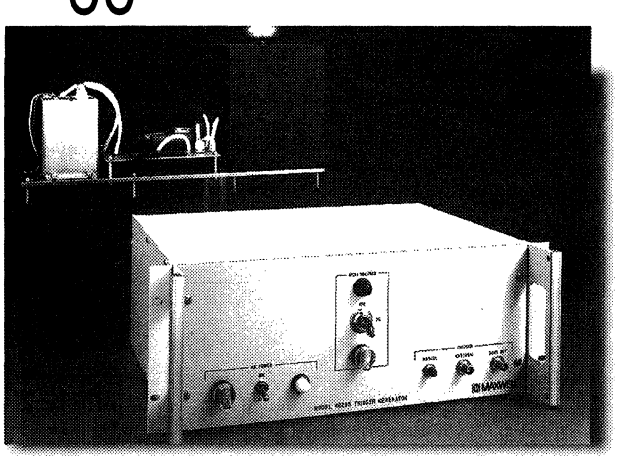
Standard CCS Charging Profile & Definitions

T = period (sec)
t_c = charge time (sec); constant current
t_d = dwell time (sec)
t_D = dead time (sec ≥ DAD = 150µs)
$T = t_c + t_d + t_d$

f = rep-rate (Hz) = $1/T$
C = capacitance (F)
V = charge voltage (V)
Pavg = supply output power (J/s)
$E = (1/2)CV^2$
$Pavg = E/t_c$



Trigger Generator



- Up to 120kV output
- Output Rise times to less than 10ns.
- Low Jitter.
- Low Pre-Fire Rate
- Multi-Output Version available
- Synthetic Air, SG6 and Oil Versions

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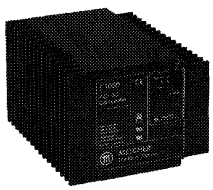
Power Supplies

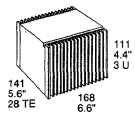
MELCHER
The Power Partners.

T-Family with PFC

500 watt AC-DC converters, rectifier for telecom and other DC bus applications,
Input to output isolation, Single output up to 56.5 V DC, Input voltage up to 255 V AC

Output voltage at 0.5 • $I_{o\,nom}$ [V]	Temperature coefficient of output [mV/K]	Output current limit [A]	Input voltage 47...63 Hz [V_{rms}]	Type
24.4	−5	16	85...255	LT 1201-7
27.25	−24...−54	14.5	85...255	LT 1240-7Z
54.5	−5	14.5	85...255	LT 1701-7
50.5...56.5	−48...−108	14.5	85...255	LT 1740-7Z
24.4	−5	16	70...140	UT 1201
27.25	−24...−54	14.5	70...140	UT 1240-7Z
54.5	−5	14.5	70...140	UT 1701-7
50.5...56.5	−48...−108	14.5	70...140	UT 1740-7Z



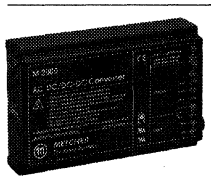


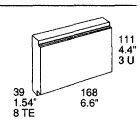
- Very high efficiency, typically 93%
- Temperature range -7: −25...71°C
- Power factor >0.99
- Harmonics <IEC 555-2
- High power density, 210 W/dm³
- DC output voltages for 24 and 48 V loads
- Battery charging temperature control
- No inrush current, hot plug-in capability
- Immune to transients and disturbances according to IEC 1000-4-2, -3, -4, -5 and -6 and VDE 160
- Safety according to IEC 950, EN 60950

M-Family

50 watt AC-DC converters, Input to output isolation
1, 2 or 3 outputs up to 48 V DC, Input voltage up to 264 V AC

Output voltage 1, 2, 3 $U_{o\,nom}$ [V]	Output current 1, 2, 3 $I_{o\,nom}$ [A]	Type class I Input 85...264 V AC	Type class II ⧈ Input 85...264 V AC
5.1	8	LM 1001-7R	LMZ 1001-7R
12	4	LM 1301-7R	LMZ 1301-7R
15	3.4	LM 1501-7R	LMZ 1501-7R
24	2	LM 1601-7R	LMZ 1601-7R
48	1	LM 1901-7R	LMZ 1901-7R
12, 12	2, 2	LM 2320-7	LMZ 2320-7
15, 15	1.7, 1.7	LM 2540-7	LMZ 2540-7
5.1, 12, 12	5, 0.7, 0.7	LM 3020-7	LMZ 3020-7
5.1, 15, 15	5, 0.6, 0.6	LM 3040-7	LMZ 3040-7





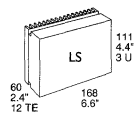
- Extremely wide input voltage range
- Efficient input filter
- I/O electric strength test 4 kV_{rms}
- Temperature range -7: −25...71°C
- Available as class II equipment ⧈
- Output voltage control (R) and inhibit
- Surge and transient suppression circuitry
- Outputs individually isolated, controlled
- Outputs fully protected against overload
- Safety according to IEC 950, EN 60950

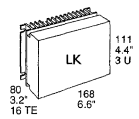
S- and K-Family with PFC

100/150 watt AC-DC converters, Input to output isolation
1 or 2 outputs up to 48 V DC, Input voltage up to 255 V AC

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Type Input voltage 85...255 V AC
5.1	16	LS 4001-7R
12	8	LS 4301-7R
15	6.5	LS 4501-7R
24	4.2	LS 4601-7R
24	4	LS 5320-7R
30	3.2	LS 5540-7R
48	2	LS 5660-7R
12, 12	4, 4	LS 5320-7R
15, 15	3.2, 3.2	LS 5540-7R
24, 24	2, 2	LS 5660-7R

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Type Input voltage 85...255 V AC
5.1	25	LK 4003-6R
12	12	LK 4301-7R
15	10	LK 4501-7R
24	6	LK 4601-7R
24	6	LK 5320-7R
30	5	LK 5540-7R
48	3	LK 5660-7R
12, 12	6, 6	LK 5320-7R
15, 15	5, 5	LK 5540-7R
24, 24	3, 3	LK 5660-7R



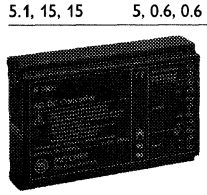


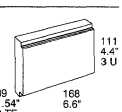
- Extremely wide input voltage range
- Efficient input filter
- Power factor >0.95
- Harmonics < IEC 1000-3-2
- Temperature range -7: −25...71°C
- I/O electric strength test 4 kV_{rms}
- Fully isolated outputs
- No derating over temperature
- Output voltage control (R)
- Inhibit input
- Input over-/undervoltage lock-out
- Surge and transient suppression circuitry
- Outputs open- and short-circuit proof
- Safety according to IEC 950, EN 60950

H-Family

50 watt AC-DC converters, Input to output isolation
1, 2 or 3 outputs up to 48 V DC, Input voltage up to 255 V AC

Output voltage 1, 2, 3 $U_{o\,nom}$ [V]	Output current 1, 2, 3 $I_{o\,nom}$ [A]	Type Input voltage 85...132 V AC	Type Input voltage 187...255 V AC
5.1	8	110H1001-2R	230H1001-2R
12	4	110H1301-2R	230H1301-2R
15	3.4	110H1501-2R	230H1501-2R
24	2	110H1601-2R	230H1601-2R
48	1	110H1901-2R	230H1901-2R
12, 12	2, 2	110H2320-2	230H2320-2
15, 15	1.7, 1.7	110H2540-2	230H2540-2
5.1, 12, 12	5, 0.7, 0.7	110H3020-2	230H3020-2
5.1, 15, 15	5, 0.6, 0.6	110H3040-2	230H3040-2





- Two AC input voltage ranges
- Output voltage control (R)
- Temperature range -2: −10...50°C
- I/O electric strength test 3 kV_{rms}
- Outputs individually isolated
- Built-in surge, transient suppression circuit
- Outputs fully protected against overload
- Safety according to IEC 950, EN 60950

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VEW-Family

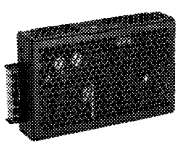
15/20/50/100 watt AC-DC converters, Input to output isolation
Single output up to 48 V DC, Input voltage up to 265 V AC

Output voltage $U_{o\,nom}$ [V]	Output current T_A=60°C $I_{o\,nom}$ [A]	Output current T_A=50°C $I_{o\,max}$ [A]	Type Input voltage 85...265 V
5	1.5	3	VEW 10-05
12	0.7	1.4	VEW 10-12
15	0.55	1.1	VEW 10-15
24	0.35	0.7	VEW 10-24
28	0.3	0.6	VEW 10-28
48	0.175	0.35	VEW 10-48

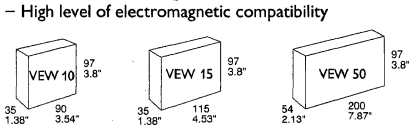
Output voltage $U_{o\,nom}$ [V]	Output current T_A=60°C $I_{o\,nom}$ [A]	Output current T_A=50°C $I_{o\,max}$ [A]	Type Input voltage 85...265 V
5	2.5	5	VEW 15-05
12	1.1	2.2	VEW 15-12
15	0.9	1.8	VEW 15-15
24	0.6	1.2	VEW 15-24
28	0.5	1	VEW 15-28
48	0.3	0.6	VEW 15-48

Output voltage $U_{o\,nom}$ [V]	Output current T_A=60°C $I_{o\,nom}$ [A]	Output current T_A=50°C $I_{o\,max}$ [A]	Type Input voltage 85...265 V
5	5	10	VEW 25-05
12	2.2	4.4	VEW 25-12
15	1.8	3.6	VEW 25-15
24	1.2	2.4	VEW 25-24
28	1	2	VEW 25-28
48	0.6	1.2	VEW 25-48

Output voltage $U_{o\,nom}$ [V]	Output current T_A=60°C $I_{o\,nom}$ [A]	Output current T_A=50°C $I_{o\,max}$ [A]	Type Input voltage 85...265 V
5	10	20	VEW 50-05
12	4.2	8.4	VEW 50-12
15	3.35	6.7	VEW 50-15
24	2.1	4.2	VEW 50-24
28	1.8	3.6	VEW 50-28
48	1	2	VEW 50-48



- 110 V AC and 230 V AC input, auto select
- I/O electric strength test 3.75 kV_{rms}
- Excellent line/load regulation
- High level of electromagnetic compatibility

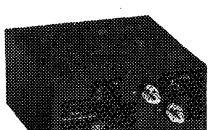


VEW 1-Ph.-Family

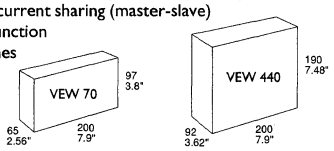
150...600 watt AC-DC converters, Input to output isolation
Single output up to 48 V DC, Input voltage up to 265 V AC

Output voltage $U_{o\,nom}$ [V]	Output current T_A=60°C $I_{o\,nom}$ [A]	Output current T_A=50°C $I_{o\,max}$ [A]	Type Input voltage 85...265 V AC
2	42	60	VEW 200-02
2	84	120	VEW 440-02
5	15	30	VEW 70-05
5	42	60	VEW 200-05
5	84	120	VEW 440-05
12	6.25	12.5	VEW 70-12
12	18.9	27	VEW 200-12
12	37.1	53	VEW 440-12
15	5	10	VEW 70-15
15	15.4	22	VEW 200-15
15	30.1	43	VEW 440-15

Output voltage $U_{o\,nom}$ [V]	Output current T_A=60°C $I_{o\,nom}$ [A]	Output current T_A=50°C $I_{o\,max}$ [A]	Type Input voltage 85...265 V AC
24	3.15	6.3	VEW 70-24
24	9.8	14	VEW 200-24
24	18.9	27	VEW 440-24
28	2.7	5.4	VEW 70-28
28	8.4	12	VEW 200-28
28	16.1	23	VEW 440-28
48	1.58	3.15	VEW 70-48
48	4.9	7	VEW 200-48
48	9.1	13	VEW 440-48



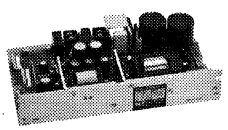
- 110 V AC and 230 V AC input, auto select
- I/O electric strength test 3.75 kV_{rms}
- Excellent line/load regulation
- High level of electromagnetic compatibility
- Output current sharing (master-slave)
- Inhibit function
- Sense lines



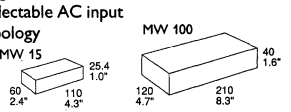
MWE-Family

15...100 watt AC-DC converters, Input to output isolation
3 or 4 outputs up to 24 V DC, Input voltage up to 264 V AC

Output voltage 1, 2, 3, 4 $U_{o\,nom}$ [V]	Output current 1, 2, 3, 4 $I_{o\,nom}$ [A]	Rated power T_A = 40°C $P_{o\,tot}$ [W]	Type Input voltage 85...264 V AC
5, 12, 12	3, 0.5, 0.5	15	MWE 15-01
5, 15, 15	3, 0.5, 0.5	15	MWE 15-11
5, 12, 12	5, 1.2, 0.5	30	MWE 30-01
5, 15, 15	5, 1.2, 0.5	30	MWE 30-11
5, 12, 12	8, 1.5, 1	50	MWE 50-01
5, 15, 15	8, 1.5, 1	50	MWE 50-11
5, 12, 5	8, 1.5, 1	50	MWE 50-21
5, 24, 12, 12	12, 2, 2, 1	100	MW 100-01
5, 12, 12, 12	12, 2, 2, 1	100	MW 100-02
5, 12, 12	12, 2, 2	100	MW 100-03
24, 12, 5, 12	3, 2, 2, 1	100	MW 100-04
5, 5, 12, 12	12, 0.5, 2, 1	100	MW 100-05
5, 5, 15, 15	7, 2, 2, 2	100	MW 100-06



- I/O electric strength test 3.75 kV_{rms}
- Component derating for high reliability
- Safety according to EN 60950, UL 1950, CSA 22.2
- Universal or selectable AC input
- Flex power topology



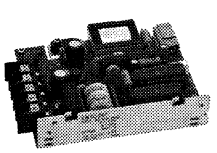
SWE-Family

5...100 watt AC-DC converters, Input to output isolation
Single output up to 48 V DC, Input voltage up to 264 V AC

Output voltage $U_{o\,nom}$ [V]	Output current T_A=40°C $I_{o\,nom}$ [A]	Type Input voltage 85...264 V AC	Config.
5	1	SWE 05-05..	FC
5	2	SWE 10-05..	F,FC
5	3	SWE 15-05..	C,F,FC
5	6	SWE 30-05..	C,F,FC
5	10	SWE 50-05..	C,F,FC
5	20	SWE 100-05..	C,F,FC
12	0.42	SWE 05-12..	FC
12	0.83	SWE 10-12..	F,FC
12	1.3	SWE 15-12..	C,F,FC
12	2.5	SWE 30-12..	C,F,FC
12	4.2	SWE 50-12..	C,F,FC
12	6.3	SWE 75-12..	C,F,FC
12	8.3	SWE 100-12..	C,F,FC

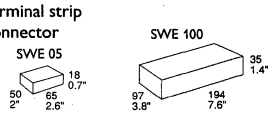
Output voltage $U_{o\,nom}$ [V]	Output current T_A=40°C $I_{o\,nom}$ [A]	Type Input voltage 85...264 V AC	Config.
15	0.67	SWE 10-15..	F,FC
15	1	SWE 15-15..	C,F,FC
15	2	SWE 30-15..	C,F,FC
15	3.4	SWE 50-15..	C,F,FC
15	5	SWE 75-15..	C,F,FC
15	6.7	SWE 100-15..	C,F,FC
24	0.42	SWE 10-24..	F,FC
24	0.63	SWE 15-24..	C,F,FC
24	1.33	SWE 30-24..	C,F,FC
24	2.1	SWE 50-24..	C,F,FC
24	3.1	SWE 75-24..	C,F,FC
24	4.2	SWE 100-24..	C,F,FC
48	1.6	SWE 75-48..	C,F,FC
48	2.1	SWE 100-48..	C,F,FC

Ordering example: SWE 15-12 FC



- Ultra thin and compact
- I/O electric strength test 3 kV_{rms}
- Noise standard: meet EN 55022 class B
- Safety according to EN 60950, UL 1950, CSA 22.2

Description of configurations:
C Case cover, terminal strip
F Open frame, terminal strip
FC Open frame, connector



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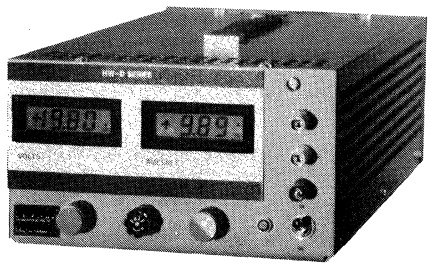
HWD Series 0-200V/0-20A Constant Voltage/Constant Current Supplies

FEATURES
- Digital Ammeter/Voltmeter
- Remotely Programmable
- Remote Sensing
- Series and Parallel Operation
- 1mV Volts Ripple
- .01% Load Regulation
- .01% Line Regulation
- Separate Voltmeter and Ammeter
- Half Rack Size or Bench Mounting



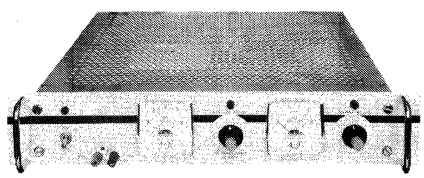
LINEAR precision low noise

APPLICATION
The HWD Series power supplies are designed to be used in the lab bench or for system application. The use of digital meters provides accurate readings of output voltage and current without the need of external DVM's.

	Output		Regulation						Output		Regulation					
			Line %		Load %						Line %		Load %			
Model Number	Volts	Amps	CV	CC	CV	CC	Price	Model Number	Volts	Amps	CV	CC	CV	CC	Price
HWD 6-20A	0-6	0-20	0.01	0.1	0.01 or 1 mv	0.5	$950.	HWD 40-5A	0-40	0-5	0.01	0.1	0.01 or 1 mv	0.5	$ 950.
HWD 10-15A	0-10	0-15	0.01	0.1	0.01 or 1 mv	0.5	950.	HWD 60-3A	0-60	0-3	0.01	0.1	0.01 or 1 mv	0.5	950.
HWD 20-10A	0-20	0-10	0.01	0.1	0.01 or 1 mv	0.5	950.	HWD 100-2A	0-100	0-2	0.01	0.1	0.01 or 1 mv	0.5	1065.
HWD 50-4	0-50	0-4	0.01	0.1	0.01 or 1 mv	0.5	950.	HWD 200-1A	0-200	0-1	0.01	0.1	0.01 or 1 mv	0.5	1200.

PR Series 0-250V/0-25A Constant Voltage/Constant Current Supplies

FEATURES
- High Power — Small Size
- Remotely Programmable
- Parallel Operation
- Mode Lites
- Low Ripple
- .01% Regulation



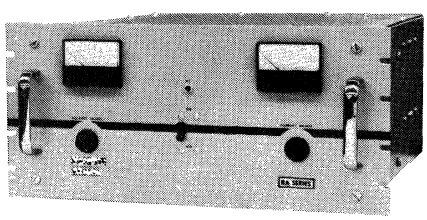
LINEAR precision low noise

APPLICATION
The PR Series find application in the laboratory and in systems where both versatility of operation and a high degree of regulation is required. The voltage to current crossover point may be set anywhere within the limits of the zero to full rated output voltage and zero to full rated output current.

	Output		Regulation							Output		Regulation					
			Line %		Load %							Line %		Load %			
Model Number	Volts	Amps	CV	CC	CC	CV	Panel Ht.	Price	Model Number	Volts	Amps	CV	CC	CC	CV	Panel Ht.	Price
PR 20-15A	0-20	0-15	0.01	0.01	0.01	0.25	3½"	$1595.	PR 40-20A	0-40	0-20	0.01	0.01	0.01	0.25	5¼"	$1770.
PR 40-10A	0-40	0-10	0.01	0.01	0.01	0.25	3½"	1550.	PR 60-14A	0-60	0-14	0.01	0.01	0.01	0.25	5¼"	1890.
PR 60-7A	0-60	0-7	0.01	0.01	0.01	0.25	3½"	1650.	PR 125-6.5A	0-125	0-6.5	0.01	0.01	0.01	0.25	5¼"	2060.
PR 125-3.2A	0-125	0-3.2	0.01	0.01	0.01	0.25	3½"	1885.	PR 125-10A	0-125	0-10	0.01	0.01	0.01	0.25	7"	2835.
PR 20-25A	0-20	0-25	0.01	0.01	0.01	0.25	5¼"	1830.	PR 250-10A	0-250	0-10	0.01	0.01	0.01	0.25	8¾"	5000.

RA Series Constant Voltage Supplies

FEATURES
- High Power — Small Size
- Remotely Programmable
- Low Ripple
- Parallel Operation
- .01% Regulation



LINEAR precision low noise

APPLICATION
The RA Series are all silicon, relatively high in power, and tightly regulated. They find application in the laboratory and in systems where both versatility of operation and a high degree of regulation is required. Adjustable solid state current limiting provides load protection.

	Output		Regulation					Output		Regulation			
Model Number	Volts	Amps	Line %	Load %	Panel Ht.	Price	Model Number	Volts	Amps	Line %	Load %	Panel Ht.	Price
RA 20-15A	0-20	0-15	0.01	0.01	3½"	$1435.	RA 125-6.5A	0-125	0-6.5	0.01	0.01	5¼"	$1840.
RA 40-10A	0-40	0-10	0.01	0.01	3½"	1433.	RA 40-30A	0-40	0-30	0.01	0.01	7"	2160.
RA 60-7A	0-60	0-7	0.01	0.01	3½"	1433.	RA 60-20A	0-60	0-20	0.01	0.01	7"	2280.
RA 125-3.2A	0-125	0-3.2	0.01	0.01	3½"	1460.	RA 125-10A	0-125	0-10	0.01	0.01	7"	2265.
RA 20-25A	0-20	0-25	0.01	0.01	5¼"	1630.	RA 40-50A	0-40	0-50	0.01	0.01	8¾"	3400.
RA 40-20A	0-40	0-20	0.01	0.01	5¼"	1580.	RA 60-30A	0-60	0-30	0.01	0.01	7"	3510.
RA 60-14A	0-60	0-14	0.01	0.01	5¼"	1650.	RA 250-10A	0-250	0-10	0.01	0.01	8¾"	4650.
Options include: meters, overvoltage, special input voltages.							RA 25-100A	0-25	0-100	0.01	0.01	10½"	4975.

The leader in precision low noise LINEAR power supplies.

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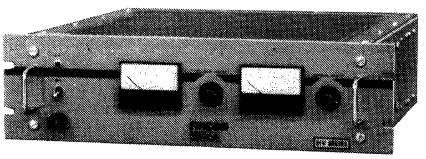
RS232 OR IEEE488 PROGRAMMING OPTIONS AVAILABLE

HV Series 0-350V Constant High Voltage Supplies

FEATURES
- All Solid State
- Adjustable Current Limit
- <1 Millivolt Ripple
- 10-Turn Voltage Adjustments
- Remote Programming
- Remote Sensing



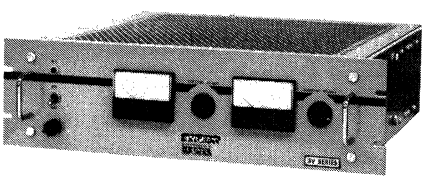
LINEAR precision low noise

APPLICATION
The HV is a versatile series of constant voltage units adjustable from zero to full rated voltage. Adjustable solid state current limiting is a feature. Options provide for either systems or laboratory use. Crossover from constant voltage to current limiting is automatic solid state and noninterrupting. Units may be operated in parallel for increased current capacity.

Model Number	Output		Regulation		Size	Price
	Volts	Amps	Line %	Load %		
HV 350-1	0-350	1	0.005	0.01	3½ x 19 x 16½	$2450.
HV 350-2	0-350	2	0.005	0.01	5¼ x 19 x 16½	2900.
HV 350-3	0-350	3	0.005	0.01	7 x 19 x 16½	3250.
HV 350-5	0-350	5	0.005	0.01	8¾ x 19 x 16½	3700.

SV Series 0-600V Constant High Voltage Supplies

FEATURES
- All Solid State
- Adjustable Current Limit
- 3 Millivolt Ripple
- 0.01% Regulation
- 10-Turn Voltage Adjustments
- Remote Programming
- Remote Sensing
- Meters



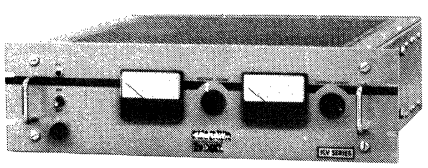
LINEAR precision low noise

APPLICATION
The SV is a versatile series of constant voltage units adjustable from 0 to full rated voltage. Options provide either systems or laboratory use. Crossover from constant voltage to current limiting is automatic solid state and noninterrupting. Units may be operated in parallel for increased current capacity.

Model Number	Output		RMS* Ripple	Regulation		Size	Price
	Volts	Amps		Line %	Load %		
SV 600-0.5	0-600	0-0.5	<3mv	0.01	0.01	3½ x 19 x 16½	$2900.
SV 600-1	0-600	0-1	<3mv	0.01	0.01	5¼ x 19 x 16½	3500.
SV 600-2	0-600	0-2	<3mv	0.01	0.01	7 x 19 x 16½	4400.

KV Series High Voltage Supplies

FEATURES
- Output 100 to 1500 VDC
- Voltage Regulated 0.5%
- Current Regulated 0.5%
- Voltmeter and Ammeter
- Ripple 0.5% RMS
- Voltage/Voltage Programmable
- Resistance Programmable



LINEAR precision low noise

APPLICATION
The KV1000 Series Power Supplies are constant voltage/constant current units with automatic crossover. Models are available with up to 3 ampere current capacity over the full voltage range. Options such as remote voltage and current programming, remote turn on and turn off make the unit a versatile piece of equipment for laboratory or manufacturing operations.

Model Number	Output		Regulation %		Panel Ht.	Price	Model Number	Output		Regulation %		Panel Ht.	Price
	Voltage	Amps	Current	Voltage				Voltage	Amps	Current	Voltage		
KV 1000-0.5	100-1000	0-0.5	0.5	0.5	5¼"	$2700.	KV 1500-0.5	100-1500	0-0.5	0.5	0.5	7"	$3095.
KV 1000-1	100-1000	0-1.0	0.5	0.5	7"	3400.	KV 1500-1	100-1500	0-1.0	0.5	0.5	10½"	4300.
KV 1000-2	100-1000	0-2.0	0.5	0.5	10½"	5800.	KV 1500-1.5	100-1500	0-1.5	0.5	0.5	14"	6600.
KV 1000-2	100-1000	0-3.0	0.5	0.5	14"	6900.							

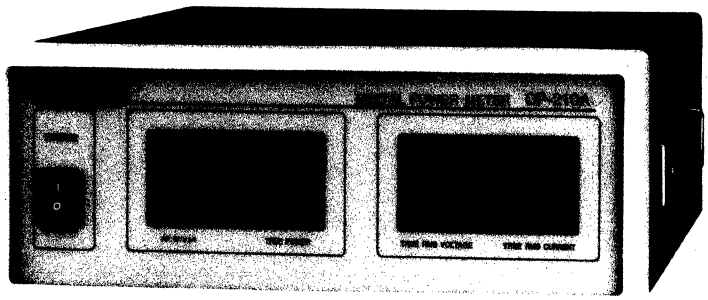
THE ALL IN ONE DIGITAL POWER METER
FOR
POWER FACTOR AND EFFICIENCY MEASUREMENT

Precision Power Measurement of Distorted Waveforms

CP-210 SERIES

FEATURES

- Auto ranging LED meters, 3-1/2 digit.
- Simultaneous readout of voltage, current, frequency and watts.
- Voltage range: 0-600 V TRMS
- Current range: 0-30 A TRMS
- Frequency range: 40-5000 Hz
- Precision: 0.3%/V 1ma/I
- Attractive metal case.
- Power source: 115 or 230V 50/60Hz
- Size: 10.2"W x 4.33"H x 13.7"D



APPLICATIONS

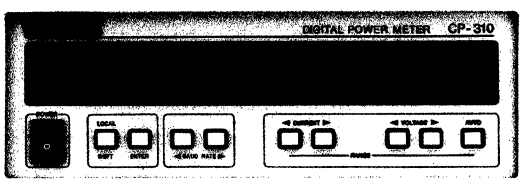
The CP-210 is a high precision, high performance digital power meter suitable for testing switching power supplies, UPS, and other equipment energized from an AC input. All four meters are built into one, which provides a simultaneous, bright led display of the four parameters and eliminates the need for 4 separate instruments at a fraction of their combined cost. At a glance, you will see the voltage, current, watts and frequency. Divide the watts readout by (VxI) to compute the power factor. This instrument will measure 50 Hz, 60 Hz and all input frequencies up to 5 kHz. The CP-210 is priced at less than half of the other competitive power meters while offering superior performance.

CP-300 SERIES

- Standard RS-232 interface
- Frequency measurement

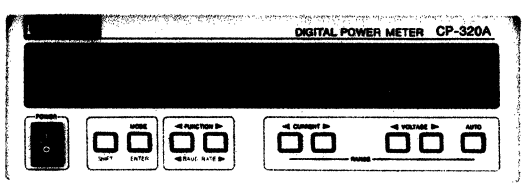
RS-232

- Closed case Calibration
- Wide bandwidth from 10 Hz to 100 kHz (model CP-320A)



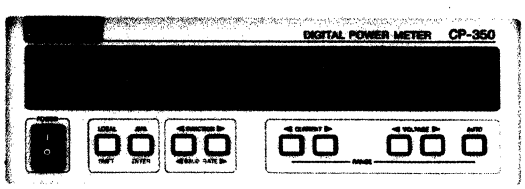
CP-310 10Hz-5kHz

V \ A	0.2000A	2.000A	20.00A
150.0V	30.00W	300.0W	3000W
300.0V	60.00W	600.0W	6000W
500.0V	100.0W	1000W	9999W



CP-320A 10Hz-100kHz

V \ A	0.2000A	2.000A	20.00A
30.00V	6.000W	60.00W	600.0W
300.0V	60.00W	600.0W	6000W
500.0V	100.0W	1000W	9999W



CP-350 10Hz-5kHz

V \ A	0.5000A	5.000A	50.00A
150.0V	75.00W	750.0W	7.500kW
300.0V	150.0W	1.50kW	15.0kW
500.0V	300.0W	3.0kW	30.0kW

ELDAN INSTRUMENTATION POWER
Division of
Mid-Eastern Industries

100 SCHOOL STREET, BERGENFIELD, N.J. 07621-2915 USA
PHONE : 201-385-5000 FAX : 201-385-0702

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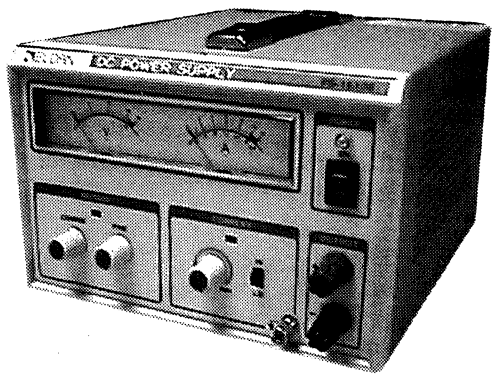
LABORATORY POWER SUPPLIES

LOW COST

METERED SINGLE, DUAL & TRIPLE OUTPUT

LOW NOISE FINE ADJUSTMENT

The **ELDAN** Power Supplies are state of the art linear regulated DC power supplies designed for laboratory and testing applications. All units are provided separate voltmeters and ammeters that provides the ability to monitor both output parameters at the same time. Front panel Mode Lights indicate constant voltage or current limit mode of operation on some models.



MODEL	DESCRIPTION	PRICE
PS-1610S	0-16 VDC 0-10A CV/CC ANALOG METERS	**$380.00**
PS-2243	0-12 VDC/12-24 VDC 0-3A ONE METER VOLT/AMP SELECTABLE	**$188.00**
PS-2245	0-12 VDC/12-24 VDC 0-5A ONE METER VOLT/AMP SELECTABLE	**$230.00**
PS-303	0-30 VDC 0-3A CV/CC ANALOG METERS	**$212.00**
PS-83001	0-30 VDC 0-5A CV/CC **DIGITAL METERS**	**$259.00**
PS-305	0-30 VDC 0-5A CV/CC ANALOG METERS	**$250.00**
PS-303D	0-30 VDC 0-3A CV/CC DUAL OUT / TRACKING FOUR ANALOG METERS	**$385.00**
PS-305D	0-30 VDC 0-3A CV/CC DUAL OUT / TRACKING FOUR ANALOG METERS	**$440.00**
PS-8107	0-30 VDC 0-10A CV/CC ANALOG METERS	**$451.00**
PS-8110	0-60 VDC 0-3A CV/CC ANALOG METERS	**$313.00**
PS-8112	0-60 VDC 0-5A CV/CC ANALOG METERS	**$403.00**

SPECIFICATIONS FOR MODEL PS-305

AC Input: 115 VAC +/-10% 50/60 Hz / 230 VAC +/-10% 50/60Hz Switch selectable at rear of unit.

Output Voltage Range: 0-30 VDC Continuously variable with coarse and fine voltage controls.

Output Current Range: 0 to 5 amperes.Adjustable current limit by single turn panel potentiometer. Adjustable from 5% of rated current to 100% of rated current.

Voltage Regulation: Line: less than 0.25%+2mV for a 10% line change. Load: Less than 0.25%+3mV for a full load step.

Ripple: Less than 1mV rms. 5mV p.p

Protection: The input is protected by a line fuse mounted at the rear of the unit. The output is protected by a adjustable single turn current limit control.

Metering: Analog DC voltmeter and ammeter. Accuracy +/-2.5% of full scale

Terminations: Input is provided with a detachable three wire line cord. The output is available at 5 way binding posts located on the front panel.

Temperature: Operating 0 to 40 C. Storage -20 to +85 C.

Size: 8-1/2"W x 12-1/2"D x 6" H. **Weight:** 23 pounds.

* Specifications typical of all models.

ELDAN

INSTRUMENTATION POWER

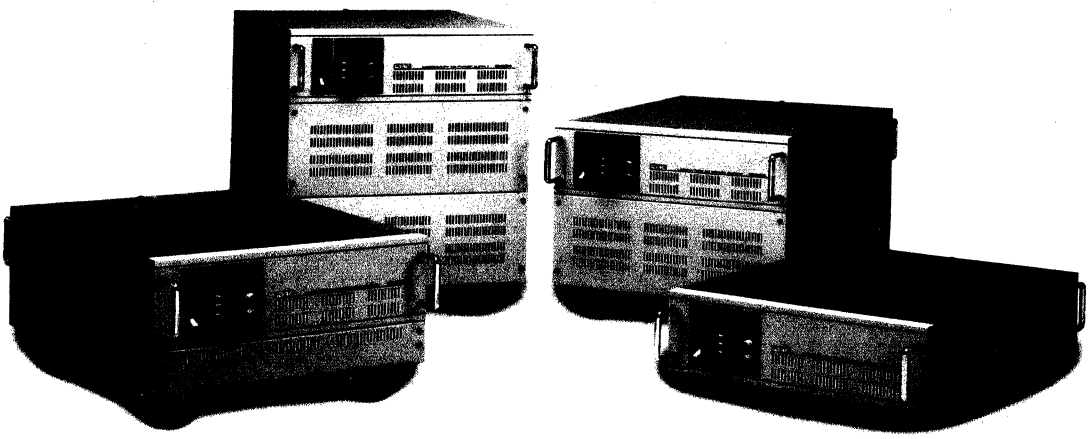
Division of Mid-Eastern Industries

100 School Street, Bergenfield, NJ 07621-2915

Phone: 201-385-0500 Fax: 201-385-0702

FAX ON DEMAND (800) 548-2183 **INTERNET:http://www.techexpo.com/WWW/mideast**

CD-Series
High-Reliability DC Power Supplies
350W TO 10kW



APPLICATIONS

The CD Series of high power DC sources is uniquely suitable for the testing and burning-in of electronic equipment, semiconductors and automotive electronics.

FEATURES

- Fully metered output 4 ½ digit LED display.
- Constant Voltage-Constant Current Mode.
- Full protection and Low Noise.

Output		Model	Input Power Voltage
CV	CC	Standard type	
V	A	CD series	AC
0-35	0-10	CD-035-010	110/220
	0-20	CD-035-020	110/220
	0-30	CD-035-030	110/220
	0-50	CD-035-050	220
	0-100	CD-035-100	220
	0-150	CD-035-150	220
	0-200	CD-035-200	220
0-60	0-10	CD-060-010	110/220
	0-20	CD-060-020	220
	0-30	CD-060-030	220
	0-50	CD-060-050	220
	0-100	CD-060-100	220

Output		Model	Input Power Voltage
CV	CC	Standard type	
V	A	CD series	AC
0-100	0-5	CD-100-005	110/220
	0-10	CD-100-010	110/220
	0-20	CD-100-020	220
	0-30	CD-100-030	220
	0-50	CD-100-050	220
0-150	0-5	CD-150-005	110/220
	0-10	CD-150-010	110/220
	0-20	CD-150-020	220
	0-30	CD-150-030	220
	0-50	CD-150-050	220
0-250	0-5	CD-250-005	110/220
	0-10	CD-250-010	110/220
	0-20	CD-250-020	220
	0-30	CD-250-030	220

NOTE: FOR HIGHER POWER MODULES CONSULT FACTORY

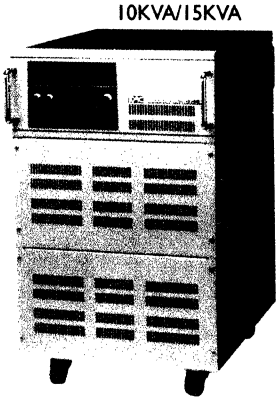
CF.CIF-Series
High Quality Stability AC POWER SOURCE
500VA - 50kVA

Model	Max Power	Output Current		Input Power
		0-150V	0-300V	
CF-500	500VA	4.2A	2.1A	110/220V 1Phase
CF-1000	1000VA	8.4A	4.2A	110/220V 1Phase
CF-2000	2000VA	16.8A	8.4A	220V 1Phase
CF-3000	3000VA	25A	12.5A	220V 1Phase
CIF				
CIF-2000	2000VA	16.8A	8.4A	220V 1Phase
CIF-3000	3000VA	25A	12.5A	220V 1Phase
CIF-5000	5000VA	42A	21A	220V 1Phase
CIF-7500	7500VA	63A	31.5A	220V 1Phase
CIF-1030	10kVA	84A	42A	220V 1 / 3 Phase
CIF-1530	15kVA	125A	62.5A	220V 1 / 3 Phase
CIF-2030	20kVA	168A	84A	220V 3Phase
CIF-3030	30kVA	250A	125A	220V 3Phase
CIF-5030	50kVA	420A	210A	220V 3Phase

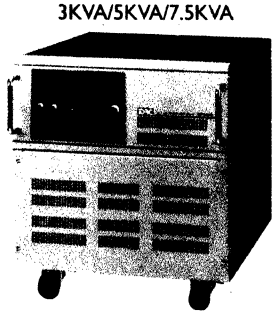
APPLICATIONS

These power sources are variable voltage (0-150VAC, 0-300VAC) and variable frequency (40Hz - 2kHz) power systems intended for testing electronic equipment and electromechanical devices. They sustain high peak power and a crest factor of 3.

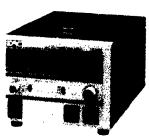
10KVA/15KVA



3KVA/5KVA/7.5KVA

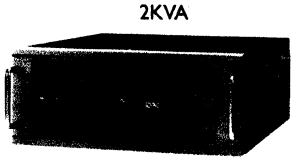


500VA



210 × 170 × 380mm

2KVA



430 × 175 × 550mm(4U)

430 × 415 × 550mm(9U)

430 × 638 × 550mm(14U)

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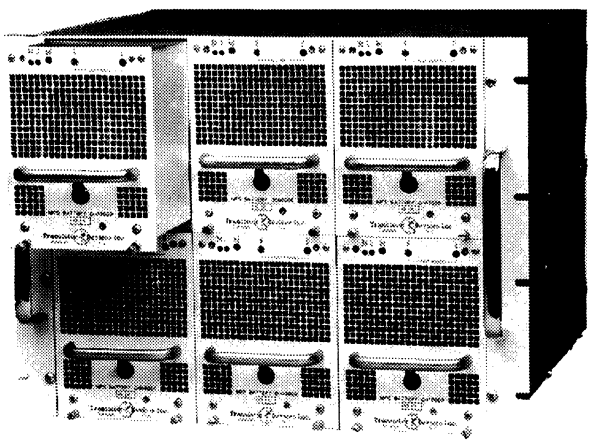
UL REGISTERED FIRM
ISO-9002

MODULAR POWER SYSTEMS

REDUNDANT POWER SYSTEMS



- N+1 PARALLEL REDUNDANT
- FAULT TOLERANT
- HOT BUS PLUG-IN
- POWER FACTOR CORRECTED
- UNIVERSAL INPUT
- 500 W TO 100 KW

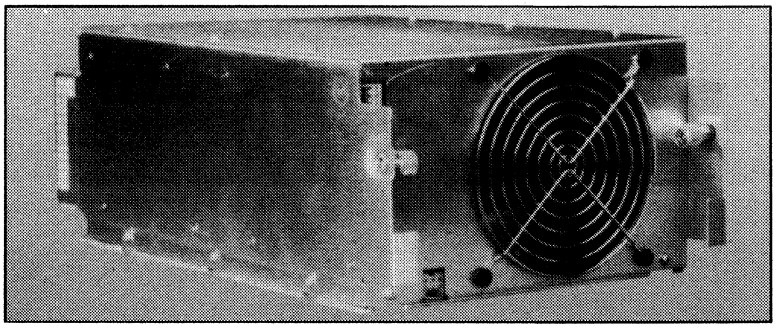
The MPS Series of 500 to 5600 Watt power supplies from Modular Power Systems are building blocks for turn-key fault tolerant power systems up to 100KW. Standard features such as current sharing, diode isolation, hot bus swap capability, monitoring signals and battery back-up make the MPS ideal for applications where downtime can't be tolerated. If our standard MPS Series doesn't meet your specifications then let us put our extensive design experience in fault tolerant power to work for you by tailoring an MPS solution to the unique aspects of your system.

MODULAR POWER SYSTEMS
36 Newburgh Road
Hackettstown, NJ 07840
Phone: 908-850-5088
www.transdev.com
info@mailer.transdev.com
Fax: 908-850-1607
A Division of Transistor Devices, Inc.

ISO 9001 CERTIFIED QUALITY SYSTEM

Modular Power Systems

SBR1150 Power Supplies



The SBR Series of power supplies are ideal for critical applications requiring true fault tolerance with battery back-up. The dual AC and DC inputs provide the ability to ride through AC power loss on battery power and replaces the DC-DC converters used in conventional redundant systems. Multiple DC outputs power your equipment while a battery charger output maintains system batteries. The SBR Series provides everything required for N+1 redundant power solutions except for the batteries.

This data sheet represents a typical unit. Our experienced Engineering team is ready to tailor an SBR single box redundant solution to the unique requirements of your system.

FEATURES

- 1150 Watts
- Hot Bus Plug-In
- Glitch-Free Transfer
- Active Current Sharing
- Power Factor Correction
- Multiple DC Outputs
- Battery Charger Outputs
- UL, CSA, VDE Approvals
- Alarm Signals
- Racking Systems Available
- Standard Products
- Tailored Solutions

SPECIFICATIONS

ELECTRICAL

AC Input Voltage	180-264 Volts AC, 47-63HZ, single phase
DC Input Voltage	42 to 56VDC
Peak Inrush Current	80 Amps maximum
Power Factor	0.98 typical
Efficiency	70% Minimum with AC Input at rated power 65% Minimum with DC Input at rated power

OUTPUT

Output Designation	V1	V2	V3	V4
Output Voltage	5V	12V	24V	56V
Output Current	120A	35A	4A	0.55A
Adjustability	±10%	±10%	±10%	N/A
Ripple and Noise (pk-pk)	150mV	150mV	500mV	500mV

Total Output Power	1150 Watts
Line Regulation	Less than ±0.2%
Load Regulation	0.5% on 5V and 12V outputs 2% on 24V output
Output Ripple & Noise	(See table above)
Isolation Diode	Each output contains an isolation diode
Parallelability	May be paralleled with like units. Forced current sharing on outputs V1, V2 and V3

PROTECTION

Overvoltage	Overvoltage protection is provided on outputs V1, V2 and V3.
Overcurrent	All outputs are short circuit protected.
Overtemperature	An internal thermostat turns the unit off in the event of an overtemperature condition.

ALARMS & CONTROLS

DC Inhibit	Each output can be turned off independently via an optically isolated signal
AC Power Fail	A TTL compatible signal indicated that the AC input is below 175VAC or the unit is drawing current from the DC battery input.
Summary Fault Alarm	TTL compatible. One signal available for all outputs.
Current Monitor	Independent buffered analog voltage signals proportional to the output current are provided.
Current Share Alarm	Outputs V1 and V2 include a TTL compatible alarm which indicates that the units are out of the share current tolerance.
Low Battery Alarm	Indicates the battery voltage is below acceptable levels.

ENVIRONMENTAL

Operating Temperature	0 to 50°C
Humidity	0% to 95% non-condensing
Cooling	Internal, constant speed fan intakes air through the front of the unit and exhausts air out the rear.

MECHANICAL

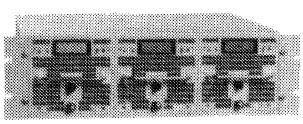
Height	5 inches
width	8.3 inches
Length	14 inches
Weight	18 lbs

AGENCY COMPLIANCE

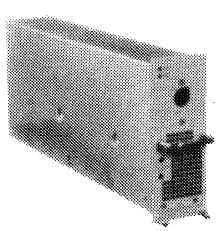
EMI	Radiated and conducted noise on the input meets FCC Part 15, Subpart J, Class A, and VDE0871, Class A
Safety	UL1950, EN60950, and CSA 22.2#234

VALUE ADDED SERVICES

Modular Power Systems offers a broad array of complementary products and value added services. This allows us to tailor a turn-key MP Series power solution to the unique requirements of your system.

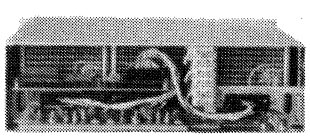


Standard Racks



EM Series Entry Modules

- system AC input interface
- Monitors multiple AC lines
- Switches over in the event of loss of line



Tailored Racks

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Hackettstown, NJ 07840
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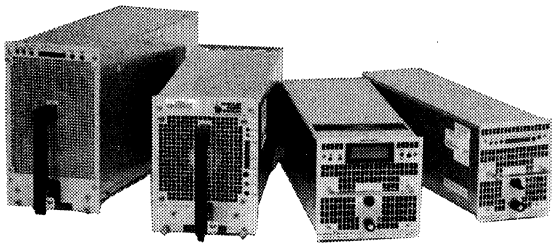
www.transdev.com
info@mailer.transdev.com
Fax: 908-850-1607
A Division of Transistor Devices, Inc.

CERTIFIED ISO 9001 QUALITY SYSTEM

Modular Power Systems

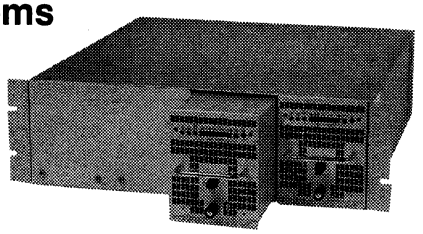
MPS Series For Distributed Power and N+1 Redundant Systems

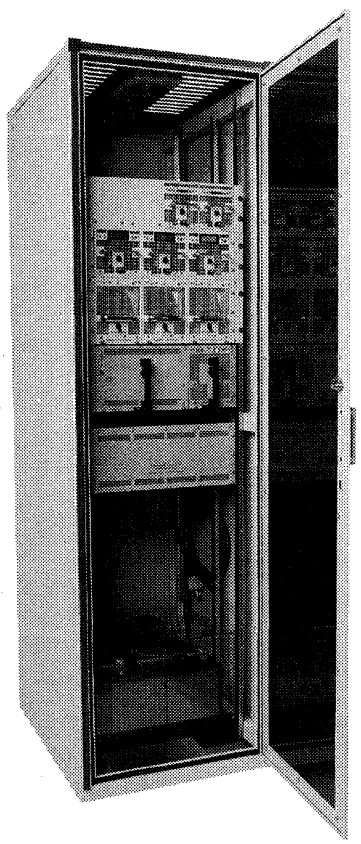


Power factor corrected from 500 - 5000 Watts. Ideal for bulk and distributed systems or for battery charging applications. Standard and Tailored Solutions. Single or multiple output, active current sharing, UL, CSA, VDE approved. The ultimate in reliability.

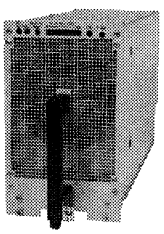
MP Rack and Panel Systems

- N+1 Redundancy
- Hot Bus Plug-in
- Active Current Sharing
- Up to 100KW
- 19" or 23" Rack Mountable
- Single or Three Phase





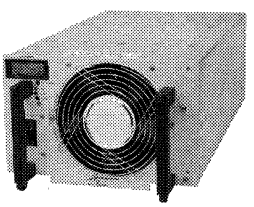
Accessories for Uninterruptible Systems



- EM25 Power Entry Module Features Line Monitoring and Glitch Free Switch-Over for Redundant Input Systems
- Battery Back-Up Systems
- Power System Monitoring

SBR Series - Uninterruptible DC Power

- AC or DC Input
- Parallel Redundancy
- Single or Multiple Outputs



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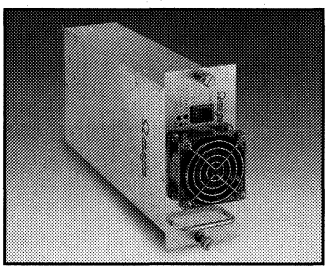
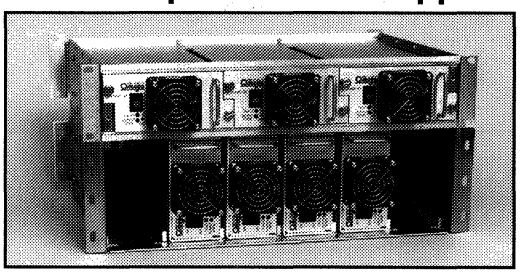
OMEGA'S HP Series – Hot Swap DC Power Supplies



HP3 500W Hot Swap power supply.



HP's mounted in 2U or 3U heights.

- 500W single output bulk power; 24 to 54VDC.
- Modular architecture for rack mount systems.
- 400W dual, triple and quad output modules.
- N+1 "Hot Swap" with ORing diode.
- Single wire current sharing.
- No minimum loading.
- SMT robotic construction.

500W Single Output Bulk Power. 400W Multiple Output Regulated Power

OMEGA's HP series includes single output 500W bulk DC power converters for N+1 redundant applications and distributed power architecture. Also offered are 400W multiple output regulated DC power supplies.

These modular, narrow slot, power supplies are easily mounted in factory configured, Hot-Swap 19 inch rack (Rack-M). These racks are available in three and six slot power configurations in 2U and 3U heights.

Single and Multiple Output Hot Swap

500W Single Output

Model No.	VDC	V1
HP3-1F	24	20A
HP3-1G	28	18A
HP3-1H	36	14A
HP3-1J	48	10A

400W Dual, Triple or Quad Outputs

VDC	V1	V2	V3	V4
2	50A	27A	8.5A	1.0A
3.3	50A	27A	8.5A	1.0A
5	50A	27A	8.5A	1.0A
12	22A	15/20 pk 30sec.	8.5A	1.0A
15	18A	12A	8.5A	1.0A
24	12A	8A	5A	1.0A
36	9A	—	—	—
48	9A	—	—	—

HP Ordering:

HP3 - XYYYY -Z

Output	X
Single	1
Dual	2
Triple	3
Quad	4

Output Voltage VDC	Y
2	A
3.3	B
5	C
12	D
15	E
24	F
28	G
36	H
48	J

Options Z	Function	Availability
Q	54VDC battery charger	500W only.
R	Reverse airflow.	400W & 500W.
T	Non hot swap panel.	400W & 500W.
V	Delete mounting handle.	400W & 500W.
Y	Delete enable switch.	400W & 500W.
Z	Custom EMI radiation.	500W only.
	Other Options	
Consult Factory	Inhibit	—
	Output	—
	Power Fail	—

Features and Specification:

- Sub-modular architecture
- SMT robotic construction.
- N+1 Hot Swap capability.
- No minimum loading.
- Single wire current sharing.
- Single output bulk power; 24 to 54VDC.
- Multiple outputs (2-4) — regulated
- Built-in ORing diode.
- One year warranty

- Input: 90-264VAC.
- 0.99 PFC.
- Hold up time: 20msec., min.
- Remote sense: V1 & V2, multi.
- Voltage adjust: ±10%.
- Regulation, multioutput: 0.1% line; 0.2% load.
- Ripple & Noise: 1% p-p max.
- Efficiency: 70% at FL.
- Output rated at 50°C.
- Standby output: 5VDC, 200ma.

- Overtemperature shut-down.
- OVP: all outputs.
- Reverse voltage protection.
- Overload protection: foldback type.
- Fan cooled: sleeveless ball bearing type.
- Dielectric withstand:
  - * In-to-out: 4300VDC.
  - * In-to-case: 2200VDC.
- Safety agency: UL, ULc & TUV.

- Interface signals.
  - * Power fail.
  - * Output good — DC OK.
  - * Remote program (±10% min).
  - * Remote on/off.
- LED status indicators.

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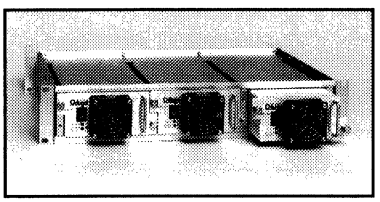
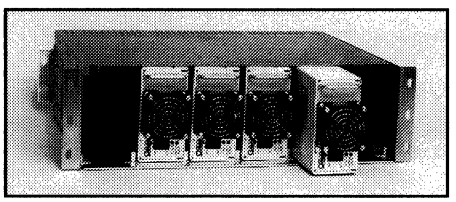
Rack 'Em with OMEGA's Rack-M™

1.0KW and 2.5KW Hot Plug Rack Systems.

OMEGA's **Rack-M**, high power Hot Plug racks utilize single output 500W HP3 power supply modules for N+1 redundancy. These racks deliver up to 1,000W or 2,500W of N+1 redundant bulk DC power in a 2U or a 3U rack. **Rack-M's** architecture and electronics provide for rack paralleling of power supply modules and automatic current sharing for load distribution. Status lines, DC OK, P OK, and master alarm monitor individual power supply modules as well as system conditions. Designed for easy installation and maintenance, the **Rack-M** system enables easy module swapping with zero system down time.



Rack-M3 Hot Swap Rack System.



Rack-M6 Hot Swap Rack System.

RACK-M Configurations:

Rack-M Group	Rack-M Size	Rack-M height	Max. No. 600W Modules	Max. N+1 Power Out.
RACK-M3	3.5" x 19" x 14"	2U	3	1000W
RACK-M6	5.25" x 19" x 14"	3U	6	2500W

Rack-M Ordering:

RACK - MN - HP3X - Y

Max Modules	Rack Size
3	2U: 3.5" x 19" x 14"
6	3U: 5.25" x 19" x 14"

Output Voltage VDC	X
24	F
28	G
36	H
48	J
54	Q

Options Y	Desc.
P	Blank front panel.
L	Extended width - 23".*

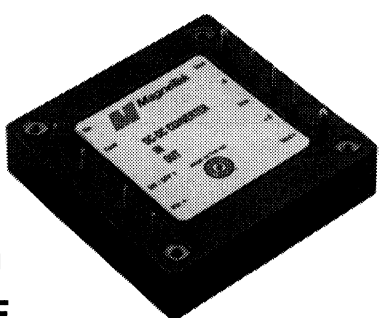
*Not available on 3U size.

Features and Specification:

(See HP3 for module specifications)

- True Hot Pluggable system.
- Zero system down time.
- Automatic, single wire current sharing.
- Integral isolation diodes.
- 90-264VAC input.
- 0-99 PFC.
- Ripple and noise: 1% p-p.
- Load regulation: 1%.
- No minimum load requirement.
- LED DC OK & P OK; front panel
- Master alarm.
- Module on-off capability.
- Remote on-off system capability.
- Standby output: 5VDC, 200ma.
- Rack circuit paralleling of outputs.
- Easy connect-disconnect.
- Self aligning connectors with guiding pins
- Pluggable backplane termination.
- Individually fan cooled modules.
- High-Rel connectors and pins.
- Standard 19" or 23" rack mount.
- 2U & 3U heights.

DC-DC POWER MODULES, TELECOM MODULES

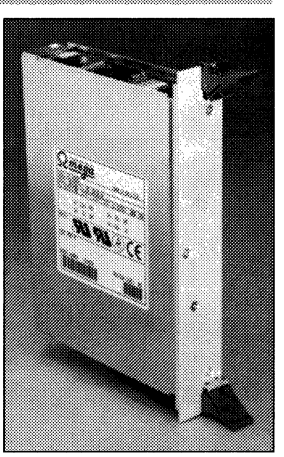


- **90% eff.**
- **t_o = 100°C**
- **Interface Signals**
- **I/O Isolation**
- **UL, CSA, CE, ISO9001**

50 – 150W
100 – 200W
300 – 400W

cPCI Power

Hot Swap...
AC or DC
350W...50°C
Sleek...Eurocard



- **Dual Power DIN Connectors**
- **PFC**
- **Quad-Output**
- **Interface Signals**
- **Smooth Swap For N + 1**

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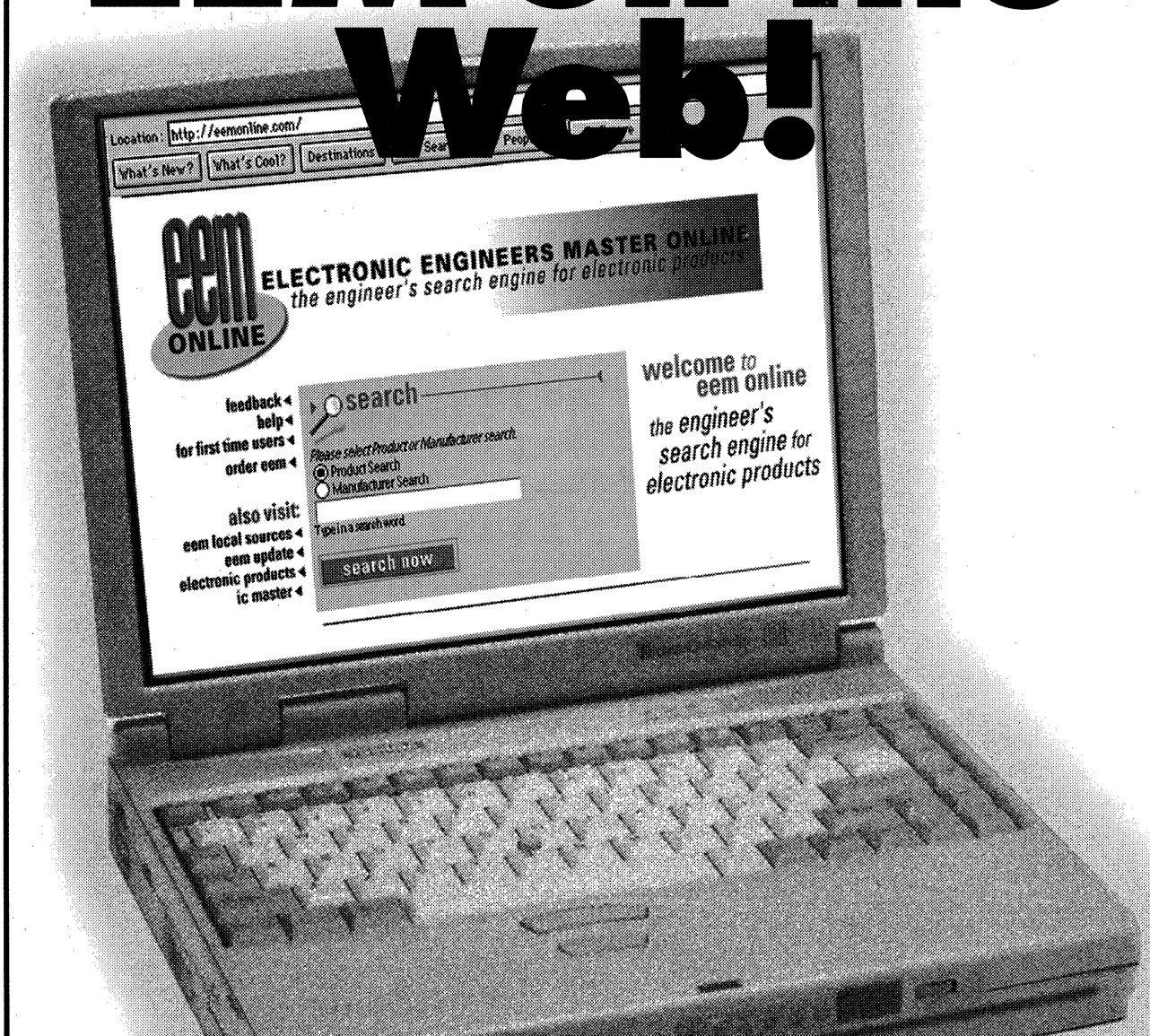

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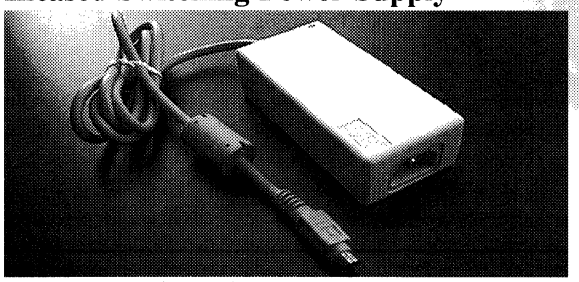
AC/DC 10W-100W Incased, Open Frame, and Wall Mount Switching Power Supplies

Features:

-Universal 85-264 VAC input
-STD outputs available from 5 VDC to 48 VDC (Regulated)
-Single, dual, and triple output up to 100 Watt total
-Max. peak-to-peak ripple approximately 1% of output Voltage
-Small Size to Wattage Ratio
-Emissions compliant FCC A, B, CISPR
-Wide range of approvals: UL, CSA, TUV, CE
-Custom design or standard product available
-Average cost under $1.25/Watt
-Samples available upon request

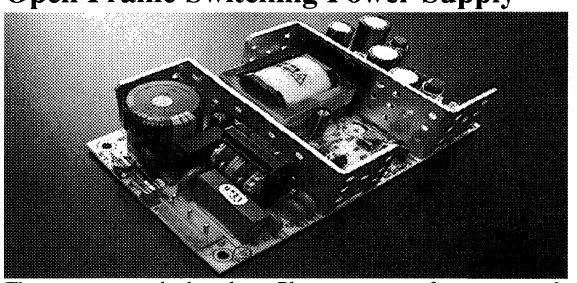
Incased Switching Power Supply



18Watt Dual Output: 5/12V, 5/24V, -12/12V
21Watt Single Output: 5V, 12V, 16V, 24V
28Watt Single Output: 12V, 15V, 24V
28Watt Dual Output: -5/5V, 5/12V, 5/24V
40Watt Single Output: 12V, 13.5V, 16V, 18V, 24V
60Watt Single Output: 12V
100Watt Single Output: 48V

These are our standard products. Please, contact us for custom products.

Open Frame Switching Power Supply



17Watt Dual Output: 5/12V
25Watt Dual Output: 5/12V
50Watt Dual Output: 5/12V
70Watt Dual Output: 5/12V

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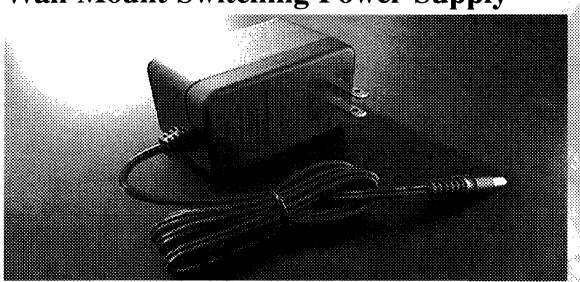
Wall Mount Switching Power Supply



10Watt Single Output: 5V
13Watt Single Output: 9V
15Watt Single Output: 7.5V
18Watt Single Output: 12V, 15V, 18V
24Watt Single Output: 24V

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-Kevin Valdez
Product Development Colorado Memory Systems Division
Hewlett-Packard Company

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POWER SUPPLIES

"The Ultimate in Packaged Power"

Standard Features & Available Options for OPT Power Supplies:

Standard Features:

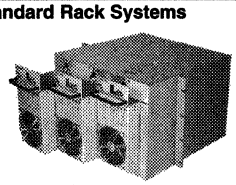
- 100 kHz "H" Bridge MOSFET Design
- Current Mode Control for Accurate Load Sharing
- True N+1 Capability
- Bi-Lateral Synchronization Port Minimizes System Harmonics
- Input Low Line Lockout Protection
- Output Over Voltage/Current Protection
- Over Temperature Protection
- Front Panel & Remote Adj. for Output Voltage & Current Limit
- Remote Fixed Margining of ± 5%
- Remote Enable and Reset Feature
- Front Panel Status Indicators & Remote Alarm Signals for Input OK, Output OK, Over Temp, Over Voltage, & Over Current
- Front Panel Test Points for Output Vdc & Adc
- UL 1950 and IEC 950/EN60950 Pending
- CSA 22.2 No. 950 Pending
- Conforms to FCC 20780 - Level A
- Meets VDE 0871/6.78 - Level A
- 50°C Burn-In w/Input Power Cycle
- 0 to 50°C Operating Ambient
- Field Demonstrated MTBF 800,000 Hours
- 2 Year Warranty

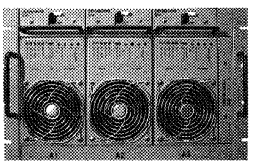
Optional Features:

- Custom Inputs DC to 400Hz
- Custom Outputs from 2V to 150Vdc
- Output Current to 2200 Amps per Module
- Air (Fan), Conduction (Water), or Immersion (FC-74) Cooled Configurations
- -40°C to +60°C Operating Ambient
- "Hot Plug" or "Manual (Bolt) Connection"
- Standard "Shoe Box" Module or 19", 23", 24" Rack Assembly
- Input Circuit Breaker Protection
- Custom Metering

Single Phase & Three Phase Standard Power Supply Rack Systems

Standard Rack Systems



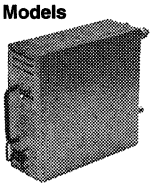


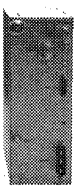
Standard Rack System Features:

- Designed to Accommodate Multiple 1Ø or 3Ø Input Power Modules
- Available in 19", 23", or 24" EIA Panel Widths
- All 15.83" Deep x 7"(4U) High or 10.5"(6U) High
- Racks Accommodate Multiple Modules as follows:
  - 1Ø Input Assemblies:
    19" x 4U = (3) x 2kW = 6kW Max
    23" x 4U = (4) x 2kW = 8kW Max
  - 3Ø Input Assemblies:
    19" x 6U = (3) x 4.8kW = 14.4kW Max
    23" x 6U = (4) x 4.8kW = 19.2kW Max
- All Systems include:
  - Input Circuit Breaker Protection on each Module
  - Perfect Load Sharing between Modules
  - Hot Plug / Hot Swap Capability
- System Outputs Available in Nominal 12V, 24V, 48V, 72V, or 120Vdc
- Applications:
  - N+1 Redundant Systems requiring > 1,000,000 hours MTBF
  - Critical Loads Requiring Hot Swap Module Replacement without Power Interruption
  - Battery Backed Emergency DC Systems including Telecommunications and Switchgear

Integral Cold Plate Conduction Cooled Single Output HCLV Power Supplies

7,200 Watt Models





Conduction Cooled Power Supply Features:

- 180-265V-3ø - 50/60 or 400Hz Input
- Up to 7,200 Watts Output
- 2.0 to 6.0 Vdc Outputs @1200Adc max
- 12 to 120 Vdc Nominal Outputs @ 60-800 Adc
- N+1 Redundant Capability
- 4.5" x 12.0" x 12.0" D Package
- Operable in any Orientation
- Bi-lateral Sychronization Port Minimizes System Harmonics
- Internal Cold Plate with Quick-connect Inlet / Outlet Fittings
- 1 GPM Coolant Flow Rate using Water at 30°C
- Cooling Fluids such as Ethylene Glycol and Water, etc. may be used with Appropriate Flow Rates
- Equipped with all Standard Features listed above
- Optional features available

Model Number

SI723M – XX / XXX

Series
Interface Type
M = Manual Plug
Voltage (12, 24, 48, 72, 120* nom)
Variation Code (Optional)
*NOTE: Specify SI7123M-120 for 120Vout

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POWER SUPPLIES

1,000 to 4,800 Watts • Single/Three Phase Input • Air Cooled • 10 to 140 Vdc Single Output Power Supplies

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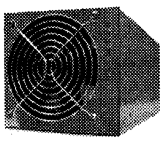
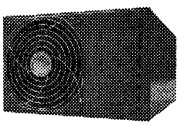


- Single Phase Input
- 1,000 to 2,000 Watt Models
- Power Factor Corrected

- Three Phase Input
- 1,200 to 4,800 Watt Models
- Power Factor Corrected



SM xx1 x - xx / xxx

Series
Wattage
101 = 1kW 1-phase
201 = 2kW 1-phase
Interface Type
M = Manual Plug
H = Hot Plug
Voltage (12, 24, 48, 72, 120* nom)
Variation Code (Optional)

***NOTE:** Specify SMxx1x-120 for 120Vout Models

M Series 1Ø & 3Ø input air cooled units feature (N+1) redundant capability in the industry standard package for power ratings of 1,000 to 4,800 watts. These units are based on a single converter transformer topology using our low leakage converter transformer geometry.

SM xx3 x - xx / xxx

Series
Wattage
123 = 1.2kW 3-phase
243 = 2.4kW 3-phase
363 = 3.6kW 3-phase
483 = 4.8kW 3-phase
Interface Type
M = Manual Plug
H = Hot Plug
Voltage (12,24,48,72, 120* nom)
Variation Code (Optional)
***NOTE:** Specify SMxx3x-120 for 120Vout Models

Input Specifications:

Unless otherwise specified Ta = 25°C, **Vin** = rated range @ 47-63Hz, Io = 0 -100%

1Ø Input Models

Parameter		Value min	Value max	Unit	Conditions
Voltage Range	SM101x-xx	90	265	Vrms	
	SM201x-xx	180	265		
Frequency Range		47	63	Hz	
Under-Voltage Lockout	SM101x-xx	80	85	Vrms	
	SM201x-xx	160	170		
Inrush Current		-	30	Apk	Vin =Vrms Nominal
Power Factor		0.99	-	-	Measured per IEC1000-3-2
Transients		Conforms to ANSI C62.42 (formerly IEEE 587-1980)			
Holdup		20	-	msec	Vin = min, Io = 100%, Vo = max

3Ø Input Models

Parameter	Value min	Value max	Unit	Conditions
Voltage Range	180	265	Vrms	
Frequency Range	47	63	Hz	
Under-Voltage Lockout	160	170	Vrms	
Inrush Current	-	30	Apk	Vin = 208V (1.2 to 4.8kW)
Power Factor	0.94	-	-	Measured per IEC1000-3-2
Transients	Conforms to ANSI C62.42 (formerly IEEE 587-1980)			
Holdup	20	-	msec	Vin = 208V, W_L < 2 kW
	10	-	msec	Vin = 208V, W_L > 2 kW

Output Specifications:

Unless otherwise specified Ta = 25°C, **Vin** = rated range @ 47-63Hz, Io = 0 - 100%

1Ø Input Models

Parameter		Value min	Value max	Unit	Conditions	
Output Voltage Range	SMxx1x-12	10	14	Vdc		
	SMxx1x-24	20	28			
	SMxx1x-48	40	56			
	SMxx1x-72	60	84			
	SMxx1x-120	100	140			
Output Current Range @ 1kW	SM101x-12	0	84	Adc	Vo=12Vdc	
	SM101x-24	0	42		Vo=24Vdc	
	SM101x-48	0	21		Vo=48Vdc	
	SM101x-72	0	14		Vo=72Vdc	
	SM101x-120	0	8.4		Vo=120Vdc	
Output Current Range @ 2 kW	SM201x-12	0	168	Adc	Vo=12Vdc	
	SM201x-24	0	84		Vo=24Vdc	
	SM201x-48	0	42		Vo=48Vdc	
	SM201x-72	0	28		Vo=72Vdc	
	SM201x-120	0	16.8		Vo=120Vdc	
Efficiency (w/o blocking diode)	SM201x-12	82	-	%	Vo=12Vdc	Vin=220Vrms
	SM201x-24	84	-		Vo=24Vdc	Io = 100%
	SM201x-48	86	-		Vo=48Vdc	
	SM201x-72	89	-		Vo=72Vdc	
	SM201x-120	92	-		Vo=120Vdc	
Regulation	Line	-0.1	+0.1	%		
	Load	-0.1	+0.1			
PARD	SMxx1x-12	-	0.10	Vpp	Bandwidth = 0 - 20Mhz	
	SMxx1x-24	-	0.20			
	SMxx1x-48	-	0.35			
	SMxx1x-72	-	0.50			
	SMxx1x-120	-	0.80			
Dynamic Response	Overshoot	-	+5	%Vo	Io(dynamic) = 0.25 Imax	
	Undershoot	-	-5		Io(static) = 0.5 Imax	
	Recovery	-	300	usec	di/dt = 1A/usec	
Load Sharing		-5	+5	%	Io = 10 to 95% Full Load	

3Ø Input Models

Parameter		Value min	Value max	Unit	Conditions	
Output Voltage Range	SMxx3x-12	10	14	Vdc		
	SMxx3x-24	20	28			
	SMxx3x-48	40	56			
	SMxx3x-72	60	84			
	SMxx3x-120	100	140			
Output Current Range @ 1.2kW	SM123x-12	0	100	Adc	Vo=12Vdc	
	SM123x-24	0	50		Vo=24Vdc	
	SM123x-48	0	25		Vo=48Vdc	
	SM123x-72	0	16.8		Vo=72Vdc	
	SM123x-120	0	10		Vo=120Vdc	
Output Current Range @ 4.8 kW	SM483x-12	0	400	Adc	Vo=12Vdc	
	SM483x-24	0	200		Vo=24Vdc	
	SM483x-48	0	100		Vo=48Vdc	
	SM483x-72	0	67		Vo=72Vdc	
	SM483x-120	0	40		Vo=120Vdc	
Efficiency (w/o blocking diode)	SMxx3x-12	82	-	%	Vo=12Vdc	Vin=208-240Vrms
	SMxx3x-24	84	-		Vo=24Vdc	Io = 100%
	SMxx3x-48	86	-		Vo=48Vdc	
	SMxx3x-72	89	-		Vo=72Vdc	
	SMxx3x-120	92	-		Vo=120Vdc	
Regulation	Line	-0.1	+0.1	%		
	Load	-0.1	+0.1			
PARD	SMxx3x-12	-	-0.10	Vpp	Bandwidth = 0 - 20Mhz	
	SMxx3x-24	-	0.20			
	SMxx3x-48	-	0.35			
	SMxx3x-72	-	0.50			
	SMxx3x-120	-	0.80			
Dynamic Response	Overshoot	-	+5	%Vo	Io(dynamic) = 0.25 Imax	
	Undershoot	-	-5		Io(static) = 0.5 Imax	
	Recovery	-	300	usec	di/dt = 1A/usec	
Load Sharing		-5	+5	%	Io = 10 to 95% Full Load	

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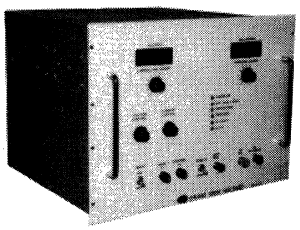

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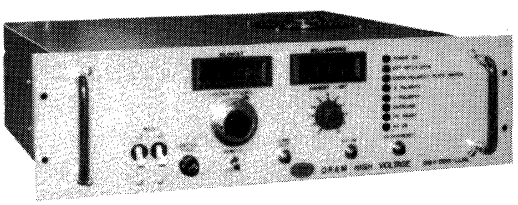

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- Tube regulated
- Saturable Core Regulated
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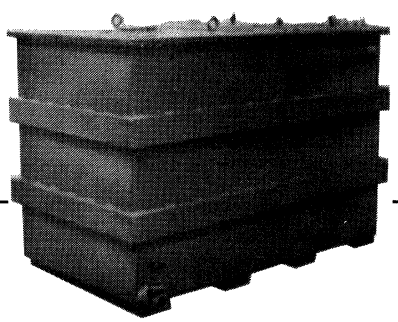
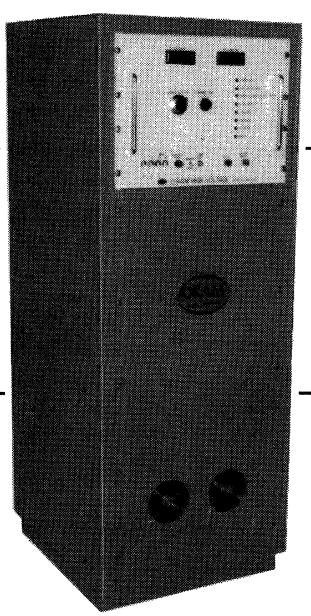


- Custom Requested features and specifications available.



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- Voltage Regulators

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- Non-Destructive AC/DC Hipot and Insulation Tester
- Voltage Dividers

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- G2/G1 Outputs BIT and Fault Indicators
- Test Points
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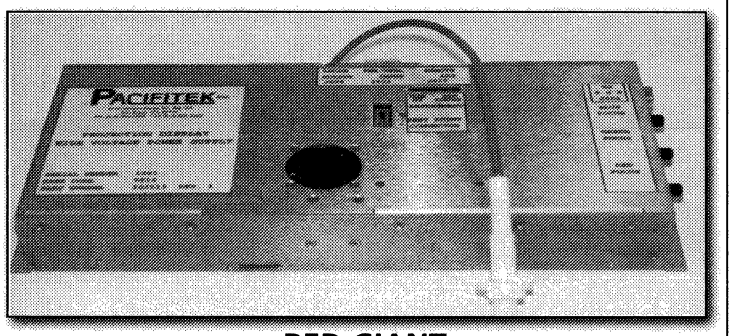
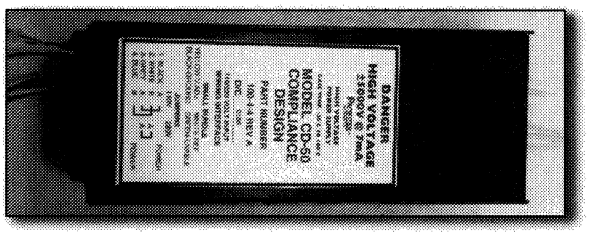
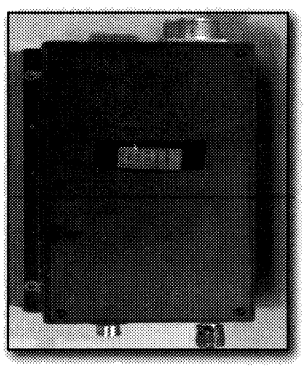


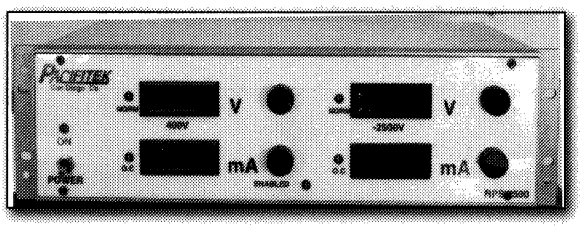
RED GIANT



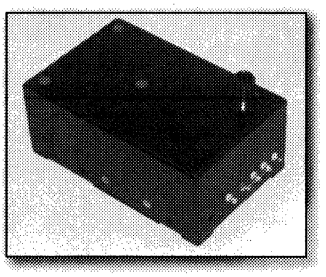
PULSAR
- 0-1KV/50-500W
- Powers OPAMPS
- Piezo Devices



DC-AC INVERTER
- 12/24 Volts Input
- 110/220/Adj. Output
- Frequency Adjustable



RPS SERIES
- Rack Mount Supply
- 50/500WATTS
- 1KV/75KV



SUPER NOVA
- Up to 35KV @ 4 MA
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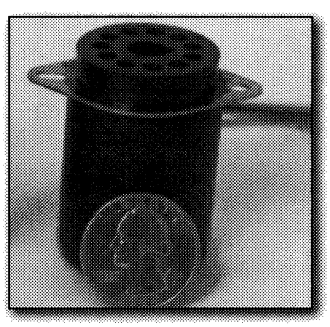
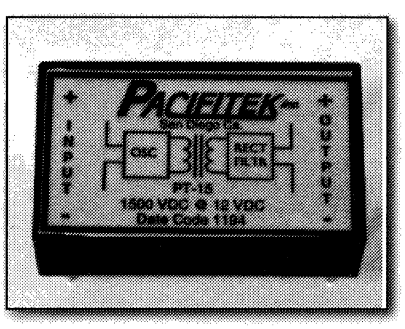
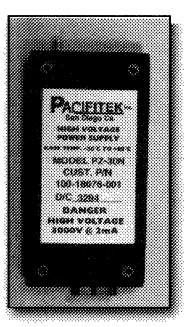
- Wide Input Range



PUP SERIES
- Ultra-Low noise and very stable.
- Socket mount PMT unit includes dynode.
- Unregulated and regulated.



PT SERIES
- 0-5KV/ 1.5 to 10 watts
- Proportional drive
- Low noise and very stable



PZ SERIES
- 0-7KV/10 watts
- Low noise, very stable for pmt applications

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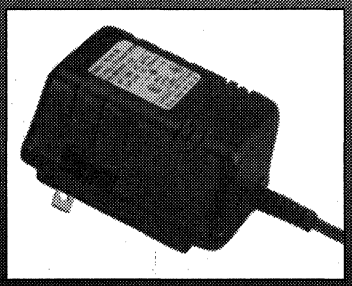
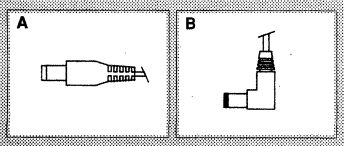


ENG Electric Co., Ltd has the capability to design and produce your short run and/or large volume orders.

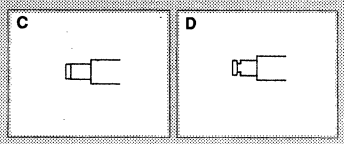
AC/AC ADAPTERS		AC/DC ADAPTERS	
OUTPUT VAC	CURRENT (ma)	OUTPUT VDC	CURRENT (ma)
2.3	3000	3	50 - 1000
3	50 - 900	3.6	50 - 700
3.6	50 - 900	4	900 - 1500
4	900 - 1000	4.5	50 - 1000
4.5	50 - 1600	5	50 - 1400
5	50 - 1500	6	50 - 1400
6	50 - 2000	6.8	400
7	350 - 1400	7	50 - 1300
7.5	50 - 1900	8	50 - 350
8	50 - 600	9	50 - 1200
9	50 - 1800	10	250 - 1500
10	250 - 1700	11	50 - 600
12	50 - 1500	12	50 - 1400
14	150 - 1200	13.5	650 - 850
15	50 - 1200	14	150 - 1200
16	50 - 1100	16	50 - 150
18	50 - 1100	18	50 - 1200
19	100 - 550	20	50 - 900
21	50 - 850	21	50 - 600
24	50 - 750	24	50 - 550

Plug Type



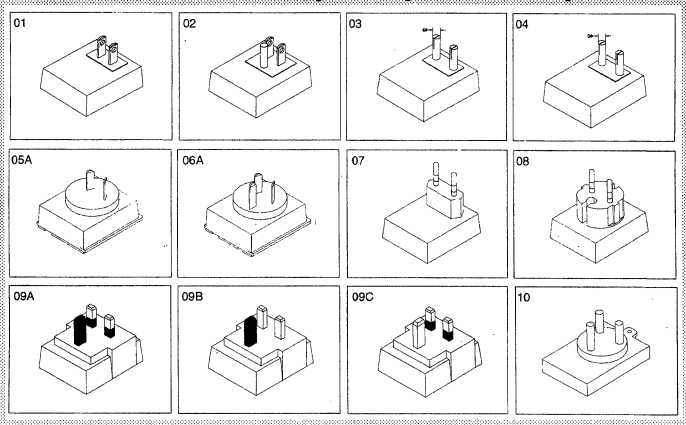
Straight Plug Angle Plug

Connector Type



Mono Plug With Groove Type

International — Adapter Input Blade Options



ENG Electric Co., Ltd. maintains extensive product approval files with many of the worldwide testing agencies including UL (United States), cUL (Canada), CSA (Canada), GS TUV & CE (European Community), BSI (Great Britain), SAA (Australia), T-mark (Japan), and others. In addition, 6 different UL insulation System approvals from class B (130°C) through Class N (200°) are maintained to facilitate agency approvals of custom OEM projects.

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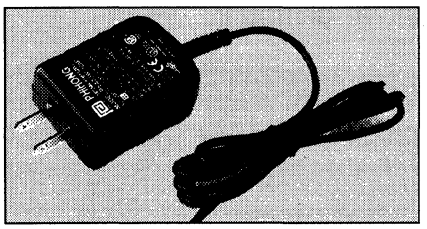
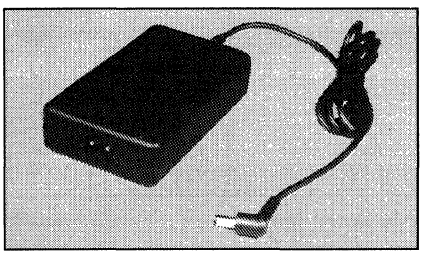


5W SLIM PROFILE ADAPTOR (Universal Input)

DIM: 62mm (2.24") x 44mm (1.75") x 25mm H (0.98")

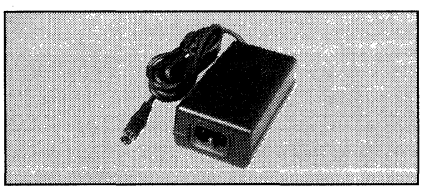
MODEL	O/P1	O/P2	O/P3	O/P4	UL	CSA
PSA-05W-105	5V/1A				V	V



15W LOW PROFILE ADAPTOR TWO WIRE (Universal Input)

DIM: 110mm (4.33") x 55mm (2.56") x 25.4mm H (1") *Inlet EN60320/C7 - 2 wires

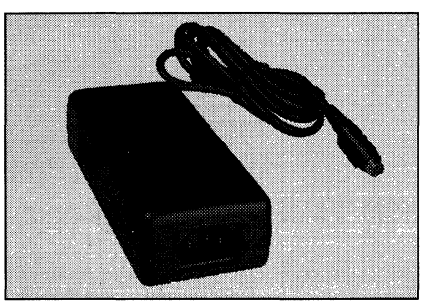
MODEL	O/P1*	O/P2	O/P3	O/P4	UL	CSA	TUV	MITI	CE
PSA-15W-050	5V/3A				V	V	V	V	V
PSA-15W-090	9V/1.5A				V	V	V	V	V
PSA-15W-120	12V/1.25A				V	V	V	V	V
PSA-15W-150	15V/1A				V	V	V		V
PSA-15W-180	18V/0.833				V	V	V		V
PSA-15W-240	24V/0.625A				V	V	V		V



15W MINI ADAPTOR (Universal Input)

DIM: 112mm (4.41") x 60mm (2.36") x 36mm H (1.42") *Inlet EN60320/C13 - 3 wires

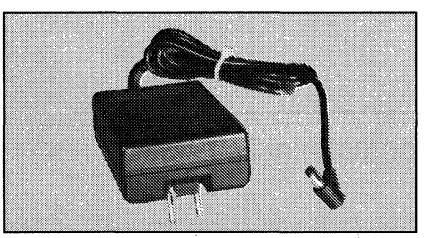
MODEL	O/P1	O/P2	SAA	UL	CSA	TUV	MITI	CE
PSA-15-201	5V/1A	12V/0.75A	V	V	V	V	V	V



17W MULTIPLE OUTPUT MINI ADAPTOR (Universal Input)

DIM: 140mm (5.51") x 60mm (2.36") x 39mm H (1.54") *Inset IEC EN60320/C13 - 3 wires

MODEL	O/P1	O/P2	O/P3	SAA	UL	CSA	TUV	MITI	CE
PSA-30U-301A	5V/1A	12V/0.7A	-12V/0.2A	V	V	V	V	V	V

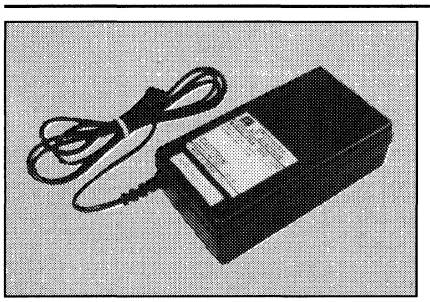


18W MINI ADAPTOR (110V Input)

DIM: 88mm (3.46") x 58mm (2.28") x 28mm H (1.1")

MODEL	O/P1	O/P2	O/P3	O/P4	UL	*CSA/NRTL	TUV	VDE
PSA-18-050	5.1V/2.5A				V	V		
PSA-18-120	12V/1.5A				V	V		

*CSA/NRTL - Tests performed by CSA to USA UL standards.



30W MINI ADAPTOR (Universal Input)

DIM: 112mm (4.41") x 60mm (2.36") x 36mm H (1.42")

MODEL	O/P1	O/P2	O/P3	O/P4	UL	CSA	TUV	VDE	MITI	CE
PSA-30U-050(P)*	5V/4A				V	V	V		V	V
PSA-30U-090(P)*	9V/2.2A				V	V	V		V	V
PSA-30U-120(P)*	12V/2.5A				V	V	V		V	V
PSA-30U-150(P)*	15V/2.0A				V	V	V		V	V
PSA-30U-180(P)*	18V/1.6A				V	V	V		V	V
PSA-30U-240(P)*	24V/1.25A				V	V	V		V	V

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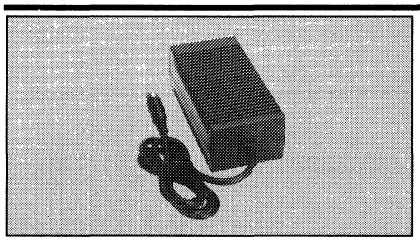
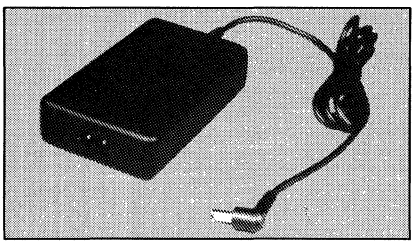


40W MULTIPLE OUTPUT ADAPTOR (Universal Input)

DIM: 166mm (6.54") x 80mm (3.15") x 56.5mm H (2.23")

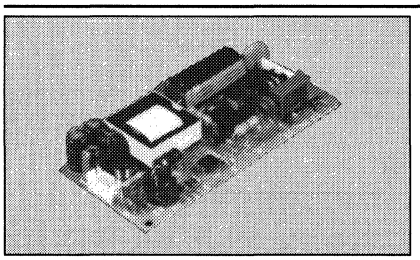
MODEL	O/P1	O/P2	O/P3	O/P4	UL	CSA	TUV	VDE
PSA-46-301	5V/3A	12V/2A	-12V/0.3A		V	V	V	
PSA-46-303	5V/3A	12V/2A	-5V/0.3A		V	V	V	
PSA-46-304	5V/3A	15V/1.6A	-15V/0.3A		V	V	V	



45W SINGLE OUTPUT ADAPTOR (Universal Input)

DIM: 105mm (4.13") x 60mm (2.36") x 30mm H (1.18") *Inlet EN60320/C7 - 2 wires

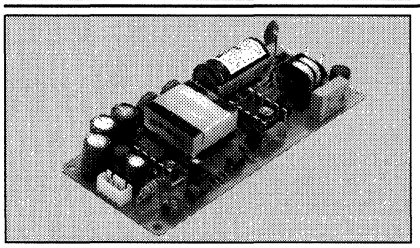
MODEL	O/P1	O/P2	O/P3	UL	cUL	TUV	MITI	CE
PSS-45W-090	9V/5A			V	V	V	V	V
PSS-45W-120	12V/3.8A			V	V	V	V	V
PSS-45W-150	15V/3.4A			V	V	V	V	V
PSS 45W-180	18V/2.8A			V	V	V	V	V
PSS-45W-240	24V/2.1A			V	V	V	V	V



10W LOW PROFILE OPEN FRAME (Universal Input)

DIM: 105mm (4.13") x 48mm (1.89") x 20mm H (0.79")

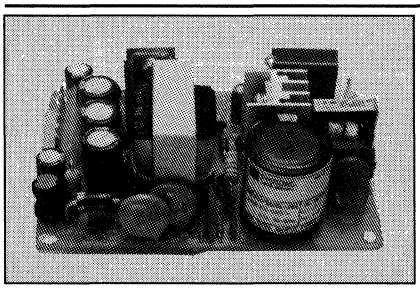
MODEL	O/P1	O/P2	O/P3	O/P4	UL	CSA	TUV	VDE
PSA-10L-050	5V/2A				V	V	V	
PSA-10L-120	12V/0.82A				V	V	V	
PSA-10L-150	15V/0.65A				V	V	V	
PSA-10L-240	24V/0.42A				V	V	V	



15W LOW PROFILE OPEN FRAME (Universal Input)

DIM: 125mm (4.9") x 50mm (1.97") x 21mm H (0.8")

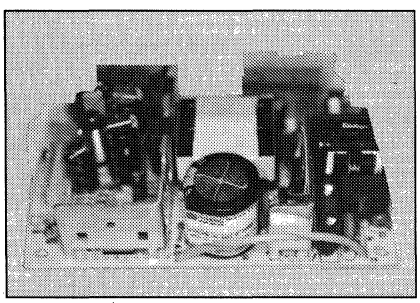
MODEL	O/P1	O/P2	O/P3	O/P4	UL	CSA	TUV	CE
PSA-15L-050	5V/3.0A				V	V	V	V
PSA-15L-120	12V/1.25Av				V	V	V	V
PSA-15L-150	15V/1.0A				V	V	V	V
PSA-15L-240	24V/0.625A				V	V	V	V



25W COST SAVER SMALL FOOTPRINT OPEN FRAME TYPE (Universal Input)

DIM: 91.5mm (3.6") x 63mm (2.48") x 29mm H (1.14")

MODEL	O/P1	O/P2	O/P3	O/P4	UL	CSA	TUV	CE
PSA-25L-050	5V/4A				V	V	V	V
PSA-25L-120	12V/2A				V	V	V	V
PSA-25L-240	24V/1A				V	V	V	V
PSA-25L-201	5V/2.6A	12V/1A			V	V	V	V



45W PERFORMANCE PLUS (Universal, Superior EMI, Up to 4 outputs)

DIM: 127mm (5.0") x 76mm (3.00") x 30mm H (1.2")

MODEL	O/P1	O/P2	O/P3	O/P4	CE	UL	CSA	TUV
PSA-45-050	5V/8A				V	V	V	V
PSA-45-120	12V/4A				V	V	V	V
PSA-45-150	15V/3A				V	V	V	V
PSA-45-240	24V/2A				V	V	V	V
PSA-4525	5V/3A	24V@1.25A			V	V	V	V
PSA-4531	5V/4A	+12V/1.5A	-12V/0.5A		V	V	V	V
PSA-4533	5V/2.5A	12V/0.5A	-5V/0.5A		V	V	V	V
PSA-4534	5V/4A	+15V/1.2A	-15V/0.5A		V	V	V	V
PSA-4541	5V/3A	12V/2A	-12V/0.5A	±5V/0.5A	V	V	V	V

Ratings are convection cooling. Increase 20-25% with 20cfm

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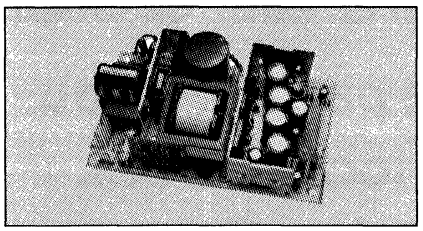
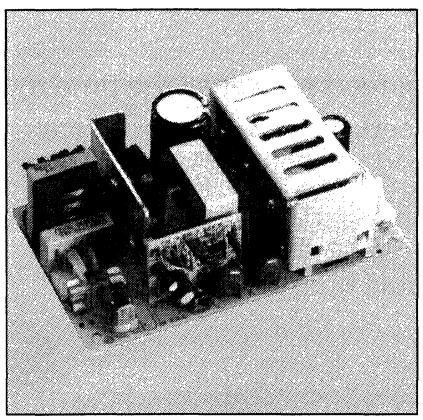


50W NETWORK POWER SUPPLY (Universal Input)

DIM: 127mm (5.0") x 76.2mm (3.0") x 32mm H (1.28")

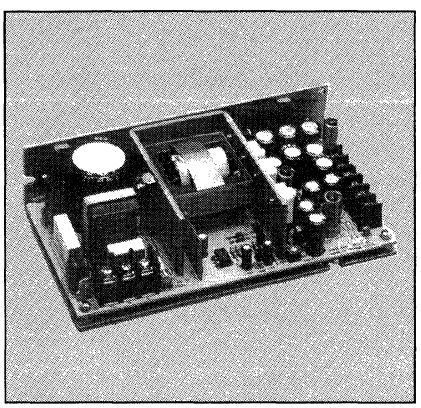
MODEL	O/P1	O/P2	O/P3	UL	CSA	TUV	CE
PSA-50-301	5.1V/8A	12V/1.5A	-12V/0.5A	V	V	V	V



60W HIGH POWER 3 X 5 TYPE (Universal Input)

DIM: 127mm (5.0") x 76.2mm (3.0") x 40mm H (1.58")

MODEL	O/P1	O/P2	O/P3	O/P4	UL	CSA	TUV	VDE	CE
PSA-60-105	5V/10A				V	V		V	V
PSA-60-112	12V/5A				V	V		V	V
PSA-60-115	15V/4A				V	V		V	V
PSA-60-124	24V/2.5A				V	V		V	V
PSA-60-148	48V/1.2A				V	V		V	
PSA-60-202	5.1V/6A	24V/1.3A			V	V		V	
PSA-60-203	5.1V/4A	12V/3.5A			V	V		V	V
PSA-60-301	5.1V/6A	12V/2.2A	-12V/0.3A		V	V		V	V
PSA-60-303	5.1V/6A	12V/2.2A	-5V/0.5A		V	V		V	
PSA-60-304	5.1V/6A	15V/1.5A	-15V/0.5A		V	V		V	

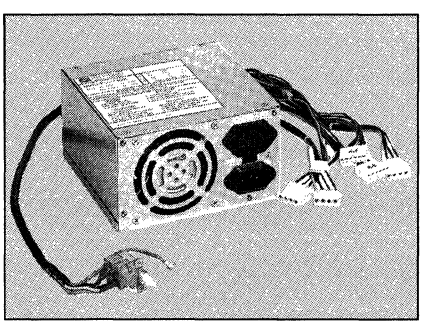


110W INDUSTRIAL SUPPLY (Universal Input)

DIM: 172.7mm (6.8") X 93.5mm (3.8") x 43.6mm H (1.72")

MODEL	O/P1	O/P2	O/P3	O/P4	CE LVD	UL	CSA	TUV	VDE
PSA-110-105	5V/22A				V	V	V	V	V
PSA-110-112	12V/9.0A				V	V	V	V	V
PSA-110-115	15V/7.3A				V	V	V	V	V
PSA-110-124	24V/4.5A				V	V	V	V	V
PSA-110-401	5V/9A	-12V/0.75A	12V/3.5A	-5V/0.75A	V	V	V	V	V
PSA-110-402	5V/9A	-12V/0.75A	12V/0.75A	12V/3.5A	V	V	V	V	V
PSA-110-403	5V/9A	12V/0.75A	-12V	24V/1.75A	V	V	V	V	V

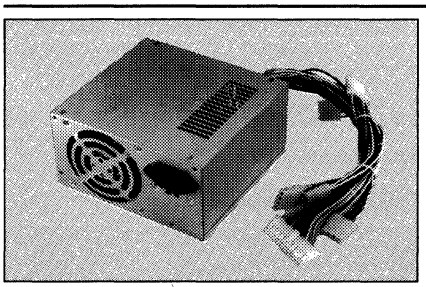
@30 cfm



COMPUTER POWER SUPPLY (200W)

DIM: 150mm (5.91") x 140mm (5.51") x 86mm H (3.39")

MODEL	O/P1	O/P2	O/P3	O/P4	UL	CSA	VDE	NORDIC
PSA-2054C	5V/23A	-5V/0.3A	12V/9A	-12V/0.5A	V	V	V	V

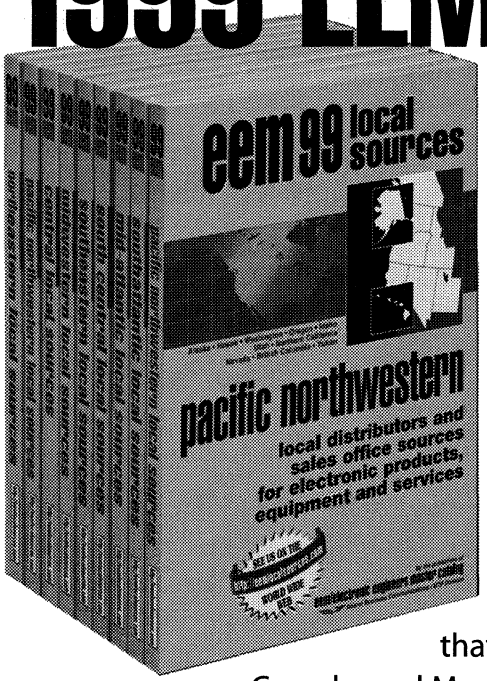


COMPUTER POWER SUPPLY (200/250W)

DIM: 150mm (5.9") x 140mm (5.5") x 86mm H (3.28")

MODEL	O/P1	O/P2	O/P3	O/P4	O/P5	O/P6	UL	CSA	VDE
PSS-200-601	3.3V/14A	5V/21A	12V/6A	-5V/0.5A	-12V/0.8A	5VSB/1A	V	V	V
PSS-250-601	3.3V/15A	5V/25A	12V/10A	-5V/0.5A	-12V/0.8A	5VSB/1A	V	V	V

1999 EEM Local Sources



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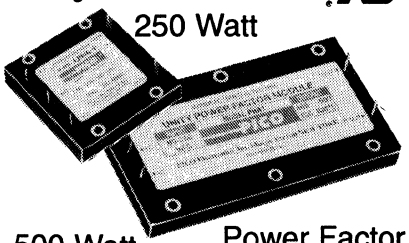
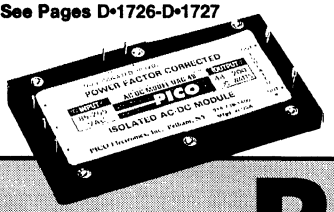


See Pages D•1726-D•1727



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- Temperature Cycle (−55°C to +125°C)
- Hi Temp, burn in

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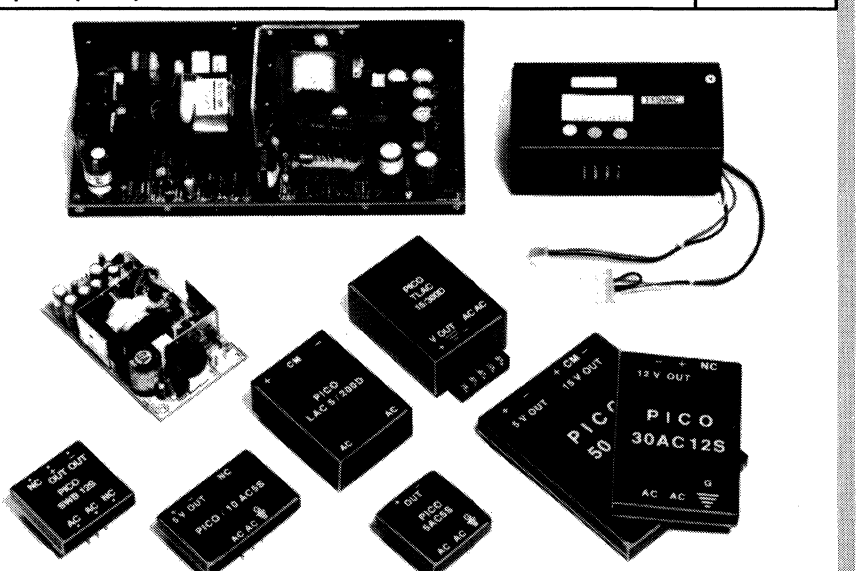
AC-DC CONVERTERS...Universal AC Input Regulated to 365 VDC for use with PICO's Hi-Power DC-DC Converters ***up to 500 Watts***	D•1728-29
AC-DC LINEAR MODULES . . Series LAC/TLAC Regulated, Isolated ***Single, Dual and Triple, Wide Input Range up to 10 Watts***	D•1730-31
AC-DC SWITCHERS . . . Series SW, Regulated, Isolated, Industrial ***Low Profile .5" ht., up to 15 Watts***	D•1732-33
AC-DC SWITCHERS . . . Series 5AC, Regulated, Isolated ***Single and Dual, Lowest Profile 0.5" ht., up to 5 Watts***	D•1734
AC-DC SWITCHERS . . . Series 10 AC, Regulated, Isolated ***Single, Dual and Triple, Lowest Profile, 0.5" ht., up to 10 Watts***	D•1735
AC-DC SWITCHERS . . . Series 30 AC, Regulated, Isolated ***Single, Dual and Triple, Lowest Profile, 0.5" ht., up to 30 Watts***	D•1736
AC-DC SWITCHERS . . . Series 50 AC, Regulated, Isolated ***Single, Dual and Triple, Lowest Profile, 0.5" ht., up to 55 Watts***	D•1737
AC-DC SWITCHERS . . . OFU 3, 4, 6 Universal Input, 85-264 VAC PCB Design ***Multiple Outputs, up to 65 Watts***	D•1738-39
AC-DC SWITCHERS . . . OFB 5, 13 Fully Enclosed, Jumper Selectable ***Multiple Outputs, up to 130 Watts***	D•1740-41
AC-DC SWITCHERS . . . OFJ 10, 20 PCB or L-bracket Design, Jumper Selectable ***Multiple Outputs, up to 200 Watts***	D•1742-43



PICO's NEW UAC SERIES

- Universal Input Voltage 85 to 265 VAC
- Isolated Output
- Power Factor Corrected, 0.99%*
- Space Saving Design, One Module Replaces Two
- Special Output Voltages Available
- Regulated Output Voltage
- Made in the USA, Fully Encapsulated

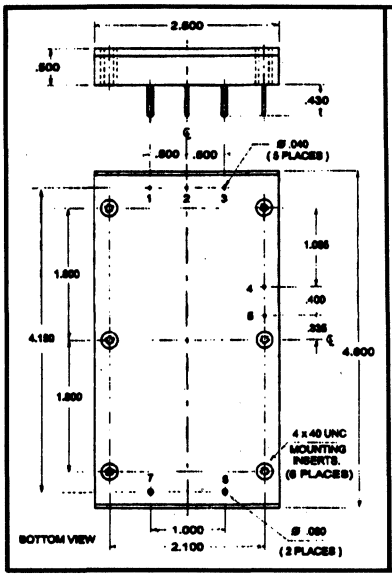
TYPICAL FEATURES/ ELECTRICAL CHARACTERISTICS:

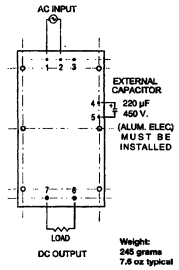
AC Line Input Voltage: 85 to 265 VAC, 47-440 Hz
Output Power: 100 to 200 Watts, See Chart
Output Voltage Ripple: 75-200 mV, See Chart
Inrush Current Typical:
120 VAC Input: 20-40 AMPS
240 VAC Input: 15-20 AMPS
Operating Temperature: 0 to 85 degrees centigrade, case temperature
See Application Notes for proper thermal considerations.
Isolation:
From Input to DC Output: 2,000 VDC
From Input or DC Output to Case: 2,000 VDC
From AC Input to Auxiliary 380 VDC Output: Non-Isolated
From Auxiliary 380 VDC Output to DC Output 2,000 VDC
From Auxiliary 380 VDC Output to Case: 2,000 VDC
Capacitor Requirement: External at Auxiliary 380 VDC Pins: 220 µf, 450 Volt Electrolytic
**MUST BE INSTALLED*
Short Circuit Protection:
Continuous

Series UAC Single Output
Input Voltage 85–265 (47–440 Hz)

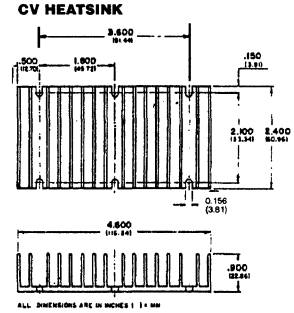
PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT (A)	MAX. OUTPUT POWER (watts)	EFF.* FULL LOAD %	OUTPUT RIPPLE FULL LOAD 1-1 MHz BW mv p*p	OUT VOLT TOLERANCE ±%*	V LD. REG. 10%-100% LOAD ±%†	LINE REGULATION (±%†)	Price
UAC5S	5	20	100	76	100	1.0	1.5	0.2	495.00
UAC9S	9	11.1	100	78	75	1.0	1.5	0.2	495.00
UAC12S	12	12.5	150	80	75	0.5	1.5	0.2	495.00
UAC15S	15	10	150	80	75	0.5	1.5	0.2	495.00
UAC24S	24	8.33	200	81	100	0.5	1	0.2	495.00
UAC28S	28	7.14	200	82	100	0.5	1	0.2	495.00
UAC48S	48	4.17	200	84	200	0.5	1	0.2	495.00

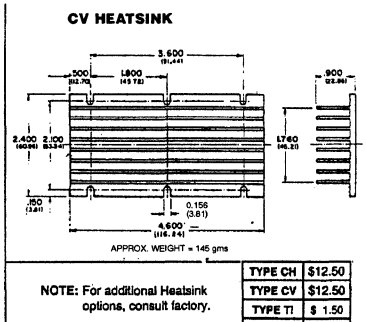
*Capacitor Required: 220µF, 450 V Aliminum Electrolytic Capacitors





PIN No.	FUNTION
1	AC IN
2	AC IN
3	N/C
4	+ 380 V BUS
5	- V BUS
6	- V OUT
7	+ V OUT





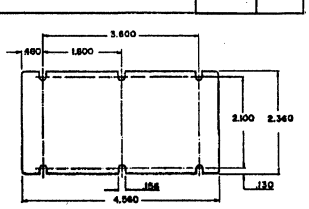
NOTE: For additional Heatsink options, consult factory.

TYPE CH	$12.50
TYPE CV	$12.50
TYPE TI	$ 1.50

PART TI = THERMAL INTERFACE

Alloy Aluminum Substrate

Thermal Conductivity, (BTU-in/hr ft² °F ___1530
Coefficient of Thermal Expansion (25-100°C, 10^{-6} in-in/°F) _____13.1
Hardness, Brinnell B _____ 23
Endurance Limit, psi _____5000
Standard Thickness (inches) _____ .002



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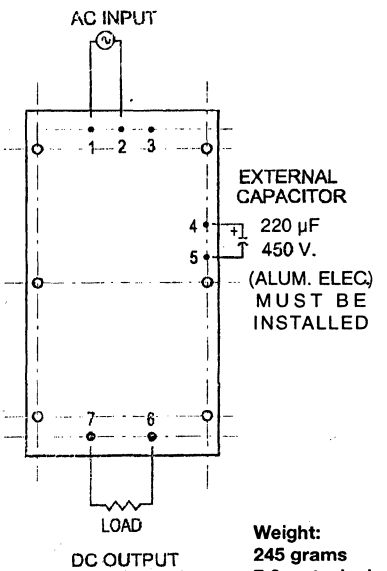
- Power Factor Corrected, 0.99%*
- Space Saving Design, One Module Replaces Two
- Special Output Voltages Available
- Regulated Output Voltage
- Made in the USA, Fully Encapsulated

THERMAL CONSIDERATIONS:

	UAC Series		
	Baseplate	Heatsink CV	Heatsink CH
Free Air	5.1	3.5	3.0
200 LFM	2.8	1.8	1.0
400 LFM	1.8	1.1	0.7
600 LFM	1.4	0.8	0.55
800 LFM	1.2	0.65	0.45
1000 LFM	1.0	0.55	0.40

PIN No.	FUNTION
1	AC IN
2	AC IN
3	N/C
4	+ 380 V BUS
5	- V BUS
6	- V OUT
7	+ V OUT



Weight:
245 grams
7.6 oz typical

Typical Examples:

EXAMPLE 1:

A UAC24S module has an efficiency of 80%. What is the maximum ambient temperature if 100 Watts of power is needed.

A) In free air.

From Table 1: T_{rca} = 5.1

Using Relation (2)

$$\Delta T = 5.1\ (100)\left[\frac{1}{0.80} - 1\right] = 127.5°C$$

$$Ta = 85 - 127.5 = -42.5°C$$

B) In free air with heatsink (CV).

T_{rca} = 3.5

$$\Delta T = 3.5\ (100)\left[\frac{1}{0.80} - 1\right] = 87.5°C$$

$$Ta = 85 - 87.5 = -2.5°C$$

C) With 400 LFM of air flow.

T_{rca} = 1.8

$$\Delta T = 1.8\ (100)\left[\frac{1}{0.80} - 1\right] = 45°C$$

$$Ta = 85 - 45 = 40°C$$

EXAMPLE 2:

What would be the maximum output power for a UAC24S module at an ambient temperature of 50°C with an efficiency of 80%.

A) If the module is used in free air.

From Table 1: T_{rca} = 5.1

Using Relation (2)

$$85 - 50 = 5.1\ P_{out}\left[\frac{1}{0.80} - 1\right]$$

$$P_{out} = \frac{35}{5.1\ [0.25]} = 27.5 \text{ Watts}$$

B) If the module is used in an area with forced air at 200 LFM with no heatsink.

T_{rca} = 2.8

$$P_{out} = \frac{35}{2.8\ [0.25]} = 50 \text{ Watts}$$

C) If the module with heatsink (CV) is used in free air.

T_{rca} = 3.5

$$P_{out} = \frac{35}{3.5\ [0.25]} = 40 \text{ Watts}$$

EXAMPLE 3:

At a maximum ambient temperature of 50°C and an efficiency of 80%, how could a UAC24S module be used if 200 Watts of output power is required.

Using Relation (2), we first find the maximum thermal resistance from case to air.

$$\Delta T = T_{rca}\ (200)\left[\frac{1}{0.80} - 1\right]$$

$$85 - 50 = T_{rca}\ (50)$$

$$T_{rca} = 0.7$$

A) If no heatsink is used.
From Table 1, more than 1,000 LFM of airflow is required.

B) If a (CV) heatsink is used.
700 LFM of airflow is required.

C) If a (CH) heatsink is used.
400 LFM of airflow is required.

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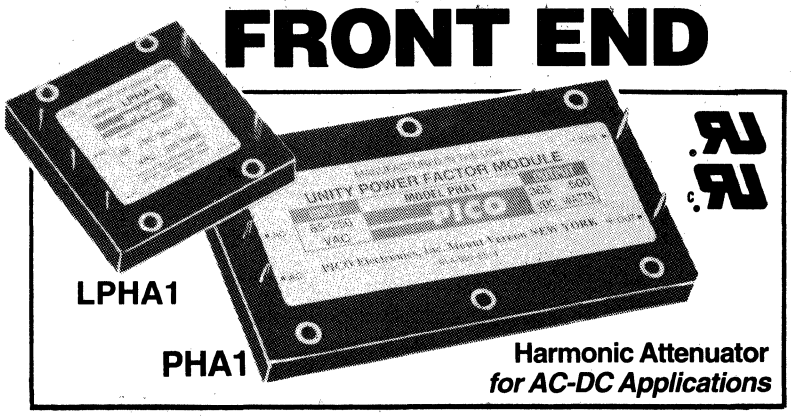
Regulated 365 VDC Output

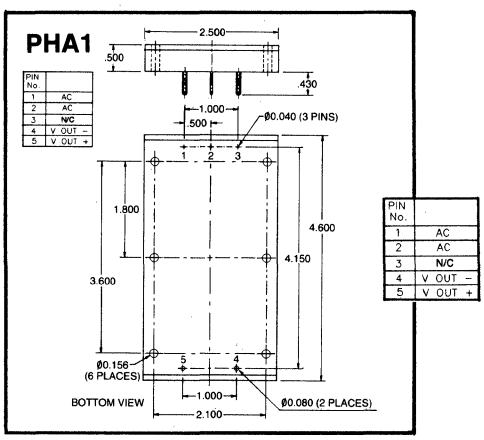
new UNITY POWER FACTOR FRONT END

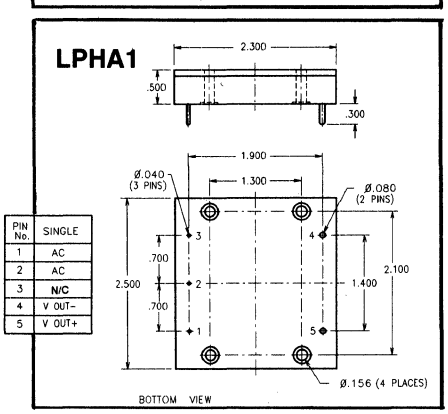
PICO's LPHA1/PHA1 is the perfect match for universal AC inputs to your worldwide DC applications. Used with PICO's LPD, PD and HPD Series of DC-DC Converters you can obtain a variety of DC outputs from ***3.3 VDC to 100 VDC in single and dual outputs.*** ***Many Laser and Motor Applications are able to use the LPHA1/PHA1 directly because of its' unique 365 Volt regulated output.*** Regardless of use PICO always optimizes ***Size, Reliability and Cost.***



- ***Universal Input Voltage (85 to 250 VAC)***
- ***Power Factor: 0.99****
- ***Efficiency 90% or better***
- ***PHA1: Up to 500 Watts*****
  LPHA1: Up to 250 Watts**
- ***Regulated Output (365 VDC)***
- ***PHA1: Only $199/ LPHA1: Only $179***

***Derate from 110 VAC to 85 VAC at the rate of 1.2% per volt.*
**50-100% of Full Load*





ELECTRICAL CHARACTERISTICS:
Regulated 365V DC Output–can be used directly for many Motor, Laser and Direct Drive Applications.

AC Line Input: 85–250 VAC/47–440 Hz
Output Power: **PHA1** Up to 500 Watts derate from 110 VAC to 85 VAC at the rate of 1.2% per volt.
LPHA1 Up to 250 Watts derate from 110 VAC to 85 VAC at the rate of 1.2% per volt
Output Voltage Tolerance at F.L.: ±2%
Output Ripple: **PHA1** 10V P-P, Full Load, with 470 UF capacitor
LPHA1 10V P-P, Full Load with 250 UF capacitor
Operating Temperature: 0°C to +85°C
Inrush Current Typical: 25–40A at 120 VAC
15–20A at 240 VAC
Output Capacitor: **PHA1** 470 UF Min., External
LPHA1 250 UF Min., External
Isolation: Input to Output: None
Input/Output to Baseplate: 2500V rms
Load Regulation: (FL-10%) ±3%
Thermal Shutdown: 90–100°C Baseplate
Short Circuit Protection: **PHA1** Requires 10 AMP Fast-Blow Fuse in input
LPH1 Requires 5 AMP Fast-Blow Fuse in input.
See connection diagram on page **D•1729**
Weight: **PHA1** 7.2 ounces (231 grams) typical
LPHA1 3.5 ounces (112 grams) typical

Networking: Can be used with PICO's LPD-PD-HPD Series to provide from 3.3 VDC to 100 VDC in single and dual outputs. Consult factory for network designs implementing all of PICO's over 1000 Power Converters to give you capabilities from 2.0 VDC to 5,000 VDC

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PICO's UNITY POWER FACTOR Front End

Application Notes: Please refer to Application Notes on pages ***D•2228-2233***
Typical examples are noted below.

Thermal Considerations:

TABLE 1:

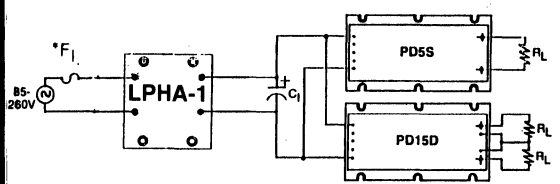
	PHA1 Series		
	Baseplate	Heatsink CV	Heatsink CH
Free Air	4.7	3.2	2.7
200 LFM	2.5	1.5	0.9
400 LFM	1.6	1.0	0.6
600 LFM	1.3	0.7	0.5
800 LFM	1.1	0.6	0.4
1000 LFM	0.9	0.5	0.36

	LPHA-1 Series		
	Baseplate	Heatsink LCV	Heatsink LCH
Free Air	7.9	4.2	4.0
200 LFM	4.9	1.6	1.6
400 LFM	2.5	1.3	1.3
600 LFM	2.2	0.9	0.9
800 LFM	1.5	0.7	0.7
1000 LFM	1.2	0.6	0.6

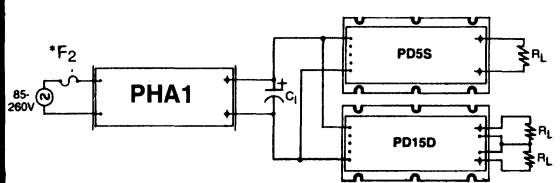
TABLE 1: =
Thermal resistance of case to air.

Connections Diagram:

Note: Consult factory for C_I capacitance and voltage ratings.



*F_1 NOTE: 4 AMP FAST-BLOW FUSE REQUIRED AS NOTED ABOVE.



*F_2 NOTE: 10 AMP FAST-BLOW FUSE REQUIRED AS NOTED ABOVE.

Typical Examples:

EXAMPLE 1:

A PHA1 module has an efficiency of 92%. What is the maximum ambient temperature if 200 Watts of power is needed.

A) In free air.

From Table 1: T_{rca} = 4.7

Using Relation (2)

$$\Delta T = 4.7\ (200)\left[\frac{1}{0.92} - 1\right] = 82°C$$

$$Ta = 85 - 82 = 3°C$$

B) In free air with heatsink (CV).

T_{rca} = 3.2

$$\Delta T = 3.2\ (200)\left[\frac{1}{0.92} - 1\right] = 56°C$$

$$Ta = 85 - 56 = 29°C$$

C) With 400 LFM of air flow.

T_{rca} = 1.6

$$\Delta T = 1.6\ (200)\left[\frac{1}{0.92} - 1\right] = 28°C$$

$$Ta = 85 - 28 = 57°C$$

EXAMPLE 2:

What would be the maximum output power for a LPH-1 module at an ambient temperature of 50°C with an efficiency of 92%.

A) If the module is used in free air.

From Table 1: T_{rca} = 7.9

Using Relation (2)

$$85 - 50 = 7.9\ P_{out}\left[\frac{1}{0.92} - 1\right]$$

$$P_{out} = \frac{35}{7.9\ [0.087]} = 51 \text{ Watts}$$

B) If the module is used in an area with forced air at 200 LFM with no heatsink.

T_{rca} = 4.9

$$P_{out} = \frac{35}{4.9\ [0.087]} = 82 \text{ Watts}$$

C) If the module with heatsink (CV) is used if free air.

T_{rca} = 4.2

$$P_{out} = \frac{35}{4.2\ [0.087]} = 96 \text{ Watts}$$

EXAMPLE 3:

At a maximum ambient temperature of 50°C and an efficiency of 90%, how could a PHA1 module be used if 400 Watts of output power is required.

Using Relation (2), we first find the maximum thermal resistance from case to air.

$$\Delta T = T_{rca}(400)\left[\frac{1}{0.9} - 1\right]$$

$$85 - 50 = T_{rca}\ (44.4)$$

$$T_{rca} = 0.79$$

A) If no heatsink is used.
From Table 1, more than 1,000 LFM of airflow is required.

B) If a (CV) heatsink is used.
700 LFM of airflow is required.

C) If a (CH) heatsink is used.
300 LFM of airflow is required.

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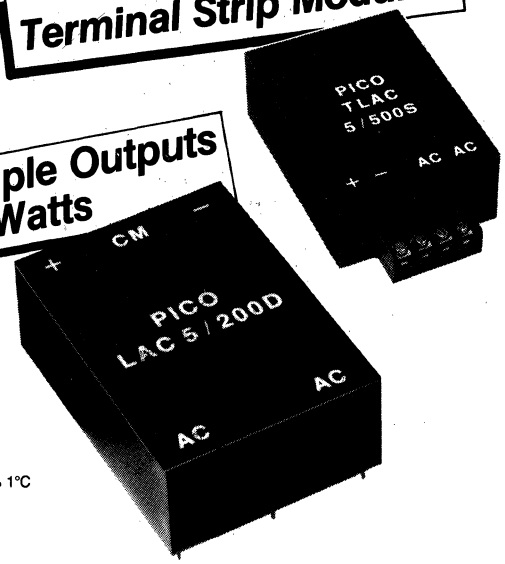
SERIES LAC-TLAC

Hi Reliability Isolated Regulated AC-DC Linear Modules

TLAC Standard Terminal Strip Modules

Single, Dual & Triple Outputs Up to 10 Watts



TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Input voltage: 105-125 VAC
Input frequency: 50 to 440 Hz
Line/load regulation: Consult chart
Output voltage tolerance: ±1.0%
Operating temperature: −25°C to +70°C
Output voltage temperature coefficient: 0.02% 1°C
Storage temperature: −55°C to +85°C
Typical isolation: 100 megohms
Short circuit protection: Continuous

Series LAC-TLAC AC-DC Linear Modules

FEATURES:

- Terminal strips available-TLAC
- Low output ripple = 1 to 2 MV RMS
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Excellent voltage regulation
- Excellent load regulation
- Up to 9 watts output power at 70°C ambient
- Typical isolation 100 megohms
- Single, dual and triple outputs
- No heat sink required
- No output capacitor required

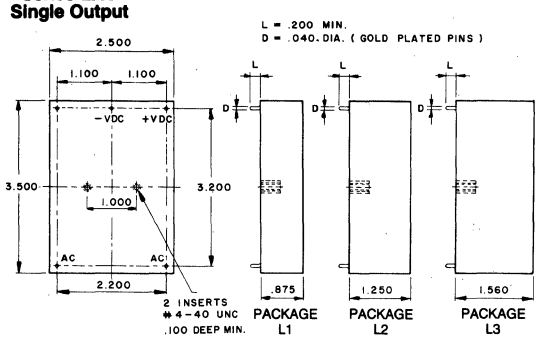
This series of linear AC to DC Power Supplies are available in 46 different models. All single, dual and triple output models offer excellent line and load regulation, while maintaining the output voltage ripple at a minimum. Continuous short-circuit protection and isolation are also standard on all models. The convenience of PC mounting, with mounting inserts, allows the use of this encapsulated unit in harsh environments, and the TLAC models offer a terminal strip for easy electrical connection.

SERIES LAC-TLAC SINGLE OUTPUT

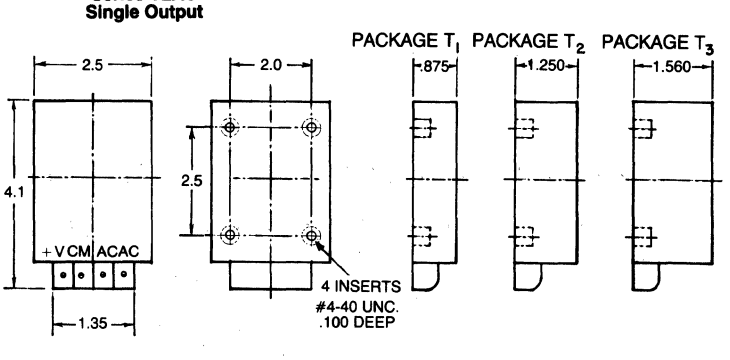
** PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	OUT VOLT TOLERANCE (±%)*	V LD. REG. LOAD	LINE REGULATION	OUTPUT VOLTAGE RIPPLE @ FULL LOAD MV RMS	PACKAGE NUMBER		HEIGHT INCHES	L PKG PRICE 1-24	T** PACKAGE 1-24
LAC 5/500S	5	500	2.5	1.0	0.2	0.05	1	L1	T1	.875	69.00	83.00
LAC 5/1000S	5	1000	5	1.0	0.2	0.05	1	L2	T2	1.250	85.00	99.00
LAC 5/2000S	5	2000	10	1.0	0.2	0.05	1	L3	T3	1.560	99.00	113.00
LAC 12/120S	12	120	1.44	1.0	0.1	0.10	1	L1	T1	.875	69.00	83.00
LAC 12/200S	12	200	2.4	1.0	0.1	0.10	1	L2	T2	1.250	85.00	99.00
LAC 12/500S	12	500	6.0	1.0	0.1	0.10	1	L3	T3	1.560	99.00	113.00
LAC 15/120S	15	120	1.8	1.0	0.1	0.10	1	L1	T1	.875	69.00	83.00
LAC 15/200S	15	200	3.0	1.0	0.1	0.10	1	L2	T2	1.250	85.00	99.00
LAC 15/500S	15	500	7.5	1.0	0.1	0.10	1	L3	T3	1.560	99.00	113.00
LAC 24/100S	24	100	2.4	1.0	0.1	0.10	1	L1	T1	.875	69.00	83.00
LAC 24/300S	24	300	7.2	1.0	0.1	0.10	1	L3	T3	1.560	99.00	113.00

** For terminal strip model add "T" to front of part number.

Series LAC Single Output



Series TLAC Single Output



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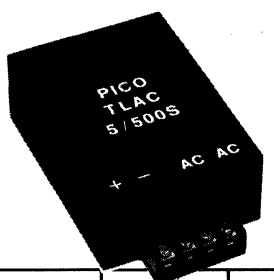
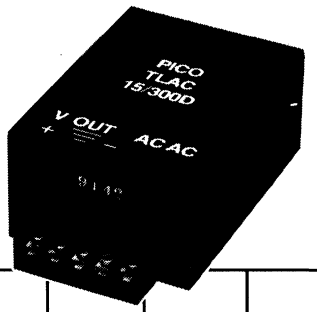
SERIES LAC-TLAC

TLAC Standard Terminal Strip Models

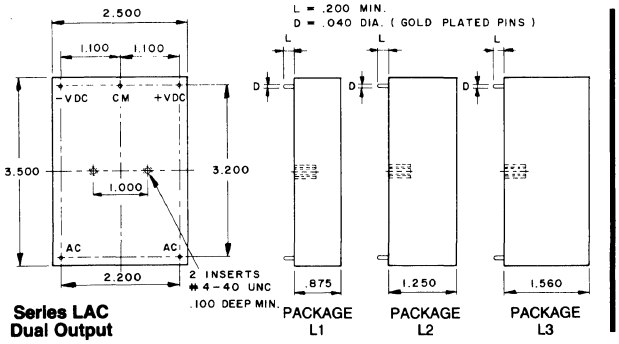




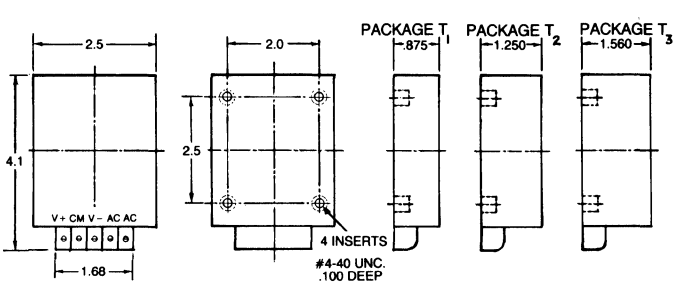
SERIES LAC-TLAC DUAL OUTPUT

** PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	OUT VOLT TOLERANCE (±%)*	V LD. REG. LOAD	LINE REGULATION	OUTPUT VOLTAGE RIPPLE @ FULL LOAD MV RMS	PACKAGE NUMBER		HEIGHT INCHES	L PKG PRICE 1-24	T ** PACKAGE 1-24
LAC 5/200D	5	200	1.0	1%	0.1%	.05%	1	L2	T2	1.250	95.00	109.00
LAC 5/300D	5	300	1.5	1%	0.1%	.05%	1	L3	T3	1.560	110.00	124.00
LAC 12/100D	12	100	1.2	1%	0.1%	.02%	1	L1	T1	.875	95.00	109.00
LAC 12/300D	12	300	3.6	1%	0.1%	.02%	1	L3	T3	1.560	110.00	124.00
LAC 15/100D	15	100	1.5	1%	0.1%	.02%	1	L1	T1	.875	95.00	109.00
LAC 15/300D	15	300	4.5	1%	0.1%	.02%	1	L3	T3	1.560	110.00	124.00
LAC 24/100D	24	100	2.4	1%	0.2%	0.1%	1	L2	T2	1.250	95.00	109.00
LAC 24/200D	24	200	4.8	1%	0.2%	0.1%	1	L3	T3	1.560	110.00	124.00

** For terminal strip model add "T" to front of part number.



Series LAC Dual Output



Series TLAC Dual Output

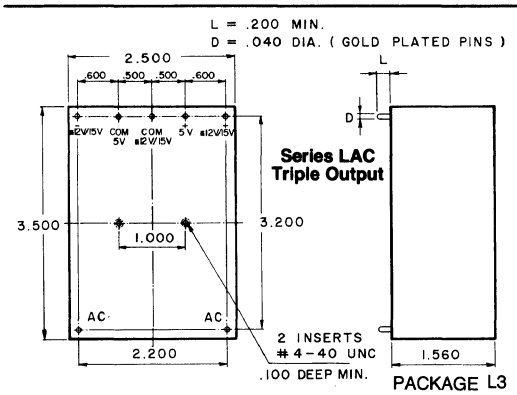
SERIES LAC-TLAC TRIPLE OUTPUT

	MAIN OUTPUT VOLTAGE					AUXILIARY OUTPUT VOLTAGE									
** PICO PART NUMBER	OUTPUT VOLTAGE DC OUTPUT	MAX LOAD CURRENT mA OUTPUT	MAX OUTPUT POWER (watts) OUTPUT	V LD.REG. LOAD %	OUTPUT VOLTAGE RIPPLE @ FULL LOAD MV RMS	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	VOLT. LOAD REG. LOAD %	OUTPUT VOLTAGE RIPPLE @ FULL LOAD MV RMS	PACKAGE NUMBER		HEIGHT INCHES	L PKG PRICE 1-24	T ** PRICE 1-24
LAC 512A	5	250	1.25	0.2	1.0	12	120	1.44	0.1	1.0	L3	T3	1.56	115.00	129.00
LAC 512B	5	500	2.5	0.2	1.0	12	120	1.44	0.1	1.0	L3	T3	1.56	130.00	144.00
LAC 515A	5	250	1.25	0.2	1.0	15	100	1.50	0.1	1.0	L3	T3	1.56	115.00	129.00
LAC 515B	5	500	2.5	0.2	1.0	15	100	1.50	0.1	1.0	L3	T3	1.56	130.00	144.00

Common Characteristics
Main Output Voltage Tolerance ±0.5%*
Main Line Regulation ±0.2%

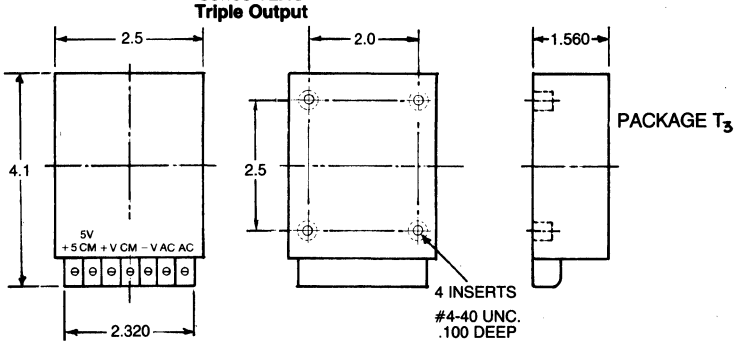
Common Characteristics
Auxiliary Output Voltage Tolerance ±0.5%*
Auxiliary Line Regulation ±0.2%

* Measurements taken at 115VAC-60Hz
** For terminal strip model add "T" to front of part number.



Series LAC Triple Output

Series TLAC Triple Output

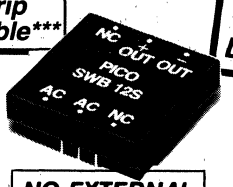


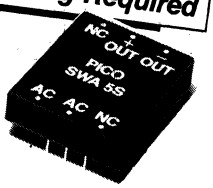
Series SW-Single Output-AC-DC Switching Power Supplies

Hi Reliability
Industrial Grade
Input Voltage (90-130VAC, 47-440Hz)
Isolated 1200 VRMS
Fully Regulated—up to 15 Watts
Short Circuit Protected

*TSW Standard Terminal Strip Models Available****

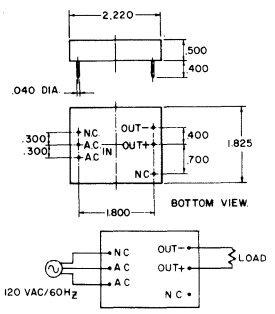
No Heat Sink or Electrical Derating Required





NO EXTERNAL CAPACITORS REQUIRED

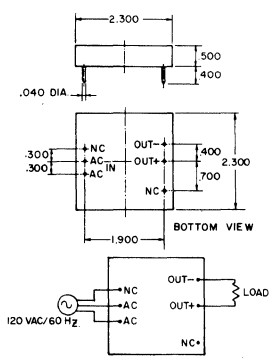
Series SWA-Single Output-5 Watts



**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD** REGULATION 25%-100% LOAD (±%)*	LINE* REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE (mv p-p)	**** PRICE 1-24
SWA3.3S	3.3	909	3	68	2	2	1	150	79.00
SWA5S	5	1000	5	68	2	2	1	150	79.00
SWA5.25S	5.2	961	5	68	2	2	1	150	79.00
SWA12S	12	415	5	68	2	2	1	100	79.00
SWA15S	15	330	5	70	2	2	1	100	79.00

*Measurements taken at 115VAC @ 60 Hz. **10% minimum load required at all times ***For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown.

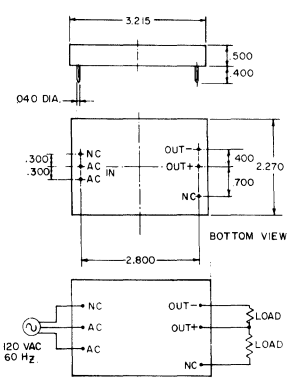
Series SWB-Single Output-10 Watts



**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD** REGULATION 25%-100% LOAD (±%)*	LINE* REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE (mv p-p)	**** PRICE 1-24
SWB3.3S	3.3	1515	5	67	2	2	1	150	89.00
SWB5S	5	1600	8	67	2	2	1	150	89.00
SWB5.25S	5.2	1538	8	67	2	2	1	150	89.00
SWB12S	12	830	10	73	2	2	1	100	89.00
SWB15S	15	660	10	75	2	2	1	100	89.00

*Measurements taken at 115VAC @ 60 Hz. **10% minimum load required at all times ***For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown.

Series SWC-Single Output-15 Watts

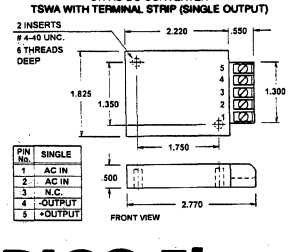


**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD** REGULATION 25%-100% LOAD (±%)*	LINE* REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE (mv p-p)	**** PRICE 1-24
SWC3.3S	3.3	1818	6	67	2	2	1	150	99.00
SWC5S	5	2000	10	67	2	2	1	150	99.00
SWC5.25S	5.2	1923	10	67	2	2	1	150	99.00
SWC12S	12	1250	15	73	2	2	1	100	99.00
SWC15S	15	1000	15	74	2	2	1	100	99.00

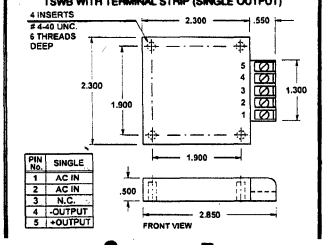
*Measurements taken at 115VAC @ 60 Hz. **10% minimum load required at all times ***For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown.

PART#	In oz.	In grams
SWA Single	2.0 oz.	56.69
SWB Single	2.7 oz.	76.54
SWC Single	3.7 oz.	104.89
TSWA Single	2.4 oz.	68.03
TSWB Single	3.1 oz.	87.88
TSWC Single	4.1 oz.	116.23

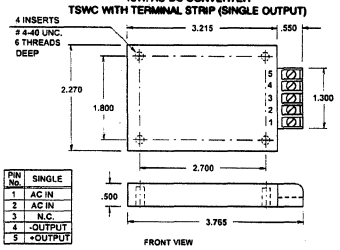
5W AC-DC CONVERTER
TSWA WITH TERMINAL STRIP (SINGLE OUTPUT)



10W. AC-DC CONVERTER
TSWB WITH TERMINAL STRIP (SINGLE OUTPUT)



15W. AC-DC CONVERTER
TSWC WITH TERMINAL STRIP (SINGLE OUTPUT)



Delivery— stock to one week

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Call Toll Free 800-228-9747

Series SW-Dual Output-AC-DC Switching Power Supplies

FEATURES:

- Excellent line regulation ±1% (90–130 VAC)
- Excellent load regulation, from 25% to 100%, ±2%
- Continuous short circuit protection
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Isolation: 100 megohms at 1200 VRMS
- Wide input 90–130 VAC, 47 to 440 Hz

This series of switching AC-DC power supplies are available in 18 different models. All single and dual outputs are isolated and offer excellent line and load regulation. These units have continuous short circuit protection, require no output capacitors and will operate from −25°C to +70°C ambient, with no heat sink or electrical derating required. The hi-reliability SW Series, up to 15 Watts, is the design choice for your stringent industrial applications.

.5" Height

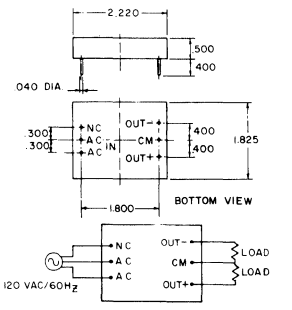
TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Input voltage: 90–130 VAC, 47 to 440 Hz
Converter frequency: 200 – 800 KHz
Operating temperature: −20°C to +70°C ambient
Storage temperature: −55°C to +105°C
Output voltage temperature coefficient: 0.02%/°C
Isolation: 1200 VRMS

TSW Standard Terminal Strip Models Available*

Series SWA-Dual Output-5 Watts

*** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA) per output	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ * FULL LOAD TYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	** LOAD REGULATION 25% - 100% LOAD (±%) *	LINE* REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE (mv p-p)	*** PRICE 1-24
SWA5D	+5	500	2.5	68	2	2	1	150	92.00
SWA12D	+12	200	2.5	68	2	2	1	100	92.00
SWA15D	+15	165	2.5	70	2	2	1	100	92.00

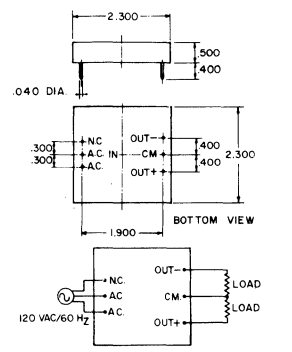
*Measurements taken at 115VAC @ 60 Hz. ** 10% Minimum load required at all times ***For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown



Series SWB-Dual Output-10 Watts

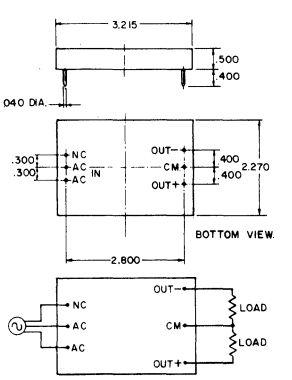
*** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA) per output	MAX. OUTPUT POWER (watts) per output	EFF. @ * FULL LOAD TYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD ** REGULATION 25% - 100% LOAD (±%) *	LINE * REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE (mv p-p)	*** PRICE 1-24
SWB5D	+5	800	4	68	2	2	1	150	102.00
SWB12D	+12	415	5	75	2	2	1	100	102.00
SWB15D	+15	335	5	76	2	2	1	100	102.00

*Measurements taken at 115VAC @ 60 Hz. ** 10% minimum load required at all times ***For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown

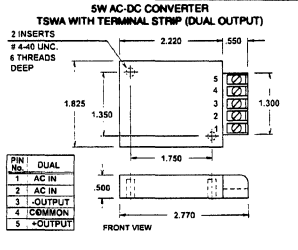


Series SWC-Dual Output-15 Watts

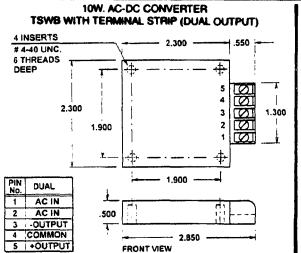
*** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA) per output	MAX. OUTPUT POWER (watts) per output	EFF. @ * FULL LOAD TYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	** LOAD REGULATION 25% - 100% LOAD (±%) *	LINE * REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE (mv p-p)	*** PRICE 1-24
SWC5D	+5	1000	5	69	2	2	1	150	112.00
SWC12D	+12	625	7.5	75	2	2	1	100	112.00
SWC15D	+15	500	7.5	76	2	2	1	100	112.00



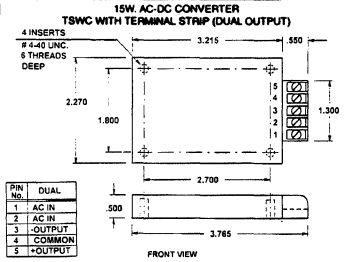
5W AC-DC CONVERTER
TSWA WITH TERMINAL STRIP (DUAL OUTPUT)



10W. AC-DC CONVERTER
TSWB WITH TERMINAL STRIP (DUAL OUTPUT)



15W. AC-DC CONVERTER
TSWC WITH TERMINAL STRIP (DUAL OUTPUT)



PART#	In oz.	In grams
SWA Dual	2.0 oz.	56.69
SWB Dual	2.7 oz.	76.54
SWC Dual	3.7 oz.	104.89
TSWA Dual*	2.4 oz.	68.03
TSWB Dual	3.1 oz.	87.88
TSWC Dual	4.3 oz	121.9

Delivery— stock to one week

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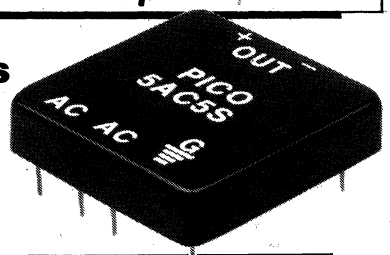
SERIES 5AC

Hi Reliability
Hi Efficiency/Isolated
Single and Dual Outputs
Regulated
5 Watt AC-DC Switchers

Lowest Profile!
0.5"ht. up to 5 Watts



TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Input voltage: 90-130VAC (47-440Hz)
Line/load Regulation: See specifications below
Converter frequency: 25-35 KHz typ.
Operating temperature: −25°C to +70°C ambient
Output voltage temperature coefficient: 0.02%/°C
Storage temperature: −55°C to +125°C
Isolation: 1200V RMS
Short circuit protection: Continuous

OPTIONS AVAILABLE
- *Expanded operating temp (−55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (−55°C to +125°C)*
- *Hi Temp, burn in*

No Heat Sink or Electrical Derating Required

Low Capacity Option
All units can be manufactured with isolation capacity of 50pF. Contact factory.

5 Watt AC-DC Switchers

FEATURES:
- Low profile 0.500"
- Low weight
- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Excellent voltage regulation
- Excellent load regulation
- Up to 5 watts output power at 70°C ambient
- Low output ripple
- Isolation 1200V RMS
- Single and dual outputs
- No heat sink required
- Miniature size
- No output capacitor required
- Shielding

This series of low profile, 5 Watt AC to DC switchers come in 7 different models. These units offer high efficiency and precise regulation throughout the operating temperature range of −25°C to +70°C ambient, with no heat sink or electrical derating required. The 5 AC series keeps a maximum *0.500"* height while still offering you 1200 volts RMS isolation in a rugged encapsulated case. The convenience of PC mounting and the availability of three outputs should aid your circuit design.

SERIES 5AC SINGLE OUTPUT/INPUT VOLTAGE 90-130VAC (47-440Hz) (OPTIONAL 170-240VAC, 47-440 Hz**)

PICO PART NUMBER	OUTPUT VOLTAGE RANGE	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 10%-100% LOAD † (±%)*	LINE REGULATION (±%)*	PRICE 1-24
5AC5S	5	1000	5	72	50	0.5	0.5	0.2	189.00
5AC12S	12	417	5	75	50	0.5	0.5	0.2	189.00
5AC15S	15	333	5	75	50	0.5	0.5	0.2	189.00
5AC24S	24	208	5	76	50	0.5	0.5	0.2	189.00

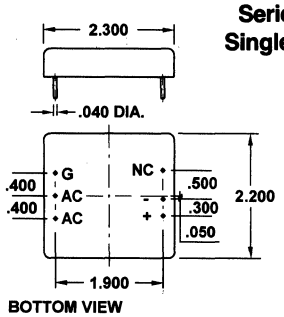
*Readings taken at 115VAC-60Hz † = 10% minimum load required **All units available with 170-240VAC input. Add H, prefix to part number-$40 per unit cost added.

SERIES 5AC DUAL OUTPUT/INPUT VOLTAGE 90-130VAC (47-440Hz) (OPTIONAL 170-240VAC, 47-440 Hz**)

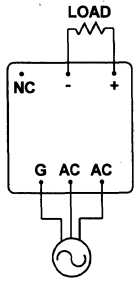
PICO PART NUMBER	OUTPUT VOLTAGE RANGE	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 25%-100% LOAD † (±%)*	LINE REGULATION (±%)*	PRICE 1-24
5AC5D	±5	500	2..5	72	50	0.5	0.5	0.2	214.00
5AC12D	±12	209	2.5	75	50	0.5	0.5	0.2	214.00
5AC15D	±15	167	2.5	75	50	0.5	0.5	0.2	214.00

*Readings taken at 115VAC-60Hz † = 10% minimum load required **All units available with 170-240VAC input. Add H, prefix to part number-$40 per unit cost added.

Series 5AC Single Output



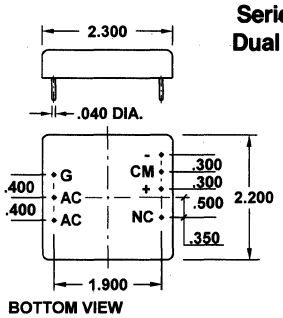
BOTTOM VIEW
Typical Weight: 145 Grams
NOTE: ALL DIMENSIONS ARE IN INCHES



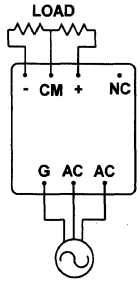
120 VAC/60 Hz
NC = NOT CONNECTED PIN

Typical Weight: 130 Grams

Series 5AC Dual Output



BOTTOM VIEW
Typical Weight: 145 Grams
NOTE: ALL DIMENSIONS ARE IN INCHES



120 VAC/60 Hz
NC = NOT CONNECTED PIN

Typical Weight: 145 Grams

*For immediate engineering assistance or to place an order–**Call Toll Free 800-228-9747***

Delivery— stock to one week

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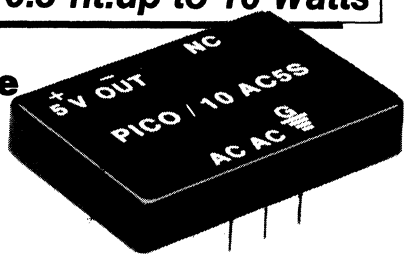
SERIES 10AC

Hi Reliability
Hi Efficiency/Isolated
Single, Dual and Triple Outputs
Regulated
10 Watt AC-DC Switchers

TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Input voltage: 90-130VAC (47-440Hz)
Line/load Regulation: See specifications below
Converter frequency: 25-35 KHz typ.
Operating temperature: −25°C to +70°C ambient
Output voltage temperature coefficient: 0.02%/°C
Storage temperature: −55°C to +125°C
Isolation: 1200V RMS
Short circuit protection: Continuous

Lowest Profile!
0.5" ht. up to 10 Watts



OPTIONS AVAILABLE PER MIL-STD-883
- ***Expanded operating temp (−55°C to +85°C)***
- ***Stabilization Bake (125°C ambient)***
- ***Temperature Cycle (−55°C to +125°C)***
- ***Hi Temp, burn in***

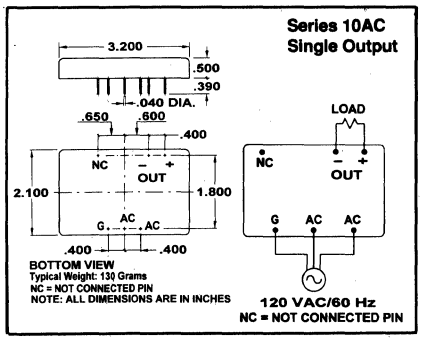
Low Capacity Option
All units can be manufactured with isolation capacity of 50pF. Contact factory.

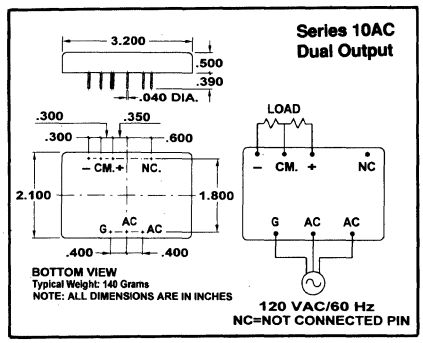
10 Watt AC-DC Switchers

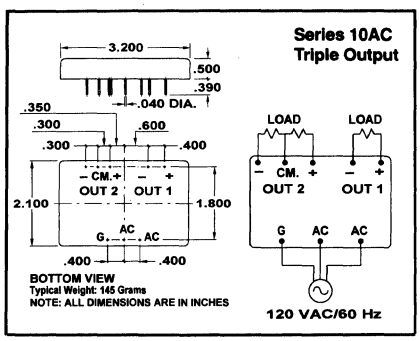
FEATURES:
- Low Profile *0.500"*
- Low weight
- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Excellent voltage regulation
- Excellent load regulation
- Up to 10 watts output power at 70°C ambient
- Low output ripple
- Isolation 1200V RMS
- Single, Dual, Triple Outputs
- No heat sink required
- Miniature size
- No output capacitor required
- Shielding

No Heat Sink or Electrical Derating Required

This series of low profile, 10 Watt AC to DC switchers come in 11 different models. These units offer high efficiency and precise regulation throughout the operating temperature range of -25°C to + 70°C ambient, with no heat sink or electrical derating required. The 10AC series keeps a maximum 0.500" height while still offering you 1200 volts RMS isolation in a rugged encapsulated case. The convenience of PC mounting and the availability of three outputs should aid your circuit design.







SERIES 10AC SINGLE OUTPUT
INPUT VOLTAGE 90-130VAC (47-440Hz)
(OPTIONAL 170-240VAC, 47-440 Hz**)

PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 10%-100% LOAD † (±%)*	LINE REGULATION (±%)*	PRICE 1-24
10AC5S	5	2000	10	75	50	0.5	0.5	0.2	199.00
10AC12S	12	833	10	77	50	0.5	0.5	0.2	199.00
10AC15S	15	666	10	79	50	0.5	0.5	0.2	199.00
10AC24S	24	416	10	80	50	0.5	0.5	0.2	199.00

*Readings taken at 115VAC-60Hz
† = 10% minimum load required
**All units available with 170-240VAC Input. Add H, prefix to part number-$40 per unit cost added.

SERIES 10AC DUAL OUTPUT
INPUT VOLTAGE 90-130VAC (47-440Hz)
(OPTIONAL 170-240VAC, 47-440Hz**)

PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 10%-100% LOAD † (±%)*	LINE REGULATION (±%)*	PRICE 1-24
10AC5D	±5	1000	5	75	50	0.5	0.5	0.2	224.00
10AC12D	±12	417	5	77	50	0.5	0.5	0.2	224.00
10AC15D	±15	333	5	80	50	0.5	0.5	0.2	224.00

*Readings taken at 115VAC-60Hz
† = 10% minimum load required
**All units available with 170-240VAC Input. Add H, prefix to part number-$40 per unit cost added.

SERIES 10AC TRIPLE OUTPUT
INPUT VOLTAGE 90-130VAC (47-440Hz)
(OPTIONAL 170-240VAC, 47-440Hz**)

	MAIN OUTPUT VOLTAGE					AUXILIARY OUTPUT VOLTAGE						
PICO PART NUMBER	OUTPUT VOLTAGE DC VDC	MAX LOAD CURRENT mA OUTPUT	MAX OUTPUT POWER (watts) OUTPUT	V LD.REG. 25-100% LOAD (±%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p*	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	VOLT. LOAD REG. 25-100% LOAD † (±%)*	OUTPUT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p*	EFF. @ FULL LOAD TYPICAL (%)	PRICE 1-24
10AC5T12	5	1400	7	0.5	50	±12	125	1.5	5	50	77	249.00
10AC5T15	5	1400	7	0.5	50	±15	100	1.5	5	50	77	249.00
10AC12T5	12	583	7	0.5	50	±5	300	1.5	5	50	77	249.00
10AC15T5	15	466	7	0.5	50	±5	300	1.5	5	50	79	249.00

Common Characteristics
Main Output Voltage Tolerance ±0.5%*
Main Line Regulation ±0.2%

Common Characteristics
Auxiliary Output Voltage Tolerance ± 5%*
Auxiliary Line Regulation ±0.2%

*Measurements taken at 115VAC-60Hz

† = 10% minimum load required
**All units available with 170-240VAC Input. Add H, prefix to part number-$40 per unit cost added.

Delivery— stock to one week

*For immediate engineering assistance or to place an order–**Call Toll Free 800-228-9747***

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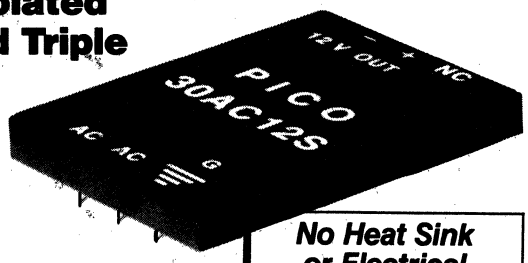
SERIES 30AC

Hi Reliability Hi Efficiency/Isolated Single, Dual and Triple Outputs Regulated 30 Watt AC-DC Switchers

Lowest Profile! 0.5" ht. up to 30 Watts



No Heat Sink or Electrical Derating Required

TYPICAL CHARACTERISTICS
Test conditions: 25°C ambient
Input voltage: 90-130VAC (47-440Hz)
Line/load regulation: See specifications below
Converter frequency: 25-35 KHz typ.
Operating temperature: −25°C to +70°C ambient
Output voltage temperature coefficient: 0.02%/°C
Storage temperature: −55°C to +125°C
Isolation: 1200V RMS
Short circuit protection: Continuous

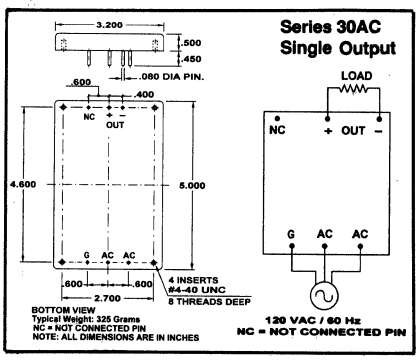
Low Capacity Option
All units can be manufactured with isolation capacity of 70pF. Contact factory.

30 Watt AC-DC Switchers

FEATURES:
- Low Profile *0.500"*
- Low weight
- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Excellent voltage regulation
- Excellent load regulation
- Up to 30 watts output power at 70°C ambient
- Low output ripple
- Isolation 1200V RMS
- Single, Dual and Triple Outputs
- No heat sink required
- Miniature size
- No output capacitor required
- Shielding

OPTIONS AVAILABLE PER MIL-STD-883
- *Expanded operating temp. (−55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (−55°C to +125°C)*
- *Hi Temp, burn in*

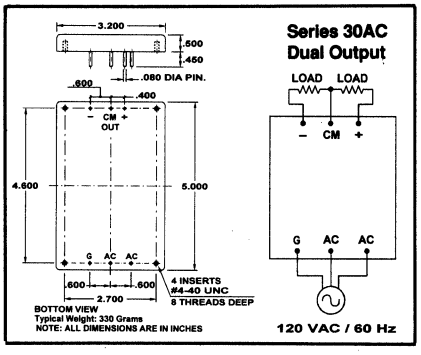
This series of low profile, 25-30 Watt AC to DC switchers come in 11 different models. These units offer high efficiency and precise regulation throughout the operating temperature range of -25°C to + 70°C ambient, with no heat sink or electrical derating required. The 30AC series keeps a maximum 0.500" height while still offering you 1200 volts RMS isolation in a rugged encapsulated case. The convenience of PC mounting and the availability of three outputs should aid your circuit design.



SERIES 30AC SINGLE OUTPUT
INPUT VOLTAGE 90-130VAC (47-440Hz)
(OPTIONAL 170-240VAC, 47-440Hz**)

PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 10%-100% LOAD † (±%)*	LINE REGULATION (±%)*	PRICE 1-24
30AC5S	5	5000	25	75	50	0.5	0.5	0.2	299.00
30AC12S	12	2500	30	81	50	0.5	0.5	0.2	299.00
30AC15S	15	2000	30	82	50	0.5	0.5	0.2	299.00
30AC24S	24	1250	30	83	50	0.5	0.5	0.2	299.00
30AC28S	28	1070	30	83	50	0.5	0.5	0.2	299.00

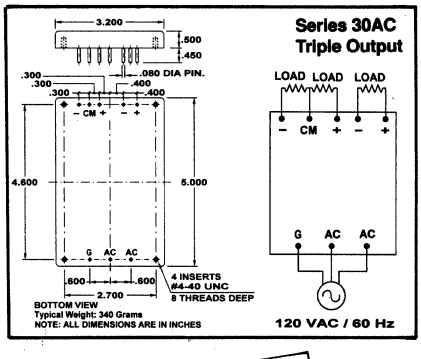
*Readings taken at 115VAC-60Hz
**All units available with 170-240VAC Input. Add H. prefix to part number-$40 per unit cost added.
† = 10% minimum load required



SERIES 30AC DUAL OUTPUT
INPUT VOLTAGE 90-130VAC (47-440Hz)
(OPTIONAL 170-240VAC, 47-440Hz**)

PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 10%-100% LOAD † (±%)*	LINE REGULATION (±%)*	PRICE 1-24
30AC5D	±5	2500	12.5	76	50	0.5	0.5	0.2	334.00
30AC12D	±12	1250	15	78	50	0.5	0.5	0.2	334.00
30AC15D	±15	1000	15	80	50	0.5	0.5	0.2	334.00

*Readings taken at 115VAC-60Hz
**All units available with 170-240VAC Input. Add H. prefix to part number-$40 per unit cost added.
† = 10% minimum load required



SERIES 30AC TRIPLE OUTPUT
INPUT VOLTAGE 90-130VAC (47-440Hz)
(OPTIONAL 170-240VAC, 47-440Hz**)

	MAIN OUTPUT VOLTAGE					AUXILIARY OUTPUT VOLTAGE						
PICO PART NUMBER	OUTPUT VOLTAGE DC VDC	MAX LOAD CURRENT mA OUTPUT	MAX OUTPUT POWER (watts) OUTPUT	V LD.REG. 25-100% LOAD (±%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p*	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	VOLT. LOAD REG. 25-100% LOAD † (±%)*	OUTPUT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p*	EFF. @ FULL LOAD TYPICAL (%)	PRICE 1-24
30AC5T12	5	4000	20	0.5	50	±12	208	2.5	5	50	78	369.00
30AC5T15	5	4000	20	0.5	50	±15	166	2.5	5	50	78	369.00
30AC12T5	12	2080	25	0.5	50	±5	500	2.5	5	50	80	369.00
30AC15T5	15	1660	25	0.5	50	±5	500	2.5	5	50	80	369.00
	Common Characteristics Main Output Voltge Tolerance ±0.5%* Main Line Rgulation ±0.2%					Common Characteristics Auxiliary Output Voltge Tolerance ±5%* Auxiliary Line Rgulation ±0.2%						

*Measurements taken at 115VAC-60Hz
**All units available with 170-240VAC Input. Add H. prefix to part number-$40 per unit cost added.
† = 10% minimum load required

Delivery— stock to one week

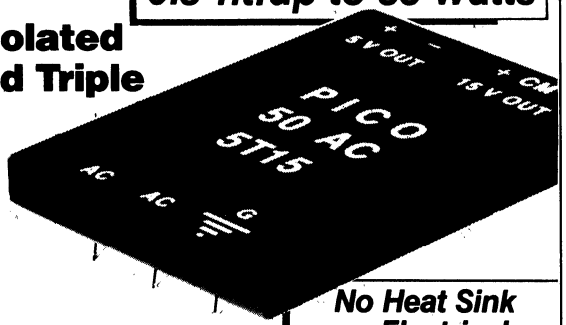
PICO Electronics, Inc.

*For immediate engineering assistance or to place an order–**Call Toll Free 800-228-9747***
143 Sparks Ave., Pelham, N.Y. 10803-1837 • FAX 914-738-8225
Internet:http://www.picoelectronics.com • E-Mail:HLSC73A@prodigy.com

SERIES 50AC

Hi Reliability Hi Efficiency/Isolated Single, Dual and Triple Outputs Regulated 55 Watt AC-DC Switchers

Lowest Profile! 0.5" ht. up to 55 Watts



No Heat Sink or Electrical Derating Required

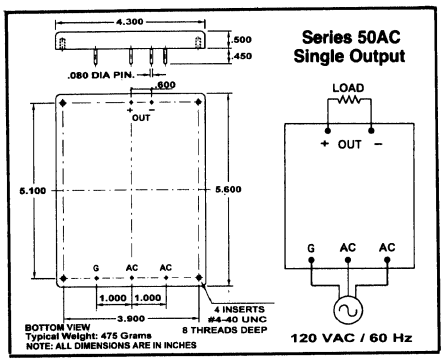
TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Input voltage: 90-130VAC (47-440Hz)
Line/load regulation: See specifications below
Converter frequency: 40-60 KHz typ.
Operating temperature: −25°C to +70°C ambient
Output voltage temperature coefficient: 0.02%C
Storage temperature: −55°C to +125°C
Isolation: 1200V RMS
Short circuit protection: Continuous

OPTIONS AVAILABLE PER MIL-STD-883
- ***Expanded operating temp (−55°C to +85°C)***
- ***Stabilization Bake (125°C ambient)***
- ***Temperature Cycle (−55°C to +125°C)***
- ***Hi Temp, burn in***

55 Watt AC-DC Switchers

FEATURES:
- Low Profile *0.500"*
- Low weight
- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Excellent voltage regulation
- Excellent load regulation
- Up to 55 watts output power at 70°C ambient
- Low output ripple
- Isolation 1200V RMS
- Single, Dual and Triple Outputs
- No heat sink required
- Miniature size
- No output capacitor required
- Shielding

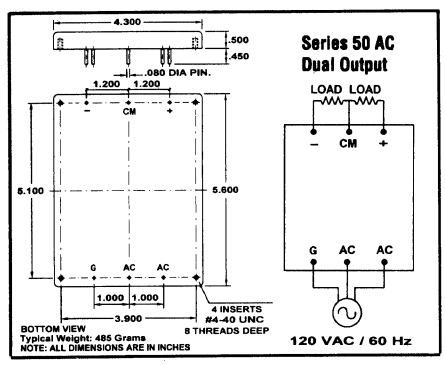
This series of low profile, 45-55 Watt AC to DC switchers come in 11 different models. These units offer high efficiency and precise regulation throughout the operating temperature range of -25°C to + 70°C ambient, with no heat sink or electrical derating required. The 50AC series keeps a maximum 0.500" height while still offering you 1200 volts RMS isolation in a rugged encapsulated case. The convenience of PC mounting and the availability of three outputs should aid your circuit design.



SERIES 50AC SINGLE OUTPUT
INPUT VOLTAGE 90-130VAC (47-440Hz)
(OPTIONAL 170-240VAC, 47-440Hz**)

PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 10%-100% LOAD † (±%)*	LINE REGULATION (±%)*	PRICE 1-24
50AC5S	5	9000	45	75	50	1.0	0.75	0.2	359.00
50AC12S	12	4583	55	80	50	0.5	0.30	0.2	359.00
50AC15S	15	3667	55	83	50	0.5	0.30	0.2	359.00
50AC24S	24	2292	55	86	50	0.5	0.30	0.2	359.00
50AC28S	28	1964	55	86	50	0.5	0.30	0.2	359.00

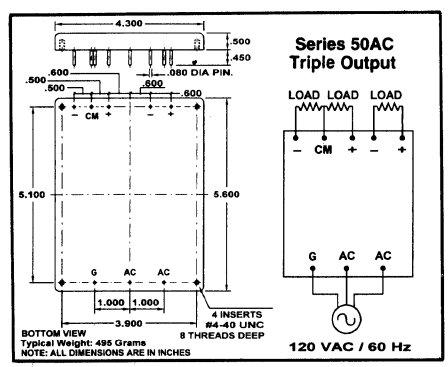
*Readings taken at 115VAC-60Hz
† = 10% minimum load required
**All units available with 170-240VAC Input. Add H, prefix to part number-$40 per unit cost added.



SERIES 50AC DUAL OUTPUT
INPUT VOLTAGE 90-130VAC (47-440Hz)
(OPTIONAL 170-240VAC, 47-440Hz**)

PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 10%-100% LOAD † (±%)*	LINE REGULATION (±%)*	PRICE 1-24
50AC5D	±5	4500	22.5	75	50	1.0	0.75	0.2	377.00
50AC12D	±12	2291	27.5	80	50	0.5	0.30	0.2	377.00
50AC15D	±15	1833	27.5	83	50	0.5	0.30	0.2	377.00

*Readings taken at 115VAC-60Hz
† = 10% minimum load required
**All units available with 170-240VAC Input. Add H, prefix to part number-$40 per unit cost added.



SERIES 50AC TRIPLE OUTPUT
INPUT VOLTAGE 90-130VAC (47-440Hz)
(OPTIONAL 170-240VAC, 47-440Hz**)

	MAIN OUTPUT VOLTAGE					AUXILIARY OUTPUT VOLTAGE						
PICO PART NUMBER	OUTPUT VOLTAGE DC VDC	MAX LOAD CURRENT mA OUTPUT	MAX OUTPUT POWER (watts) OUTPUT	V LD.REG. 25-100% LOAD (±%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p*	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	VOLT. LOAD REG. 25-100% LOAD† (±%)*	OUTPUT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p*	EFF. @ FULL LOAD TYPICAL (%)	PRICE 1-24
50AC5T12	5	8000	40	0.75	50	±12	208	2.5	1.0	50	75	395.00
50AC5T15	5	8000	40	0.75	50	±15	167	2.5	1.0	50	75	395.00
50AC12T5	12	3750	45	0.25	50	±5	500	2.5	1.0	50	77	395.00
50AC15T5	15	3000	45	0.25	50	±5	500	2.5	1.0	50	79	395.00

Common Characteristics
Main Output Voltge Tolerance ±0.5%*
Main Line Rgulation ±0.2%

Common Characteristics
Auxiliary Output Voltge Tolerance ±0.5%*
Auxiliary Line Rgulation ±0.2%

*Measurements taken at 115VAC-60Hz

† = 10% minimum load required
**All units available with 170-240VAC Input. Add H, prefix to part number-$40 per unit cost added.

Delivery— stock to one week

PICO Electronics, Inc. *Call Toll Free 800-228-9747*

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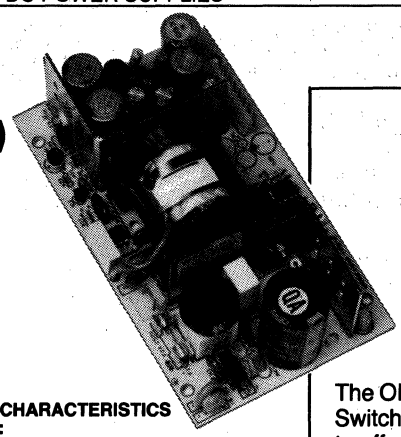
Internet:http://www.picoelectronics.com • E-Mail:HLSC73A@prodigy.com

SERIES OFU

30-40-65 Watt
Universal Input (85-264 VAC)
No Jumper Required
Agency Approved
Isolated
Short Circuit Protection



Open Frame PCB AC-DC Switchers

FEATURES:
- 85 to 264 VAC input
- 47 to 440 Hz
- UL-CSA-TUV certified
- Compact size
- Meets FCC/VDE-EMI requirements
- Hi-Reliability
- Over voltage protection
- Over current protection
- 100% hi-temperature testing
- Single-Dual-Triple outputs

The OFU Series of Open Frame AC-DC Switching Power Supplies are designed to offer the best of today's technical advancements. Standard features include small size, universal input, agency approvals, plus 100% burn-in. For a high reliable, low cost answer to your circuit requirements, let PICO simplify your power needs for computer designs or industrial applications.

TYPICAL CHARACTERISTICS:

Meets conduction limits: FCC 20780 Level B, VDE 0871 Level A

Meets or exceeds:

® UL 1950

CSA 1402C

EN 60950/IEC 950

Efficiency: 65% min. @ full load
Hold-up time: 16 msec typical
Line regulation: ±0.5% max. @ full load
Inrush current: 30 Amps @ 115 VAC
60 Amps @ 230 VAC
Isolation: 3750 VAC—input to output
1250 VAC—input to ground

ELECTRICAL CHARACTERISTICS ALL MODELS:

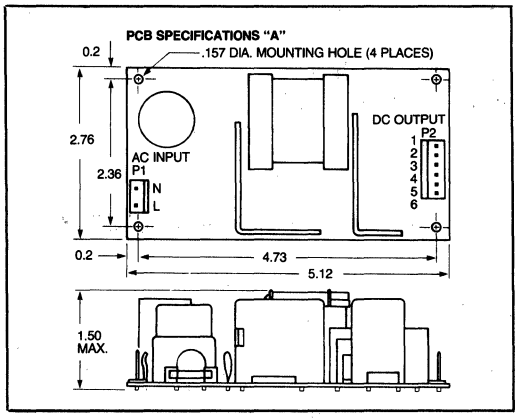
Input voltage: 85 to 264 VAC
Input frequency: 47 to 440 Hz

Input current:	OFU 30	OFU 40	OFU 65
115 VAC	0.65A	0.85A	1.0A
230 VAC	0.35A	0.45A	0.6A

Over voltage: 5.6 to 6.6V threshold on 5V output models
Over current: All outputs short circuit protected
Ripple/noise: 1% p-p max. on all models
Temp. coefficient: ±0.04%/°C

OFU3-30 Watt, 85-264 VAC Input

		OUTPUT 1				OUTPUT 2				OUTPUT 3				MECH. DRAWING	PRICE 1-24
MODEL NUMBER	MAX. TOTAL POWER	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE		
OFU3-1S	25W	+5VDC	0.3A	5A	1%	–	–	–	–	–	–	–	–	A	52.80
OFU3-2S	30W	+12VDC	0.2A	2.5A	1%	–	–	–	–	–	–	–	–	A	52.80
OFU3-3S	30W	+15VDC	0.1A	2A	1%	–	–	–	–	–	–	–	–	A	52.80
OFU3-4S	30W	+24VDC	0.1A	1.3A	1%	–	–	–	–	–	–	–	–	A	52.80
OFU3-5D	30W	+5VDC	0.3A	3A	3%	+12VDC	0.3A	1.5A	5%	–	–	–	–	A	54.00
OFU3-6D	30W	+5VDC	0.3A	3A	3%	+15VDC	0.2A	1.5A	5%	–	–	–	–	A	54.00
OFU3-7D	30W	+5VDC	0.3A	3A	3%	+24VDC	0.1A	1A	5%	–	–	–	–	A	54.00
OFU3-8M	30W	+5VDC	0.3A	3A	3%	+12VDC	0.3A	1.5A	5%	-5VDC	0.05A	0.2A	10%	A	56.20
OFU3-9M	30W	+5VDC	0.3A	3A	3%	+12VDC	0.3A	1.5A	5%	-12VDC	0.05A	0.2A	10%	A	56.20
OFU3-10M	30W	+5VDC	0.3A	3A	3%	+15VDC	0.2A	1.5A	5%	-15VDC	0.05A	0.2A	10%	A	56.20
OFU3-11M	30W	+5VDC	0.3A	3A	3%	+15VDC	0.2A	1.5A	5%	-12VDC	0.05A	0.2A	10%	A	56.20



NOTES:

1. Dimensions shown in inch.
2. Tolerance 0.02 maximum.
3. Weight: 9.9 oz. (280 grams) approx.

CONNECTOR DATA

Input connector mates with Molex housing 09-50-3031 and Molex 2878 series crimp terminal.

Output connector mates with Molex housing 09-50-3061 and Molex 2878 series crimp terminal.

PIN CHART PCB "A"

MODEL NUMBER	DC OUTPUT CONNECTOR					
	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN #6
OFU3-1S/2S/3S/4S	OUTPUT #1	OUTPUT #1	OUTPUT #1	RETURN	RETURN	RETURN
OFU3-5D/6D/7D	OUTPUT #1	OUTPUT #1	COMMON	COMMON	N.C.	OUTPUT #2
OFU3-8M/9M/10M/11M	OUTPUT #1	OUTPUT #1	COMMON	COMMON	OUTPUT #3	OUTPUT #2

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Delivery— stock to one week

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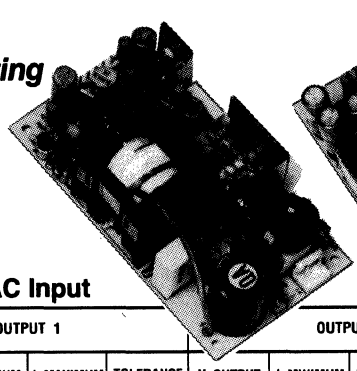
Internet:http://www.picoelectronics.com • E-Mail:HLSC73A@prodigy.com

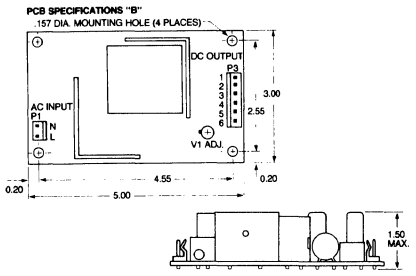
35 MODELS
0°C to +50°C Operating Temperature
Single-Dual Multiple Outputs Available
Standard 100% Hi Temp Testing



Universal Input Voltage
No Jumper Required
Multiple Outputs

OFU4-40 Watt, 85-264 VAC Input

		OUTPUT 1				OUTPUT 2				OUTPUT 3				MECH. DRAWING	PRICE 1-24
MODEL NUMBER	MAX. TOTAL POWER	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE		
OFU4-1S	30W	+5VDC	0.5A	6A	1%	–	–	–	–	–	–	–	–	B	59.40
OFU4-2S	40W	+12VDC	0.2A	3.5A	1%	–	–	–	–	–	–	–	–	B	59.40
OFU4-3S	40W	+15VDC	0.2A	3A	1%	–	–	–	–	–	–	–	–	B	59.40
OFU4-4S	40W	+24VDC	0.1A	2A	1%	–	–	–	–	–	–	–	–	B	59.40
OFU4-5D	40W	+5VDC	0.5A	3A	3%	+12VDC	0.2A	2A	5%	–	–	–	–	B	60.60
OFU4-6D	40W	+5VDC	0.5A	3A	3%	+15VDC	0.2A	2A	5%	–	–	–	–	B	60.60
OFU4-7D	40W	+5VDC	0.5A	3A	3%	+24VDC	0.1A	1A	5%	–	–	–	–	B	60.60
OFU4-8M	40W	+5VDC	0.5A	3A	3%	+12VDC	0.2A	2A	5%	-5VDC	0.05A	0.3A	10%	B	61.60
OFU4-9M	40W	+5VDC	0.5A	3A	3%	+12VDC	0.2A	2A	5%	-12VDC	0.05A	0.3A	10%	B	61.60
OFU4-10M	40W	+5VDC	0.5A	3A	3%	+15VDC	0.2A	2A	5%	-15VDC	0.05A	0.3A	10%	B	61.60
OFU4-11M	40W	+5VDC	0.5A	3A	3%	+15VDC	0.2A	2A	5%	-12VDC	0.05A	0.3A	10%	B	61.60
OFU4-12M	40W	+5VDC	0.5A	3A	3%	+24VDC	0.1A	1A	5%	-12VDC	0.05A	0.3A	10%	B	61.60



NOTES: 1. Dimensions shown in inch.
2. Tolerance 0.02 maximum.
3. Weight: 10.6 oz. (300 grams) approx.

CONNECTOR DATA

Input connector mates with Molex housing 09-50-3031 and Molex 2878 series crimp terminal.

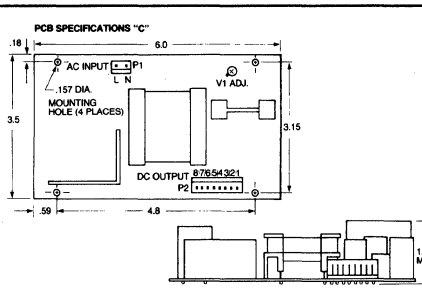
Output connector mates with Molex housing 09-50-3061 and Molex 2878 series crimp terminal.

PIN CHART PCB "B"

MODEL NUMBER	DC OUTPUT CONNECTOR					
	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN #6
OFU4-1S/2S/3S/4S	OUTPUT #1	OUTPUT #1	OUTPUT #1	RETURN	RETURN	RETURN
OFU4-5D/6D/7D	OUTPUT #2	OUTPUT #1	OUTPUT #1	COMMON	COMMON	N.C.
OFU4-8M/9M/10M/11M /12M	OUTPUT #2	OUTPUT #1	OUTPUT #1	COMMON	COMMON	OUTPUT #3

OFU6-65 Watt, 85-264 VAC Input

		OUTPUT 1				OUTPUT 2				OUTPUT 3				MECH. DRAWING	PRICE 1-24
MODEL NUMBER	MAX. TOTAL POWER	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE		
OFU6-1S	50W	+5VDC	1A	10A	1%	–	–	–	–	–	–	–	–	C	68.20
OFU6-2S	65W	+12VDC	0.5A	5.5A	1%	–	–	–	–	–	–	–	–	C	68.20
OFU6-3S	65W	+15VDC	0.4A	4.5A	1%	–	–	–	–	–	–	–	–	C	68.20
OFU6-4S	65W	+24VDC	0.3A	3A	1%	–	–	–	–	–	–	–	–	C	68.20
OFU6-5D	65W	+5VDC	1A	6A	3%	+12VDC	0.5A	3A	5%	–	–	–	–	C	69.40
OFU6-6D	65W	+5VDC	1A	6A	3%	+15VDC	0.4A	3A	5%	–	–	–	–	C	69.40
OFU6-7D	65W	+5VDC	1A	6A	3%	+24VDC	0.3A	2A	5%	–	–	–	–	C	69.40
OFU6-8M	65W	+5VDC	1A	6A	3%	+12VDC	0.5A	3A	5%	-5VDC	0.1A	0.5A	10%	C	71.60
OFU6-9M	65W	+5VDC	1A	6A	3%	+12VDC	0.5A	3A	5%	-12VDC	0.1A	0.5A	10%	C	71.60
OFU6-10M	65W	+5VDC	1A	6A	3%	+15VDC	0.4A	3A	5%	-15VDC	0.1A	0.5A	10%	C	71.60
OFU6-11M	65W	+5VDC	1A	6A	3%	+15VDC	0.4A	3A	5%	-12VDC	0.1A	0.5A	10%	C	71.60
OFU6-12M	65W	+5VDC	1A	6A	3%	+24VDC	0.3A	2A	5%	-12VDC	0.1A	0.5A	10%	C	71.60



NOTES: 1. Dimensions shown in inch.
2. Tolerance 0.02 maximum.
3. Weight: 13.4 oz. (380 grams) approx.

CONNECTOR DATA

Input connector mates with Molex housing 09-50-3031 and Molex 2878 series crimp terminal.

Output connector mates with Molex housing 09-50-3081 and Molex 2878 series crimp terminal.

PIN CHART PCB "C"

MODEL NUMBER	DC OUTPUT CONNECTOR							
	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN #6	PIN #7	PIN #8
OFU6-1S/2S/3S/4S	OUTPUT #1	OUTPUT #1	OUTPUT #1	OUTPUT #1	RETURN	RETURN	RETURN	RETURN
OFU6-5D/6D/7D	OUTPUT #1	OUTPUT #1	COMMON	COMMON	OUTPUT #2	OUTPUT #2	N.C.	N.C.
OFU6-8M/9M/10M/12M	OUTPUT #1	OUTPUT #1	COMMON	COMMON	OUTPUT #2	OUTPUT #2	OUTPUT #3	N.C.

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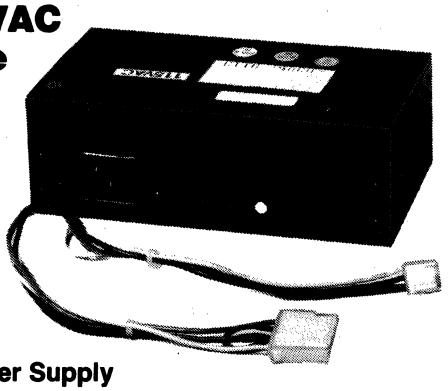
Internet:http://www.picoelectronics.com • E-Mail:HLSC73A@prodigy.com

SERIES OFB

50-130 Watt Fully Enclosed 90-130 VAC or 180-260 VAC Input-Jumper Selectable Short Circuit Protection Isolated Outputs



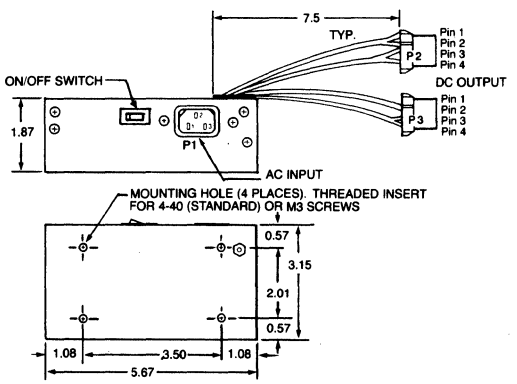
Fully Enclosed AC-DC Switchers

FEATURES:
- 90-130 VAC or 180-260 VAC input
- Meets FCC/VDE, EMI requirements
- 100% burn-in testing
- Meets or exceeds UL-CSA requirements
- Hi Reliability
- Over current protection
- Low noise less than 1% p-p
- Single-dual-triple and quad outputs

OFB 5-50 Watt AC-DC Switching Power Supply

		OUTPUT 1				OUTPUT 2				OUTPUT 3				MECH. DRAWING	PRICE 1-24
MODEL NUMBER	MAX. TOTAL POWER	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE		
OFB5-1S	50W	+5VDC	2A	10A	1%	–	–	–	–	–	–	–	–	D	74.80
OFB5-2S	50W	+12VDC	0.8A	4.2A	1%	–	–	–	–	–	–	–	–	D	74.80
OFB5-3S	50W	+15VDC	0.6A	3.5A	1%	–	–	–	–	–	–	–	–	D	74.80
OFB5-4S	50W	+24VDC	0.4A	2.2A	1%	–	–	–	–	–	–	–	–	D	74.80
OFB5-5D	50W	+5VDC	0.5A	2A	3%	+12VDC	0.5A	3.5A	5%	–	–	–	–	D	77.00
OFB5-6M	50W	+5VDC	1A	6A	3%	+12VDC	0.4A	2A	5%	-5VDC	0.1A	0.5A	10%	D	80.40
OFB5-7M	50W	+5VDC	1A	6A	3%	+12VDC	0.4A	2A	5%	-12VDC	0.1A	0.5A	10%	D	80.40
OFB5-8M	50W	+5VDC	1A	6A	3%	+15VDC	0.4A	2A	5%	-15VDC	0.1A	0.5A	10%	D	80.40

MECHANICAL SPECIFICATIONS "D"



NOTES:

1. Dimensions shown in inch.
2. Tolerance 0.02 maximum.
3. Weight: 21.9 oz. (620 grams) approx.

CONNECTOR DATA

Output connectors mate with AMP P/N 1-480426-0 pin housing assembly or P/N 1-350211-1 pin header assembly.

PIN CHART OFB5 "D"

MODEL NUMBER	CONNECTOR NO. P1			P2				P3			
	PIN 1	PIN 2	PIN 3	PIN 1	PIN 2	PIN 3	PIN 4	PIN 1	PIN 2	Pin 3	Pin 4
OFB5-1S	AC Live	Ground	AC Neutral	Return	Return	+5V	+5V	N/A	N/A	N/A	N/A
OFB5-2S	AC Live	Ground	AC Neutral	Return	Return	+12V	+12V	N/A	N/A	N/A	N/A
OFB5-3S	AC Live	Ground	AC Neutral	Return	Return	+15V	+15V	N/A	N/A	N/A	N/A
OFB5-4S	AC Live	Ground	AC Neutral	Return	Return	+24V	+24V	N/A	N/A	N/A	N/A
OFB5-5D	AC Live	Ground	AC Neutral	+12V	Common	Common	+5V	+12V	Common	Common	+5V
OFB5-6M	AC Live	Ground	AC Neutral	+12V.	-5V	Common	+5V	+12V	N.C.	Common	+5V
OFB5-7M	AC Live	Ground	AC Neutral	+12V	-12V	Common	+5V	+12V	N.C.	Common	+5V
OFB5-8M	AC Live	Ground	AC Neutral	+15V	-15V	Common	+5V	+15V	N.C.	Common	+5V

*For immediate engineering assistance or to place an order–**Call Toll Free 800-228-9747***

Delivery– stock to one week

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Internet:http://www.picoelectronics.com • E-Mail:HLSC73A@prodigy.com

The OFB Series of fully enclosed AC-DC Switching Power Supplies are designed to offer the best of todays technical advancements. Standard features include small size, jumper selectable input voltage, meeting agency requirements and 100% burn-in, for a high reliable, low cost answer to your circuit requirements. One to four standard outputs ease your distribution problems for computer designs or industrial applications.

TYPICAL CHARACTERISTICS:

Input voltage: 90-130 VAC or 180-260 VAC jumper selectable

Input frequency: 47 to 440 Hz

Input current:	OFB 5	OFB 13
115 VAC	0.9 A	2.8 A
230 VAC	0.5 A	1.5 A

Ripple and noise: 1% p-p max.

Short circuit protection: All outputs

Over voltage protection: Output one all models

Temp. coefficient: ±0.04%/°C

Efficiency: 65% min. @ full load

Line regulation: ±0.5% max. @ full load

Isolation: Input to output 3000 VAC
Input to ground 1500 VAC

Operating temp: 0°C to +50°C

Storage temp: −20°C to +85°C

Hold-up time: 20 msec typical

EMI requirements: Meets requirements FCC 20780 Level B, VDE 0871 Level A

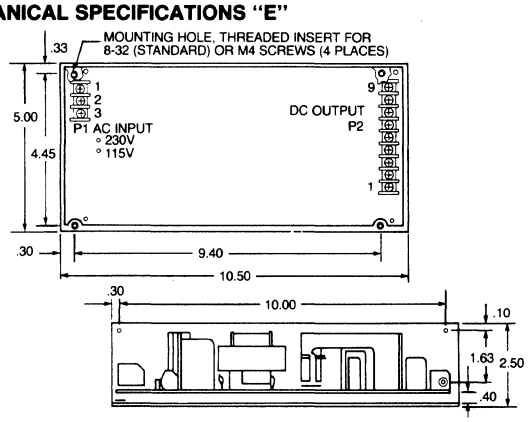
Safety requirements: Model OFB 5 certified, UL-1950, CSA-1402C, EN 609050/IEC 950.

Model OFB 13 meets requirements of UL-1950, CSA 1402C, IEC 950.

OFB 13-130 Watt AC-DC Switching Power Supply

		OUTPUT 1				OUTPUT 2				OUTPUT 3				OUTPUT 4				MECH. DRAWING	PRICE 1-24
MODEL NUMBER	MAX. TOTAL POWER	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE		
OFB13-1D	130W	+5VDC	3A	15A	3%	+12VDC	1A	5A	5%	–	–	–	–	–	–	–	–	E	129.80
OFB13-2T	130W	+5VDC	3A	15A	3%	+12VDC	1A	5A	5%	-12VDC	0A	0.8A	5%	–	–	–	–	E	132.40
OFB13-3M	130W	+5VDC	3A	15A	3%	+12VDC	0.8A	4A	5%	-12VDC	0A	0.8A	5%	-5VDC	0	0.8A	5%	E	137.60
OFB13-4M	130W	+5VDC	3A	15A	3%	+12VDC	0.8A	4A	5%	-12VDC	0A	0.8A	5%	+12VDC	0.5A	1.5A	6%	E	137.60
OFB13-5M	130W	+5VDC	3A	15A	3%	+12VDC	0.8A	4A	5%	-12VDC	0A	0.8A	5%	+15VDC	1A	4A	10%	E	137.60
OFB13-6M	130W	+5VDC	3A	15A	3%	+12VDC	0.8A	4A	5%	-15VDC	0A	0.8A	5%	+15VDC	0.5A	1.5A	6%	E	137.60
OFB13-7M	130W	+5VDC	3A	15A	3%	+12VDC	0.8A	4A	5%	-12VDC	0A	0.8A	5%	+24VDC	1A	4A	10%	E	137.60

MECHANICAL SPECIFICATIONS "E"



NOTES:

1. Dimensions shown in inch.
2. Tolerance 0.02 maximum.
3. Weight: 3.5 lbs. approx. for enclosed unit.

CONNECTOR DATA

Input connector type is Beau Inc. P/N 72-5-03C.

Output connector type is Beau Inc. P/N 72-5-09C.

Screws are 6-32 on 0.375 inch centers.

PIN CHART OFB13 "E"

MODEL NUMBER	CONNECTOR NO. P1			P2						
	PIN 1	PIN 2	PIN 3	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5,6,7	PIN 8,9	Pin 10
OFB13-1D	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	-5V	N.C.	Common	+5V	N.C.
OFB13-2T	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	N.C.	-12V	Common	+5V	N.C.
OFB13-3M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	-5.V	-12V	Common	+5V	N.C.
OFB13-4M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V (6A)	N.C.	-12V	Common	+5V	+12V (4A)
OFB13-5M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	N.C.	-12V	Common	+5V	+24V
OFB13-6M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V (6A)	-5V	-12V	Common	+5V	+12V (4A)
OFB13-7M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	-5V	-12V	Common	+5V	+24V

*Power failure detect.

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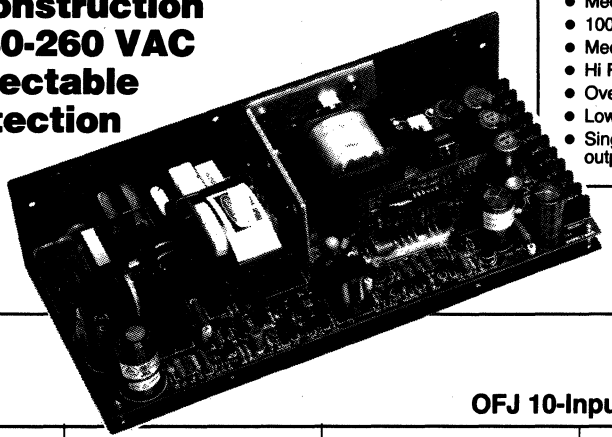
SERIES OFJ

AC-DC Switchers

100-200 Watt
PCB-L-Bracket Construction
90-130 VAC or 180-260 VAC
Input-Jumper Selectable
Short Circuit Protection
Isolated Outputs

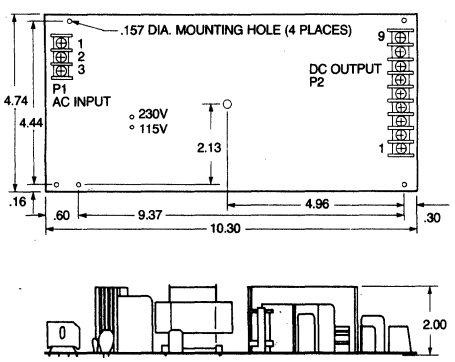


FEATURES:
- 90-130 VAC or 180-260 VAC input
- Meets FCC/VDE, EMI requirements
- 100% burn-in testing
- Meets or exceeds UL-CSA-IEC requirements
- Hi Reliability
- Over current protection
- Low noise less than 1% p-p
- Single-dual-triple quad and 2 models with *five* outputs

OFJ 10-Input 90-130 VAC or 180-260 VAC

		OUTPUT 1				OUTPUT 2				OUTPUT 3				OUTPUT 4				MECH. DRAWING	PRICE 1-24
MODEL NUMBER	MAX. TOTAL POWER	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE		
OFJ10-1D	100W	+5VDC	2A	10A	3%	+12VDC	1A	5A	5%	–	–	–	–	–	–	–	–	F	104.60
OFJ10-2M	100W	+5VDC	2A	10A	3%	+12VDC	1A	5A	5%	-12VDC	0A	0.8A	5%	–	–	–	–	F	106.80
OFJ10-3M	100W	+5VDC	2A	10A	3%	+12VDC	0.8A	4A	5%	-12VDC	0A	0.8A	5%	-5VDC	0A	0.8A	5%	F	109.00
OFJ10-4M	100W	+5VDC	2A	10A	3%	+12VDC	0.8A	4A	5%	-12VDC	0A	0.8A	5%	+12VDC	0.5A	1.5A	6%	F	109.00
OFJ10-5M	100W	+5VDC	2A	10A	3%	+12VDC	0.8A	4A	5%	-12VDC	0A	0.8A	5%	+15VDC	1A	3A	8%	F	109.00
OFJ10-6M	100W	+5VDC	2A	10A	3%	+12VDC	0.8A	4A	5%	-15VDC	0A	0.8A	5%	+15VDC	0.5A	1.5A	8%	F	109.00
OFJ10-7M	100W	+5VDC	2A	10A	3%	+12VDC	0.8A	4A	5%	-12VDC	0A	0.8A	5%	+24VDC	1A	3A	8%	F	109.00

MECHANICAL SPECIFICATIONS "F"



NOTES:
1. Dimensions shown in inch.
2. Tolerance 0.02 maximum
3. Weight: 2.05 lbs. (930 grams) approx.

CONNECTOR DATA

Input connector type is Beau Inc. P/N 72-5-03C.

Output connector type is Beau Inc. P/N 72-5-09C.

Screws are 6-32 on 0.375 inch centers.

PIN CHART OFJ10 "F"

MODEL NUMBER	CONNECTOR NO. P1			P2					
	PIN 1	PIN 2	PIN 3	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5,6,7	PIN 8,9
OFJ10-1D	AC Live	AC Ground	AC Neutral	P.F.D.*	N.C.	+12V	N.C.	Common	+5V
OFJ10-2M	AC Live	AC Ground	AC Neutral	P.F.D.*	-12V	+12V	N.C.	Common	+5V
OFJ10-3M	AC Live	AC Ground	AC Neutral	P.F.D.*	-12V	+12V	-5V	Common	+5V
OFJ10-4M	AC Live	AC Ground	AC Neutral	P.F.D.*	-12V	+12V (4A)	+12V (1.5A)	Common	+5V
OFJ10-5M	AC Live	AC Ground	AC Neutral	P.F.D.*	-12V	+12V	+15V	Common	+5V
OFJ10-6M	AC Live	AC Ground	AC Neutral	P.F.D.*	+15V	+12V	+15V	Common	+5V
OFJ107M	AC Live	AC Ground	AC Neutral	P.F.D.*	-12V	+12V	+24V	Common	+5V

*Power failure detect

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Internet:http://www.picoelectronics.com • E-Mail:HLSC73A@prodigy.com

The OFJ Series of AC-DC Switching Power Supplies are designed to offer the best of todays technical advancements.
These models are available in 100 and 200 watts. Standard features include jumper selectable input voltage, meeting agency requirements and 100% burn-in, for a high reliable, low cost answer to your circuit requirements. 14 models with up to 5 standard outputs provide solutions for power distribution problems.

TYPICAL CHARACTERISTICS:

Input voltage: 90–130 VAC or 180–260 VAC jumper selectable

Input frequency: 47 to 440 Hz

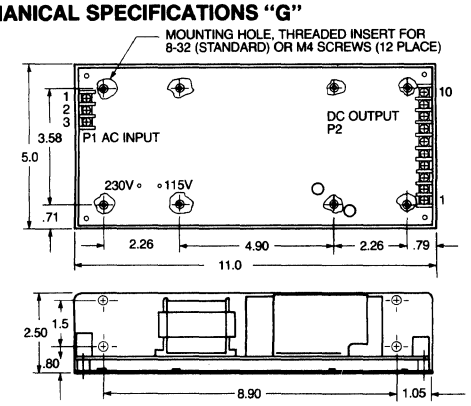
Input current:	OFJ 10	OFJ 20
115 VAC	2.2 A	4.2 A
230 VAC	1.2 A	2.4 A

Ripple and noise: 1% p-p max.
Short circuit protection: All outputs
Over voltage protection: Output one all models
Temp. coefficient: ±0.04%/°C
Efficiency: 65% min. @ full load
Line regulation: ±0.5% max. @ full load
Isolation: Input to output 3750 VAC
Input to ground 1750 VAC
Operating temp: 0°C to +50°C
Storage temp: −20°C to +85°C
Hold-up time: 20 msec typical
EMI requirements: Meets requirements FCC 20780 Level B, VDE 0871 Level A
Safety requirements: Meets or exceeds UL-1950, CSA-1402C, IEC 950

OFJ 20-Input 90-130 VAC or 180-260 VAC

		OUTPUT 1				OUTPUT 2				OUTPUT 3				OUTPUT 4				OUTPUT 5				MECH. DRAWING	PRICE 1-24
MODEL NUMBER	MAX. TOTAL POWER	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE	V OUTPUT	I MINIMUM	I MAXIMUM	TOLERANCE		
OFJ20-1M	200W	+5VDC	4A	20A	3%	+12VDC	1A	6A	5%	-5VDC	0A	1A	5%	–	–	–	–	–	–	–	–	G	162.80
OFJ20-2M	200W	+5VDC	4A	20A	3%	+12VDC	1A	6A	5%	-12VDC	0A	1A	5%	–	–	–	–	–	–	–	–	G	162.80
OFJ20-3M	200W	+5VDC	4A	20A	3%	+12VDC	1A	6A	5%	-5VDC	0A	1A	5%	-12VDC	0A	1A	5%	–	–	–	–	G	167.20
OFJ20-4M	200W	+5VDC	4A	20A	3%	+12VDC	1A	6A	5%	-12VDC	0A	1A	5%	+12VDC	0A	4A	5%	–	–	–	–	G	167.20
OFJ20-5M	200W	+5VDC	4A	20A	3%	+12VDC	1A	6A	5%	-12VDC	0A	1A	5%	+24VDC	0A	3A	8%	–	–	–	–	G	167.20
OFJ20-6M	200W	+5VDC	4A	20A	3%	+12VDC	1A	6A	5%	-5VDC	0A	1A	5%	-12VDC	0A	1A	5%	+12VDC	0.6A	4A	5%	G	171.60
OFJ20-7M	200W	+5VDC	4A	20A	3%	+12VDC	1A	6A	5%	-5VDC	0A	1A	5%	-12VDC	0A	1A	5%	+24VDC	0.3A	3A	8%	G	171.60

MECHANICAL SPECIFICATIONS "G"



NOTES:
1. Dimensions shown in inch.
2. Tolerance 0.02 maximum
3. Weight: 3.5 lbs. (1.6 Kgs) approx. for L-bracket form.

CONNECTOR DATA

Input connector type is Beau Inc. P/N 72-5-03C.

Output connector type is Beau Inc. P/N 72-5-10C.

Screws are 6-32 on 0.375 inch centers.

PIN CHART OFJ20 "G"

MODEL NUMBER	CONNECTOR NO. P1			P2						
	PIN 1	PIN 2	PIN 3	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5,6,7	PIN 8,9	PIN 10
OFJ20-1M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	-5V	N.C.	Common	+5V	N.C.
OFJ20-2M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	N.C.	-12V	Common	+5V	N.C.
OFJ20-3M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	-5V	-12V	Common	+5V	N.C.
OFJ20-4M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V (6A)	N.C.	-12V	Common	+5V	+12V (4A)
OFJ20-5M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	N.C.	-12V	Common	+5V	+24V
OFJ20-6M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V (6A	-5V	-12V	Common	+5V	+12V (4A)
OFJ207M	AC Ground	AC Neutral	AC Live	P.F.D.*	+12V	-5V	-12V	Common	+5V	+24V

*Power failure detect

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- **Switching Power Supplies**
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GENERAL SPECIFICATIONS

- Input Rating:

120 VAC	60Hz	UL/CSA	North America.
220/230 VAC	50Hz	TUV/VDE/CE	Europe.
100 VAC	50/60Hz	JIS	Japan.
240 VAC	50Hz	BSI/SAA	U.K/Australia/S. Africa.

- Tolerance of Output Voltage: ±0.5V at rated load.
- Dielectric Withstand Voltage: UL/CSA JIS 1500 VAC/One Minute.
  VDE BSI TUV SAA 4000 VAC/One Minute.
- Humidity: 95%
- Storage Temperature: -40°C to +70°C.
- Operation Temperature: -10°C to +40°C.
- Output Cord: 6 feet, AWG 24 or heavier.
- MTBF.: 30000 hours at 25°C, full load.
- Q A STD: MIL-STD-105D
- Customer Design Are Available On Request To Meet Exact Specification.

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1780 EVERGREEN STREET
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- JIS Approved Japanese Power Supplies
- British (U.K.) Style Power Supplies

STANDARD AC/DC ADAPTORS JIS UL ■ CSA APPROVED

MODEL	INPUT	OUTPUT	UL	CSA	JIS
AD-0690	120V 15W	6VDC 900mA	✓	✓	✓
AD-061A	120V 15W	6VDC 1 A	✓	✓	✓
AD-0780	120V 15W	7.5VDC 800mA	✓	✓	✓
AD-0790	120V 15W	7.5VDC 900mA	✓	✓	✓
AD-071A	120V 15W	7.5VDC 1 A	✓	✓	✓
AD-0980	120V 15W	9VDC 800mA	✓	✓	✓
AD-0990	120V 15W	9VDC 900mA	✓	✓	✓
AD-091A	120V 15W	9VDC 1 A	✓	✓	✓
AD-1260	120V 15W	12VDC 600mA	✓	✓	✓
AD-1270	120V 15W	12VDC 700mA	✓	✓	✓
AD-1280	120V 15W	12VDC 800mA	✓	✓	✓
AD-1280	120V 15W	12.6VDC 800mA	✓	✓	
AD-1550	120V 15W	15VDC 500mA	✓	✓	✓
AD-1560	120V 15W	15VDC 600mA	✓	✓	✓
AD-1645	120V 15W	16VDC 450mA	✓	✓	✓
AD-1650	120V 15W	16VDC 500mA	✓	✓	✓
AD-1655	120V 15W	16VDC 550mA	✓	✓	✓
AD-1835	120V 15W	18VDC 350mA	✓	✓	✓
AD-1840	120V 15W	18VDC 400mA	✓	✓	✓
AD-1850	120V 15W	18VDC 500mA	✓	✓	✓
AD-2035	120V 15W	20VDC 350mA	✓	✓	✓
AD-2040	120V 15W	20VDC 400mA	✓	✓	✓
AD-2045	120V 15W	20VDC 450mA	✓	✓	✓
AD-2230	120V 15W	22VDC 300mA	✓	✓	✓
AD-2235	120V 15W	22VDC 350mA	✓	✓	✓
AD-2240	120V 15W	22VDC 400mA	✓	✓	✓
AD-2430	120V 15W	24VDC 300mA	✓	✓	✓
AD-2435	120V 15W	24VDC 350mA	✓	✓	✓
AD-1370	120V 15W	13VDC 700mA	✓		✓
AD-0660L	120V 15W	6VDC 600mA	✓		✓
AD-0670L	120V 15W	6VDC 700mA	✓		✓
AD-0680L	120V 15W	6VDC 800mA	✓		✓
AD-0760L	120V 15W	7.5VDC 600mA	✓		✓
AD-0770L	120V 15W	7.5VDC 700mA	✓		✓
AD-0960L	120V 15W	9VDC 600mA	✓	✓	✓
AD-1540L	120V 15W	15VDC 400mA	✓	✓	✓
AD-1845	120V 15W	18VDC 450mA	✓	✓	✓
AD-2030L	120V 15W	20VDC 300mA	✓	✓	✓
AD-2425L	120V 15W	24VDC 250mA	✓	✓	✓
AD-0970	120V 15W	9VDC 700mA	✓		✓
AD-052A	120V 20W	5VDC 2 A	✓		✓
AD-062A	120V 22W	6VDC 2 A	✓		✓
AD-091A2	120V 18W	9VDC 1.2 A	✓		✓
AD-091A5	120V 22W	9VDC 1.5 A	✓		✓
AD-1290	120V 18W	12VDC 900mA	✓		✓
AD-121A	120V 22W	12VDC 1 A	✓	✓	✓
AD-121A2	120V 22W	12VDC 1.2 A	✓	✓	✓
AD-1570	120V 18W	15VDC 700mA	✓		✓
AD-1580	120V 22W	15VDC 800mA	✓		✓
AD-1590	120V 22W	15VDC 900mA	✓		✓
AD-1660	120V 18W	16VDC 600mA	✓		✓
AD-1670	120V 18W	16VDC 700mA	✓		✓
AD-1680	120V 22W	16VDC 800mA	✓		✓
AD-1860	120V 18W	18VDC 600mA	✓		✓
AD-1870	120V 22W	18VDC 700mA	✓		✓
AD-1880	120V 22W	18VDC 800mA	✓		✓
AD-2050	120V 18W	20VDC 500mA	✓		✓
AD-2060	120V 22W	20VDC 600mA	✓		✓
AD-2070	120V 22W	20VDC 700mA	✓		✓
AD-2250	120V 18W	22VDC 500mA	✓		✓
AD-2260	120V 22W	22VDC 600mA	✓		✓
AD-2450	120V 22W	24VDC 500mA	✓		✓
AD-2460	120V 22W	24VDC 600mA	✓		✓
AA-1540L	120V 15W	15VAC 400mA	✓		
AA-1550	120V 15W	15VAC 500mA	✓		
AA-1645	120V 15W	16VAC 450mA	✓		

MODEL	INPUT	OUTPUT	UL	CSA	JIS
AA-1650	120V 15W	16VAC 500mA	✓		
AA-1835	120V 15W	18VAC 350mA	✓		
AA-1840	120V 15W	18VAC 400mA	✓		
AA-1845	120V 15W	18VAC 450mA	✓		
AA-2030L	120V 15W	20VAC 300mA	✓		
AA-2035	120V 15W	20VAC 350mA	✓		
AA-2040	120V 15W	20VAC 400mA	✓		
AA-2230	120V 15W	22VAC 300mA	✓		
AA-2235	120V 15W	22VAC 350mA	✓		
AA-2425L	120V 15W	24VAC 250mA	✓		
AA-1960	120V 15W	19VAC 600mA	✓	✓	
AA-081A	120V 15W	8VAC 1 A	✓	✓	
AA-091A	120V 15W	9VAC 1 A	✓	✓	
AA-1283	120V 15W	12VAC 830mA	✓	✓	
AA-1850	120V 15W	18VAC 500mA	✓		
AA-2417	120V 15W	24VAC 170mA	✓	✓	
AA-061A	120V 15W	6VAC 1 A	✓		
AA-071A	120V 15W	7.5VAC 1 A	✓		
AA-091A	120V 15W	9VAC 1 A	✓	✓	
AA-1280	120V 15W	12VAC 800mA	✓	✓	
AA-1370	120V 15W	13VAC 700mA	✓		
AA-1560	120V 15W	15VAC 600mA	✓		
AA-1655	120V 15W	16VAC 550mA	✓		
AA-2045	120V 15W	20VAC 450mA	✓		
AA-2240	120V 15W	22VAC 400mA	✓		
AA-2435	120V 15W	24VAC 350mA	✓		
AA-0670L	120V 15W	6VAC 700mA	✓		
AA-0680L	120V 15W	6VAC 800mA	✓		
AA-0690L	120V 15W	6VAC 900mA	✓		
AA-0760L	120V 15W	7.5VAC 600mA	✓		
AA-0770L	120V 15W	7.5VAC 700mA	✓		
AA-0780	120V 15W	7.5VAC 800mA	✓		
AA-0790	120V 15W	7.5VAC 900mA	✓		
AA-0960L	120V 15W	9VAC 600mA	✓		
AA-0970	120V 15W	9VAC 700mA	✓		
AA-0980	120V 15W	9VAC 800mA	✓		
AA-0990	120V 15W	9VAC 900mA	✓		
AA-1260	120V 15W	12VAC 600mA	✓		
AA-1270	120V 15W	12VAC 700mA	✓		
AD-5129-1	120V 24W	5VDC 1200mA +12VDC 200mA -12VDC 200mA	✓	✓	
AD-5129-3	120V 24W	5VDC 1000mA +12VDC 300mA -12VDC 100mA	✓		
AD-5129-5	120V 24W	5VDC 1500mA +12VDC 150mA -12VDC 50mA	✓		
AD-0903	120V 3W	9VDC 30mA		✓	✓
AD-0905	120V 3W	9VDC 50mA		✓	✓
AD-0910	120V 3W	9VDC 100mA	✓	✓	✓
AD-0920M	120V 5W	9VDC 200mA	✓	✓	✓
AD-0930M	120V 5W	9VDC 300mA	✓	✓	✓
AD-1205	120V 3W	12VDC 50mA	✓	✓	✓
AD-1210	120V 3W	12VDC 100mA	✓	✓	✓
AD-1215	120V 5W	12VDC 150mA	✓	✓	✓
AD-1220M	120V 5W	12VDC 200mA	✓	✓	✓
AD-1605	120V 3W	16VDC 50mA		✓	✓
AD-1610	120V 5W	16VDC 100mA	✓	✓	✓
AD-1015	120V 5W	10VDC 150mA	✓	✓	✓
AD-1225M	120V 5W	12VDC 250mA	✓	✓	✓
AD-0910RT	120V 3.5W	9VDC 100mA	✓		✓
AD-0920RT	120V 5W	9VDC 200mA	✓		✓
AD-0310	120V 3W	3VDC 100mA	✓	✓	✓
AD-0320	120V 3W	3VDC 200mA	✓	✓	✓

MODEL	INPUT	OUTPUT	UL	CSA	JIS
AD-0330	120V 3W	3VDC 300mA	✓	✓	✓
AD-0340	120V 3W	3VDC 400mA	✓	✓	✓
AD-0350	120V 4W	3VDC 500mA	✓	✓	✓
AD-0410	120V 3W	4.5VDC 100mA	✓	✓	✓
AD-0420	120V 3W	4.5VDC 200mA	✓	✓	✓
AD-0430	120V 4W	4.5VDC 300mA	✓	✓	✓
AD-0440	120V 5W	4.5VDC 400mA	✓	✓	✓
AD-0603	120V 3W	6VDC 30mA		✓	✓
AD-0610	120V 3W	6VDC 100mA	✓	✓	✓
AD-0620	120V 3W	6VDC 200mA	✓	✓	✓
AD-0630M	120V 5W	6VDC 300mA	✓	✓	✓
AD-0710	120V 3W	7.5VDC 100mA	✓	✓	✓
AD-0720	120V 4W	7.5VDC 200mA	✓	✓	✓
AA-0310	120V 3W	3VAC 100mA	✓	✓	
AA-0320	120V 3W	3VAC 200mA	✓	✓	
AA-0330	120V 3W	3VAC 300mA	✓	✓	
AA-0340	120V 3W	3VAC 400mA	✓	✓	
AA-0350	120V 4W	3VAC 500mA	✓	✓	
AA-0410	120V 3W	4.5VAC 100mA	✓	✓	
AA-0420	120V 3W	4.5VAC 200mA	✓	✓	
AA-0430	120V 4W	4.5VAC 300mA	✓	✓	
AA-0440	120V 5W	4.5VAC 400mA	✓	✓	
AA-0603	120V 3W	6VAC 30mA		✓	
AA-0610	120V 3W	6VAC 100mA	✓	✓	
AA-0620	120V 3W	6VAC 200mA	✓	✓	
AA-0630M	120V 5W	6VAC 300mA	✓	✓	
AA-0710	120V 3W	7.5VAC 100mA	✓	✓	
AA-0720	120V 4W	7.5VAC 200mA	✓	✓	
AA-0903	120V 3W	9VAC 30mA		✓	
AA-0905	120V 3W	9VAC 50mA		✓	
AA-0910	120V 3W	9VAC 100mA	✓	✓	
AA-0920M	120V 5W	9VAC 200mA	✓	✓	
AA-0930M	120V 5W	9VAC 300mA	✓	✓	
AA-1015	120V 5W	10VAC 150mA	✓	✓	
AA-1205	120V 3W	12VAC 50mA	✓	✓	
AA-1210	120V 3W	12VAC 100mA	✓	✓	
AA-1215	120V 5W	12VAC 150mA	✓	✓	
AA-1220M	120V 5W	12VAC 200mA	✓	✓	
AA-1605	120V 3W	16VAC 50mA		✓	
AA-1610	120V 5W	16VAC 100mA	✓	✓	
AA-1225M	120V 5W	12VAC 250mA	✓		
AD-2S50	120V 9W	6VDC/12VDC500mA	✓		✓
AD-6S20/50	120V 9W	3/4.5/6/7.5/9/12VDC200mA/500mA	✓	✓	✓
AD-6S50	120V 9W	3/4.5/6/7.5/9/12VDC500mA	✓	✓	✓
AD-6S20/50N	120V 9W	3/4.5/6/7.5/9/12VDC200mA/500mA	✓		✓
AD-6S10/30N	120V 9W	3/4.5/6/7.5/9/12VDC100mA/300mA	✓		✓
AD-6S30N	120V 9W	3/4.5/6/7.5/9/12VDC300mA	✓		✓
AA-0760	120V 9W	7.5VAC 600mA	✓		
AA-0940	120V 9W	9VAC 400mA	✓		
AA-1530	120V 9W	15VAC 300mA	✓		
AA-1245	120V 9W	12VAC 450mA	✓		
AA-042A	120V 15W	4.5VAC 2 A	✓	✓	
AA-061A5	120V 15W	6VAC 1.5 A	✓	✓	
AA-071A5	120V 16W	7.5VAC 1.5 A	✓	✓	
AA-091A	120V 15W	9VAC 1 A	✓	✓	
AA-1283	120V 15W	12VAC 830mA	✓	✓	
AA-121A	120V 18W	12VAC 1 A	✓	✓	
AA-1370	120V 15W	13VAC 700mA	✓	✓	
AA-1670	120V 16W	16VAC 700mA	✓	✓	
AA-1860	120V 16W	18VAC 600mA	✓	✓	
AA-2055	120V 16W	20VAC 550mA	✓	✓	
AA-2445	120V 16W	24VAC 450mA	✓	✓	
AA-0680	120V 9W	6VAC 800mA	✓	✓	
AA-0950	120V 9W	9VAC 500mA	✓	✓	
AA-0960	120V 9W	9VAC 600mA	✓	✓	

PILLAR INDUSTRIES
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PILLAR INDUSTRIES Manufacturer of AC ADAPTORS

STANDARD AC/DC ADAPTORS JIS UL ■ CSA APPROVED

220/230V AC 50 HZ EUROPEAN CONTINENTAL TYPE AC ADAPTOR/TUV, VDE OR CE APPROVED

MODEL	INPUT	OUTPUT	UL	CSA	JIS
AA-1235	120V 9W	12VAC 350mA	✓	✓	
AA-1240	120V 9W	12VAC 400mA	✓	✓	
AA-1250	120V 9W	12VAC 500mA	✓	✓	
AA-1260	120V 9W	12VAC 600mA	✓	✓	
AA-1525	120V 9W	15VAC 250mA	✓	✓	
AA-1535	120V 9W	15VAC 350mA	✓	✓	
AA-1540	120V 9W	15VAC 400mA	✓	✓	
AA-1625	120V 9W	16VAC 250mA	✓	✓	
AA-1630	120V 9W	16VAC 300mA	✓	✓	
AA-1635	120V 9W	16VAC 350mA	✓	✓	
AA-1825	120V 9W	18VAC 250mA	✓	✓	
AA-1830	120V 9W	18VAC 300mA	✓	✓	
AA-2020	120V 9W	20VAC 200mA	✓	✓	
AA-2025	120V 9W	20VAC 250mA		✓	
AA-2030	120V 9W	20VAC 300mA	✓	✓	
AA-2420	120V 9W	24VAC 200mA	✓	✓	
AA-2425	120V 9W	24VAC 250mA	✓	✓	
AD-0450	120V 5W	4.5VDC 500mA	✓	✓	✓
AD-0630	120V 5W	6VDC 300mA	✓	✓	✓
AD-0640	120V 6W	6VDC 400mA	✓	✓	✓
AD-0650	120V 8W	6VDC 500mA	✓	✓	✓
AD-0730	120V 5W	7.5VDC 300mA	✓	✓	✓
AD-0740	120V 7W	7.5VDC 400mA	✓	✓	✓
AD-0920	120V 5W	9VDC 200mA	✓	✓	✓
AD-0930	120V 6W	9VDC 300mA	✓	✓	✓
AD-0940	120V 7W	9VDC 400mA	✓	✓	✓
AD-1220	120V 6W	12VDC 200mA	✓	✓	✓
AD-1230	120V 7W	12VDC 300mA	✓	✓	✓
AD-1515	120V 5W	15VDC 150mA	✓	✓	✓
AD-1516	120V 5W	15VDC 160mA	✓	✓	✓
AD-1520	120V 7W	15VDC 200mA	✓	✓	✓
AD-1525	120V 8W	15VDC 250mA	✓	✓	✓
AD-1615	120V 5W	16VDC 150mA	✓	✓	✓
AD-1620	120V 7W	16VDC 200mA	✓	✓	✓
AD-1815	120V 7W	18VDC 150mA	✓	✓	✓
AD-1820	120V 7W	18VDC 200mA	✓	✓	✓
AD-2010	120V 5W	20VDC 100mA	✓	✓	✓
AD-2015	120V 7W	20VDC 150mA	✓	✓	✓
AD-2410	120V 5W	24VDC 100mA	✓	✓	✓
AD-2415	120V 7W	24VDC 150mA	✓	✓	✓
AD-0660	120V 9W	4.50R 6VDC 600mA	✓	✓	✓
AD-0670	120V 9W	6VDC 700mA	✓	✓	✓
AD-0680	120V 9W	6VDC 800mA	✓	✓	✓
AD-0950	120V 9W	9VDC 500mA	✓	✓	✓
AD-0960	120V 9W	9VDC 600mA	✓	✓	✓
AD-1235	120V 9W	12VDC 350mA	✓	✓	✓
AD-1240	120V 9W	12VDC 400mA	✓	✓	✓
AD-1250	120V 9W	12VDC 500mA	✓	✓	✓
AD-1525	120V 9W	15VDC 250mA	✓	✓	✓
AD-1530	120V 9W	15VDC 300mA	✓	✓	✓
AD-1540	120V 9W	15VDC 400mA	✓	✓	✓
AD-1625	120V 9W	16VDC 250mA	✓	✓	✓
AD-1630	120V 9W	16VDC 300mA	✓	✓	✓
AD-1635	120V 9W	16VDC 350mA	✓	✓	✓
AD-1825	120V 9W	18VDC 250mA	✓	✓	✓
AD-1830	120V 9W	18VDC 300mA	✓	✓	✓
AD-2020	120V 9W	20VDC 200mA	✓	✓	✓
AD-2025	120V 9W	20VDC 250mA		✓	✓
AD-2030	120V 9W	20VDC 300mA	✓	✓	✓
AD-2420	120V 9W	24VDC 200mA	✓	✓	✓
AD-2425	120V 9W	24VDC 250mA	✓	✓	✓
AD-0760	120V 9W	7.5VDC 600mA	✓		✓
AD-1245	120V 9W	12VDC 450mA	✓		✓

MODEL	INPUT	OUTPUT	UL	CSA	JIS
AD-1535	120V 9W	15VDC 350mA	✓	✓	✓
AA-1230	120V 7W	12VAC 300mA	✓	✓	
AA-1820	120V 7W	18VAC 200mA	✓		
AA-630	120V 5W	6VAC 300mA	✓		
AA-650	120V 8W	6VAC 500mA	✓		
AA-0450	120V 7W	4.8VAC 500mA	✓		
AA-0660	120V 7W	6VAC 600mA	✓		
AA-0930	120V 5W	9VAC 300mA	✓		
AA-1620	120V 7W	16VAC 200mA	✓		
AA-1150	120V 10W	11VAC 500mA	✓		
AA-1045-0210	120V 10W	10.7/2.4VAC450/100mA	✓		
AA-0660	120V 9W	6VAC 600mA	✓	✓	
AA-0670	120V 9W	6VAC 700mA	✓	✓	
AD-05126	110V0.225W	5VDC 600mA +12VDC 250mA -12VDC 250mA	✓	✓	
AD-122A	120V	12VDC 2 A	✓		
AD-121A6	120V	12V 1.6A	✓	✓	
AD-1073DT	120V 15W	10.5VDC 730mA	✓	✓	
AD-091A5	120V 24W	11VDC 1.53A	✓		
AD-1095DT	120V 18W	10.6VDC 950mA	✓	✓	

220/230 AC 50HZ EUROPEAN CONTINENTAL TYPE AC ADAPTOR/TUV OR VDE APPROVED

MODEL	INPUT	OUTPUT	TUV	VDE	CE
AD-51274B	220V 10.8W	5VDC 700mA 12VDC 500mA	✓		
AD-5129	220V 24.5W	5VDC 1 A +12VDC 200mA -12VDC 200mA	✓		
AD-051A5R	220V 18.75W	5VDC 1.5 A	✓		
AD-0330B	220V 4.4W	3VDC 300mA	✓	✓	
AD-0350B	230V 5.5W	3VDC 500mA	✓		✓
AD-0430B	220V 4.4W	4.5VDC 300mA	✓	✓	
AD-0630B	230V 4.4W	6VDC 300mA	✓		✓
AD-0730B	230V 5.5W	7.5VDC 300mA	✓		✓
AD-0930B	230V 6.6W	9VDC 300mA	✓		✓
AD-1220B	230V 5W	12VDC 200mA	✓		✓
AD-1515B	220V 5W	15VDC 150mA	✓		
AD-1815B	220V 5.5W	18VDC 150mA	✓	✓	
AD-2010B	220V 4.4W	20VDC 100mA	✓	✓	
AD-2410B	220V 5W	24VDC 100mA	✓	✓	
AD-1516B	220V 5W	15VDC 160mA		✓	
AD-0820B	220V	8.4VDC 220mA	✓		
AD-0450B	220V 7.8W	4.5VDC 500mA	✓		
AD-0650B	230V 7.7W	6VDC 500mA	✓		✓
AD-0750B	220V 8.8W	7.5VDC 500mA	✓		
AD-0950B	230V 9.9W	9VDC 500mA	✓		✓
AD-1230B	230V 7.3W	12VDC 300mA	✓		✓
AD-1525B	220V 7W	15VDC 250mA	✓		
AD-1820B	220V 7.7W	18VDC 200mA	✓		
AD-2015B	220V 6.6W	20VDC 150mA	✓		
AD-2415B	220V 7W	24VDC 150mA	✓		

MODEL	INPUT	OUTPUT	TUV	VDE	CE
AA-0330B	220V 3.3W	3VAC 300mA	✓		
AA-0350B	220V 4.4W	3VAC 500mA	✓		
AA-0430B	220V 3.3W	4.5VAC 300mA	✓		
AA-0630B	220V 3.3W	6VAC 300mA	✓		
AA-0730B	220V 4.4W	7.5VAC 300mA	✓		
AA-0930B	220V 4.4W	9VAC 300mA	✓		
AA-1220B	220V 4.4W	12VAC 200mA	✓		
AA-1515B	220V 4.4W	15VAC 150mA	✓		
AA-1815B	220V 4.4W	18VAC 150mA	✓		
AA-2010B	220V 4.4W	20VAC 100mA	✓		
AA-2410B	220V 3.96W	24VAC 100mA	✓		
AD-0360B	220V 5.5W	3VDC 600mA	✓		
AD-0460B	220V 6.6W	4.5VDC 600mA	✓		
AD-0660B	220V 7.7W	6VDC 600mA	✓		
AD-0760B	220V 8.8W	7.5VDC 600mA	✓		✓
AD-0960B	220V 9.9W	9VDC 600mA	✓		
AD-1250B	230V 9.9W	12VDC 500mA	✓		✓
AD-1540B	230V 9.9W	15VDC 400mA	✓		✓
AD-1830B	230V 8.8W	18VDC 300mA	✓		✓
AD-2030B	230V 9.9W	20VDC 300mA	✓		✓
AD-2425B	220V 9.9W	24VDC 250mA	✓		
AA-0360B	220V 5.5W	3VAC 600mA	✓		
AA-0460B	220V 6.6W	4.5VAC 600mA	✓		
AA-0660B	220V 7.7W	6VAC 600mA	✓		
AA-0760B	220V 8.8W	7.5VAC 600mA	✓		
AA-0960B	220V 9.9W	9VAC 600mA	✓		
AA-1250B	230V 9.9W	12VAC 500mA	✓		✓
AA-1540B	220V 9.9W	15VAC 400mA	✓		
AA-1830B	220V 8.8W	18VAC 300mA	✓		
AA-2030B	220V 9.9W	20VAC 300mA	✓		
AA-2425B	220V 9.9W	24VAC 250mA	✓		
AD-071AB	230V 14.3W	7.5VDC 1000mA	✓		✓
AD-091AB	230V 15.5W	9VDC 1000mA	✓		✓
AD-1280B	230V 17.6W	12VDC 800mA	✓		✓
AD-1560B	230V 15.4W	15VDC 600mA	✓		✓
AD-1850B	220V 15.4W	18VDC 500mA	✓		
AD-2030B	230V 11W	20VDC 300mA	✓		✓
AD-2440B	230V 14.3W	24VDC 400mA	✓		✓
AD-061A2B	220V 13.2W	6VDC 1.2 A	✓		
AD-122AB	220V	12VDC 2 A	✓		
AA-061A2B	220V 11W	6VAC 1.2 A	✓		
AA-071AB	220V 11W	7.5VAC 1 A	✓		
AA-091AB	230V 13.2W	9VAC 1 A	✓		✓
AA-1280B	220V 14.3W	12VAC 800mA	✓		
AA-1560B	230V 13.2W	15VAC 600mA	✓		✓
AA-1850B	220V 12.2W	18VAC 500mA	✓		
AA-2030B	220V 8.8W	20VAC 300mA	✓		
AA-2440B	220V 13.2W	24VAC 400mA	✓		

DC REGULATED 5% U.S. VERSION

MODEL	INPUT	OUTPUT	UL	CSA
AD-0330R	120V 6W	3VDC 300mA	✓	✓
AD-0520R	120V 6W	5VDC 200mA	✓	✓
AD-0530R	120V 11W	12VDC 200mA 5.2VDC 300mA	✓	
AD-0950R	120V 10WA	9VDC 500mA		✓
AD-1240R	120V 10WA	12VDC 400mA		✓

BATTERY CHARGER

MODEL	INPUT	OUTPUT	UL	CSA
BC-2408A	120V 3.5A	24VDC 8 Amp	✓	✓
BC-0760R	120 VAC	7.5VDC 600 mA	✓	

PILLAR INDUSTRIES
1780 EVERGREEN STREET/DUARTE, CA 91010/TEL: 626-358-1337 • 800-887-9981/FAX: 626-358-0398

PILLAR INDUSTRIES Manufacturer of AC ADAPTORS

STANDARD AC/DC ADAPTORS JIS, UL, CSA, APPROVED

MODEL	INPUT	OUTPUT	UL	CSA
A60745C	120V	7.5 VAC 4500mA	x	x
A50927C	120V	9 VAC 2700mA	x	x
A60942C	120V	9 VAC 4150mA	x	x
A70940C	120V	9 VAC 4000mA	x	x
A70945C	120V	9 VAC 4500mA	x	x
A41219C	120V	12 VAC 1900mA	x	x
A51225C	120V	12 VAC 2500mA	x	x
A61235C	120V	12 VAC 3500mA	x	x
A71245C	120V	12 VAC 4500mA	x	x
A41315C	120V	13.7 VAC 1500mA	x	x
A52013C	120V	20.03 VAC 1350mA	x	x
A62119C	120V	21 VAC 1900mA	x	x
A72120C	120V	21 VAC 2000mA	x	x
A42410C	120V	24 VAC 1000mA	x	x
A52413C	120V	24 VAC 1300mA	x	x
A72418C	120V	24 VAC 1800mA	x	x
TEAD-35-030600U	120V	3 VDC 600mA	x	x
TEAD-41-030700U	120V	3 VDC 700mA	x	x
TEAD-41-030800U	120V	3 VDC 800mA	x	x
TEAD-41-030900U	120V	3 VDC 900mA	x	x
TEAD-41-031000U	120V	3 VDC 1000mA	x	x
TEAD-41-040600U	120V	4.5 VDC 600mA	x	x
TEAD-41-040700U	120V	4.5 VDC 700mA	x	x
TEAD-41-040800U	120V	4.5 VDC 800mA	x	x
TEAD-41-040900U	120V	4.5 VDC 900mA	x	x
TEAD-48-041500U	120V	4.5 VDC 1500mA	x	x
TEAD-48-051000U	120V	5 VDC 1000mA	x	x
TEAD-28-060050U	120V	6 VDC 50mA	x	x
TEAD-48-061200U	120V	6 VDC 1200mA	x	x
TEAD-48-061500U	120V	6 VDC 1500mA	x	x
TEAD-28-070050U	120V	7.5 VDC 50mA	x	x
TEAD-28-070150U	120V	7.5 VDC 150mA	x	x
TEAD-41-070500U	120V	7.5 VDC 500mA	x	x
TEAD-48-071500U	120V	7.5 VDC 1500mA	x	x
TEAD-48-101000U	120V	10 VDC 1000mA	x	x
TEAD-48-101200U	120V	10 VDC 1200mA	x	x
TEAD-48-101500U	120V	10 VDC 1500mA	x	x
TEAD-48-13100U	120V	13 VDC 100mA	x	x
TEAD-28-150050U	120V	15 VDC 50mA	x	x
TEAD-28-150100U	120V	15 VDC 100mA	x	x
TEAD-48-151000U	120V	15 VDC 1000mA	x	x
TEAD-48-161000U	120V	16 VDC 1000mA	x	x
TEAD-28-180050U	120V	18 VDC 50mA	x	x
TEAD-28-180080U	120V	18 VDC 80mA	x	x
TEAD-28-180100U	120V	18VDC 100mA	x	x
TEAD-48-200800U	120V	20VDC 800mA	x	x

220/230 AC 50HZ EUROPEAN CONTINENTAL TYPE AC ADAPTOR TUV, VDE OR CE APPROVED

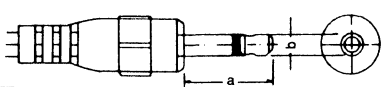
MODEL	INPUT	OUTPUT	TUV	VDE	CE
A40337GC	230V	3 VAC 3700mA		x	x
A40628GC	230V	6 VAC 2800mA		x	x
A40915GC	230V	9 VAC 1500mA		x	x
A40918GC	230V	9 VAC 1800mA		x	x
A40921GC	230V	9 VAC 2100mA		x	x
A41213GC	230V	12 VAC 1300mA		x	x
A41216GC	230V	12 VAC 1600mA		x	x
A41511GC	230V	15 VAC 1100mA		x	x
A41513GC	230V	15 VAC 1300mA		x	x
A41807GC	230V	18 VAC 700mA		x	x
A41809GC	230V	18 VAC 900mA		x	x
A41811GC	230V	18 VAC 1100mA		x	x
A42460GC	230V	24 VAC 600mA		x	x
A42480GC	230V	24 VAC 800mA		x	x
A42410GC	230V	24 VAC 1000mA		x	x
TE-61000V	230V	6 VDC 1000mA	x		x
TE-751000V	230V	7.5 VDC 1000mA	x		x
TE-90200V	230V	9 VDC 200mA	x		x
TE-12700V	230V	12 VDC 700mA	x		x
TE-1351000V	230V	13.5 VDC 1000mA	x		x
TE-14600V	230V	14 VDC 600mA	x		x
TE-14800V	230V	14 VDC 800mA	x		x
TE-15300V	230V	15 VDC 300mA	x		x
TE-16550V	230V	16 VDC 550mA	x		x
TE-16700V	230V	16 VDC 700mA	x		x
TE-18250V	230V	18 VDC 250mA	x		x
TE-20400V	230V	20 VDC 400mA	x		x
TE-22400V	230V	22 VDC 400mA	x		x
TE-22500V	230V	22 VDC 500mA	x		x
TE-24300V	230V	24 VDC 300mA	x		x
TE-24500V	230V	24 VDC 500mA	x		x

IN HOUSE PLUG-MOLD MACHINE

So we can supply the plug type specify directly from our California facility.

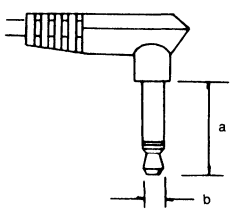
OUTPUT PLUG TYPES

OP-01/OP-02



TYPE	a	b
OP-01	0.453	0.098
	11.5	2.5
OP-02	0.571	0.138
	14.5	3.5

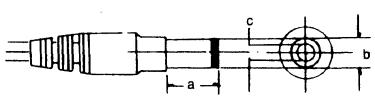
OP-03/OP-04



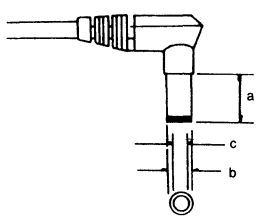
TYPE	a	b
OP-03	0.492	0.098
	12.5	2.5
OP-04	0.571	0.138
	14.5	3.5

OP-05/OP-06/OP-07-1/OP-07-2

TYPE	a	b	c
OP-05	0.472	0.197	0.079
	12.0	5.0	2.1
OP-06	0.472	0.197	0.098
	12.0	5.0	2.5
OP-07-1	0.472	0.217	0.098
	12.0	5.5	2.5
OP-07-2	12.0	5.5	2.1

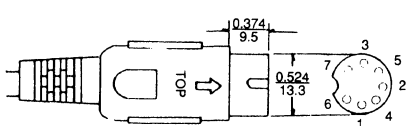


OP-08/OP-09



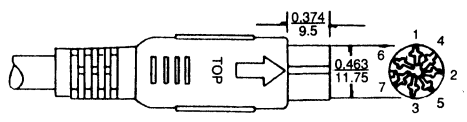
TYPE	a	b	c
OP-08	0.472	0.197	0.083
	12.0	5.0	2.1
OP-09	0.453	0.217	0.098
	12.0	5.5	2.5

OP-10/OP-11



TYPE	PRESENT PIN						
	1	2	3	4	5	6	7
OP-10	✔	✔	✔	✔	✔		
OP-11	✔	✔	✔				

OP-12

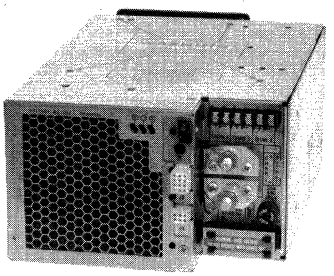


TYPE	PRESENT PIN						
	1	2	3	4	5	6	7
OP-12	✔	✔	✔	✔	✔		

PILLAR INDUSTRIES
1780 EVERGREEN STREET/DUARTE, CA 91010/TEL: 626-358-1337 • 800-887-9981/FAX: 626-358-0398

Pioneer Magnetics

Power up to the 21st century with PMI The world leader in high power switching supplies

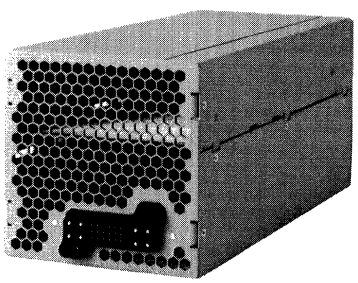


- More than 500,000 units in the field
- Over 500,000 hours MTBF
- Available with Pioneer's patented >.99 Power Factor Correction

The broadest line in the industry is now even broader.

Pioneer Magnetics, known for its wide line of switchers with both AC and DC inputs, from 500 to 6,000 watts, in single and multiple output configurations, has expanded its product offerings to include power supplies with eleven outputs.

You can now call on us for *all* of your power supply needs. Our experienced application engineers will be happy to discuss your power requirements and send you data sheets on the products which will best fit in your particular application.



PM3320B/3320BP

NEW! Highest Density PowerFactors™ PFC Isolated Front Ends

The perfect front end for driving high density DC/DC modules in distributed power systems.

- Up to 4500 watts
- >.99 Power Factor Corrected
- 24 and 48 volt versions
- Wireless current sharing
- Use in N+1 Fault Tolerant Systems
- Optional isolation diodes
- True Hot Pluggable Operation available
- Small 5"x5"x11" package

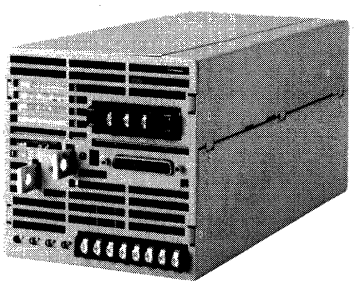
Call or write for Isolated Front End data sheets. PM3320B/3320BP

NEW! PowerFactors™ Line of PFC Logic Power Supplies

One to Eleven Output Power Supplies with adjustable outputs to meet your exact volt/amp requirements.

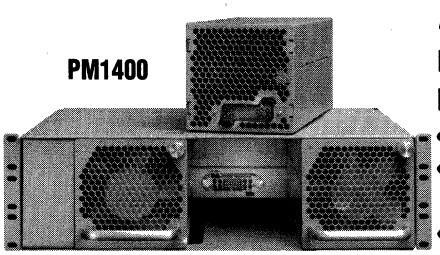
- 750-3000 watts
- 2 to 48 VDC outputs
- Optional isolation diodes
- Small Packaging
- >.99 Power Factor Corrected
- Use in N+1 Fault Tolerant Systems
- True Hot Pluggable Operation available
- Current Sharing

Call or write for Multiflex data sheets: PM3346/PM3386



PM3346/PM3386

PM1400



NEW! Flexible Rack Systems

For ease of power system integration in N+1 redundant, parallel, scalable or other multiple power supply configurations.

- True Hot Pluggable Systems
- For use with either isolated Front End or Multiple Output Power Supplies
- Parallel or Separate Inputs and Outputs

Call or write for Flexi-Rack data sheet: PM1400

Pioneer Magnetics
Number one in high power switching supplies.

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LINEAR ENCAPSULATED POWER MODULES 1.5Vdc - 250Vdc

See section 4025 pages D•2110-2115 for DC/DC converters.

FEATURES:

CONTACT FACTORY FOR NEW CATALOG

- **REGULATION LINE & LOAD 0.2% TO 0.02%**
- **P.C. CARD OR CHASSIS MOUNTING**
- **SHORT CIRCUIT PROTECTION**
- **SINGLE, DUAL, TRIPLE OUTPUTS**

SPECIFICATIONS:①

- **INPUT VOLTAGE AND FREQUENCY:** 105 TO 125 VAC-50-60HZ, 400 HZ Available
- **VOLTAGE OUTPUT TOLERANCE:** Factory set at ±1% (fixed)
- **TEMPERATURE COEFFICIENT:** 0.02%/°C typical
- **INPUT ISOLATION:** 50 Mohms
- **OPERATING TEMPERATURE:** -25°C to +71°C
- **STORAGE TEMPERATURE:** -25°C to 85°C

SINGLE VOLTAGE UNITS

OUTPUT VOLTAGE (Vdc)	OUTPUT CURRENT (mA)	REGULATION LINE	REGULATION LOAD	RIPPLE AND NOISE (mV RMS)	CASE STYLE	MODEL NUMBER	SLOW BLOW FUSE	PRICE 1-9 QTY.
5	200	0.20%	0.20%	1.0	G	P34-5SM	1/32A	$40.00
	500	0.20%	0.20%	0.5	A, 1AT	P37	1/16A	34.00
	500	0.02%	0.05%	0.5	A, 1AT	P37-1	1/16A	46.00
	1000	0.20%	0.20%	1.0	B, 1BT	P38	1/8A	55.00
	1000	0.02%	0.05%	1.0	B, 1BT	P38-1	1/8A	70.00
	1000	0.02%	0.05%	0.5	C, 1CT	P38/1.56	1/8A	73.00
	2000	0.02%	0.10%	1.0	C, 1CT	P39	1/4A	83.00
	3000	0.02%	0.15%	1.0	D, 1DT	P39-3	3/8A	104.00
10	120	0.10%	0.10%	1.0	E	P33-10SM	1/32A	55.00
	150	0.10%	0.10%	1.0	A, 1AT	P33-10S	1/16A	31.00
	250	0.10%	0.10%	1.0	B, 1BT	P34-10S	1/16A	45.00
	500	0.02%	0.05%	0.5	C, 1CT	P37-10S	1/8A	59.00
	1000	0.02%	0.05%	0.5	D, 1DT	P38-10S	3/8A	80.00
	1500	0.02%	0.05%	0.5	D, 1DT	P38-10SA	1/4A	95.00
12	100	0.10%	0.10%	1.0	E	P32-12SM	1/32A	55.00
	120	0.02%	0.10%	1.0	A, 1AT	P33-12S	1/16A	31.00
	200	0.10%	0.10%	1.0	B, 1BT	P34-12S	1/16A	44.00
	500	0.02%	0.10%	0.5	C, 1CT	P37-12S	2/10A	59.00
	1000	0.10%	0.10%	1.0	D, 1DT	P38-12S	3/10A	76.00
15	80	0.10%	0.10%	1.0	E	P33-15SM	1/32A	55.00
	120	0.02%	0.10%	1.0	A, 1AT	P33-15S	1/16A	29.00
	200	0.10%	0.10%	1.0	B, 1BT	P34-15S	1/10A	42.00
	300	0.10%	0.10%	1.0	C. 1CT	P35-15S	1/8A	60.00
	500	0.02%	0.10%	0.5	C, 1CT	P37-15S	2/10A	66.00
	800	0.02%	0.10%	1.0	D, 1DT	P38-15S	3/10A	76.00
18	50	0.10%	0.10%	1.0	E	P32-18SM	1/32A	55.00
	50	0.02%	0.05%	1.0	A, 1AT	P32-18S	1/32A	35.00
	100	0.02%	0.05%	1.0	B, 1BT	P33-18S	1/16A	38.00
24	50	0.10%	0.10%	1.0	E	P32-24SM	1/32A	55.00
	100	0.10%	0.10%	1.0	A, 1AT	P33-24S	1/16A	35.00
	200	0.10%	0.10%	1.0	B, 1BT	P34-24S	1/8A	55.00
	300	0.10%	0.10%	1.0	C, 1CT	P35-24S	2/10A	62.00
	500	0.10%	0.10%	1.0	D, 1DT	P37-24S	1/4A	76.00
	800	0.10%	0.10%	1.0	*H, 1HT	P38-24S	3/8A	100.00
	1000	0.10%	0.10%	1.0	*H, 1HT	P39-24S	1/2A	135.00
48	50	0.20%	0.20%	2.0	B, 1BT	P32-48S	1/16A	47.00
	100	0.20%	0.20%	2.0	B. 1BT	P33-48S	1/8A	59.00
	200	0.20%	0.20%	2.0	C, 1CT	P34-48S	1/4A	83.00
50	50	0.05%	0.20%	1.0	B, 1BT	P32-50S	1/16A	42.00
	100	0.05%	0.20%	2.0	B, 1BT	P33-50S	1/8A	55.00
	200	0.05%	0.20%	2.0	C, 1CT	P34-50S	1/4A	77.00
	300	0.20%	0.20%	3.0	D, 1DT	P35-50S	3/8A	83.00
75	35	0.05%	0.20%	2.0	B. 1BT	P32-75S	1/10A	46.00
	70	0.05%	0.20%	2.0	B. 1BT	P33-75S	2/10A	58.00
	150	0.05%	0.20%	2.0	C, 1CT	P34-75S	3/10A	80.00
	200	0.10%	0.20%	3.0	D, 1DT	P35-75S	3/8A	87.00
100	25	0.05%	0.20%	2.0	B, 1BT	P32-100S	1/16A	46.00
	50	0.05%	0.20%	2.0	B, 1BT	P33-100S	1/8A	58.00
	100	0.05%	0.20%	3.0	C. 1CT	P34-100S	1/4A	80.00
	150	0.10%	0.20%	3.0	D, 1DT	P35-100S	3/8A	87.00

① 115VAC, 50 to 400Hz. @ 25°c.

② CASE STYLE ENDING WITH THE LETTER "T" (CHASSIS MOUNTED UNITS WITH TERMINAL BARRIER STRIP) ARE DESIGNATED BY THE SUFFIX "T" CASE STYLES A,B,C,D,G, AND E (PC CARD MOUNTING) DO NOT REQUIRE SUFFIXING

③ **MOST COMPETITORS' PINOUTS AVAILABLE—CONTACT FACTORY**

④ FOR 400HZ, USE SUFFIX 04 AFTER MODEL NUMBER

FROM STOCK

"Manufacturer since 1969"

POLYTRON DEVICES, INC.
P.O. BOX 398, PATERSON, N.J. 07544 (973) 345-5885 **FAX: (973) 345-1264**
website: www.polytrondevices.com • e-mail: polytron@erols.com

LINEAR POWER MODULES (continued) ***CONTACT FACTORY FOR NEW CATALOG***

	OUTPUT VOLT. (Vdc)	OUTPUT CURRENT (mA)	REGULATION LINE	REGULATION LOAD	RIPPLE AND NOISE (mV RMS)	CASE ② STYLE ③	MODEL NUMBER	SLOW BLOW FUSE	PRICE 1-9 QTY.
SINGLE VOLTAGE UNITS (cont'd.)	150	17	0.05%	0.20%	2.0	A, 1AT	P32-150S	1/16A	$46.00
		35	0.05%	0.20%	3.0	B, 1BT	P33-150S	2/10A	58.00
		70	0.05%	0.20%	3.0	C, 1CT	P34-150S	1/4A	80.00
		100	0.10%	0.20%	3.0	D, 1DT	P35-150S	3/8A	87.00
	180	15	0.05%	0.20%	3.0	B, 1BT	P32-180S	1/16A	47.00
		30	0.05%	0.20%	3.0	B, 1BT	P33-180S	2/10A	59.00
		55	0.05%	0.20%	3.0	C, 1CT	P34-180S	1/4A	81.00
		80	0.10%	0.20%	3.0	D, 1DT	P35-180S	3/8A	88.00
	200	12	0.05%	0.20%	3.0	B, 1BT	P32-200S	1/16A	47.00
		25	0.05%	0.20%	3.0	B, 1BT	P33-200S	1/8A	59.00
		50	0.05%	0.20%	3.0	C, 1CT	P34-200S	1/4A	81.00
		75	0.10%	0.20%	3.0	D, 1DT	P35-200S	3/8A	88.00
	250	10	0.05%	0.20%	3.0	B, 1BT	P32-250S	1/16A	48.00
		20	0.05%	0.20%	3.0	B, 1BT	P33-250S	1/8A	60.00
		40	0.05%	0.20%	3.0	C, 1CT	P34-250S	1/4A	82.00
		60	0.10%	0.20%	3.0	D, 1DT	P35-250S	3/8A	90.00
DUAL VOLTAGE	± 5	±50	0.02%	0.02%	1.0	A, 2AT	P32-5	1/32A	35.00
		±100	0.10%	0.10%	1.0	A, 2AT	P33-5	1/32A	48.00
		±200	0.10%	0.10%	1.0	B, 2BT	P34-5	1/16A	57.00
		±300	0.02%	0.05%	0.5	C, 2CT	P35-5	1/10A	65.00
		±500	0.02%	0.05%	0.5	C, 2CT	P37-5	1/8A	73.00
		±1000	0.01%	0.10%	1.0	D. 2DT	P38-5	1/4A	94.00
	± 8	±500	0.10%	0.10%	1.0	D, 2DT	P37-8	2/10A	78.00
	± 10	±100	0.02%	0.05%	0.5	A, 2AT	P33-10	1/16A	45.00
	± 12	±25	0.10%	0.10%	2.0	G	P31-12M	1/32A	40.00
		±25	0.02%	0.05%	0.5	A, 2AT	P31-12	1/32A	26.00
		±50	0.02%	0.05%	0.5	A, 2AT	P32-12	1/32A	33.00
		±100	0.10%	0.10%	1.0	A, 2AT	P33-12	1/16A	45.00
		±200	0.10%	0.10%	1.0	B. 2BT	P34-12	1/8A	65.00
		±300	0.10%	0.10%	1.0	C, 2CT	P35-12	2/10A	76.00
		±500	0.10%	0.10%	1.0	D, 2DT	P37-12	3/10A	93.00
		±800	0.10%	0.10%	1.0	D, 2DT	P38-12	4/10A	115.00
	± 15	±25	0.10%	0.10%	2.0	G	P31-M	1/32A	40.00
		±25	0.20%	0.20%	1.0	A, 2AT	P31	1/32A	26.00
		±25	0.02%	0.02%	0.5	A, 2AT	P31-1	1/32A	29.00
		±50	0.20%	0.20%	1.0	A, 2AT	P32	1/16A	31.00
		±50	0.02%	0.02%	0.5	A, 2AT	P32-1	1/16A	41.00
		±100	0.20%	0.20%	1.0	A, 2AT	P33	1/10A	42.00
		±100	0.02%	0.02%	1.0	A, 2AT	P33-1	1/10A	47.00
		±200	0.20%	0.20%	1.0	B, 2BT	P34	2/10A	62.00
		±200	0.02%	0.05%	1.0	B. 2BT	P34-1	2/10A	75.00
		±350	0.20%	0.20%	1.0	C, 2CT	P35	1/4A	75.00
		±350	0.02%	0.05%	1.0	C, 2CT	P35-1	1/4A	86.00
		±500	0.10%	0.10%	1.0	D, 2DT	P37-15	3/8A	94.00
		±800	0.10%	0.10%	1.0	D, 2DT	P38-15	1/2A	120.00
	± 18	±50	0.10%	0.10%	1.0	A, 2AT	P32-18	1/16A	36.00
		±100	0.10%	0.10%	1.0	B, 2BT	P33-18	1/10A	50.00
	± 24	±50	0.10%	0.10%	1.0	B, 2BT	P32-24	1/16A	51.00
		±100	0.10%	0.20%	1.0	B, 2BT	P33-24	1/8A	76.00
		±200	0.10%	0.20%	1.0	C, 2CT	P34-24	1/4A	101.00
TRIPLE VOLTAGE	5/ ±12	250/±60	0.02%	0.10%	1.0	C, 3CT	P51-12	1/10A	57.00
		250/±120	0.02%	0.10%	1.0	C, 3CT	P52-12	1/10A	73.00
		300/±180	0.02%	0.10%	1.0	C, 3CT	P53-12L	2/10A	80.00
		500/±120	0.02%	0.10%	1.0	C, 3CT	P53-12	2/10A	80.00
		1000/±150	0.02%	0.10%	1.0	D, 3DT	P53-1280	1/4A	103.00
	5/ ±15	250/±50	0.02%	0.10%	1.0	C, 3CT	P51-15	1/10A	58.00
		250/±100	0.02%	0.10%	1.0	C, 3CT	P52-15	1/10A	75.00
		300/±150	0.02%	0.10%	1.0	C. 3CT	P53-15L	2/10A	81.00
		500/±100	0.02%	0.10%	1.0	C, 3CT	P53-15	2/10A	81.00
		1000/±150	0.02%	0.10%	1.0	D, 3DT	P53-1580	1/4A	109.00

② CASE STYLE ENDING WITH THE LETTER "T" (CHASSIS MOUNTED UNITS WITH TERMINAL BARRIER STRIP) ARE DESIGNATED BY THE SUFFIX "T" CASE STYLES A,B,C,D,G, AND E (PC CARD MOUNTING) DO NOT REQUIRE SUFFIXING

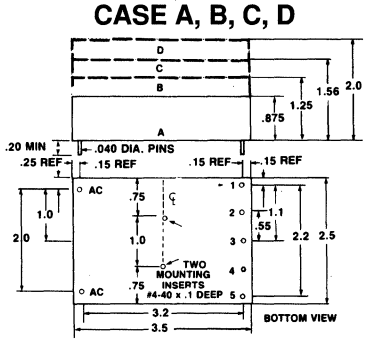
	SINGLE AND DUAL UNITS	TRIPLE OUTPUT UNITS
1	-Vdc*	COM (5)
2	NO PIN	+5 Vdc
3	COM*	-12/-15
4	NO PIN	COM (12/15)
5	+VDC	+12/+15

* -VDC Internally connected to COM for single output units. All dimensions are inches.

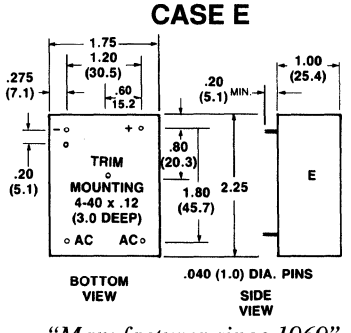
OPTIONS AVAILABLE	SUFFIX	PRICE ADDER
220VAC	X	5.00
240VAC	XE	5.00
100VAC	Q	10.00
115/220	AX	15.00
Alternate Pin-Out	22	NONE
Chassis mounting with terminal barrier strip (case styles ending with letter ("T")	T	10.00

ALSO AVAILABLE:
Switching Power Modules-Encapsulated
Up to 30W
AC or DC Input (90-130 VAC)
*** Universal Input Available**
Overvoltage and Short Circuit Protected
High Performance EMI Filter
Single, Dual & Triple Output
Linear Post Regulators
Contact Factory For Details

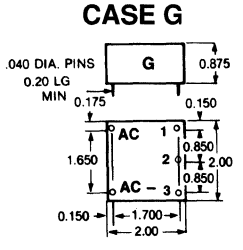
CASE A, B, C, D



CASE E



CASE G



P34-5SM: ① + 5VDC② and ③ COM
P31-M + P31-12M: ① – 15VDC ② COM ③ + 15VDC

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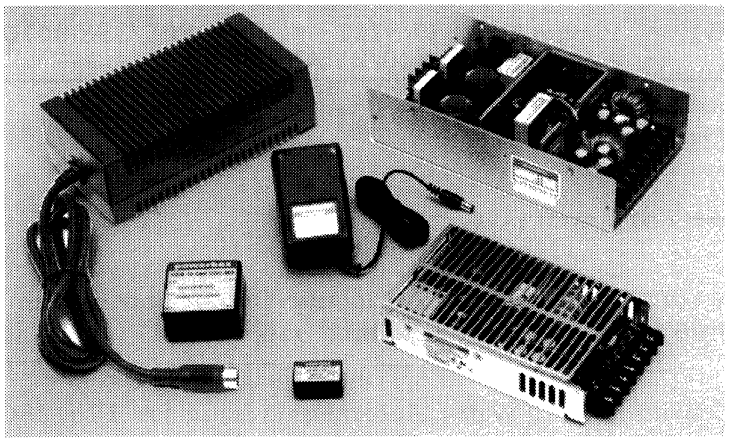
AC/DC SWITCHED MODE



The Powerbox range of AC/DC switching power supplies includes encapsulated, externals (desktop and wall mount), open frame, eurostandard, enclosed, lab supplies and UPS.

Product Selection

Encapsulated/Modular
- Input Voltage: nominal 115 or 230VAC, 90 - 260VAC
- Output Voltage: *Single:* 5, 9, 12, 15, 24, and 48
  Multiple: various, including: ±5, ±12, ±15; 5&±12, 5&±15
- Output Power: various from 5W to 25W
- Isolation: 1,500VAC typical. 3,000VAC options

External/Desktop/Wall Mount, regulated & unregulated
- Input Voltage: nominal 115 or 230VAC, 90 - 260VAC
- Output Voltage: *Single:* nearly anything from 2 - 48V, AC or DC
  Multiple: various, including: ±5, ±12, ±15; 5&±12, 5&±15
- Output Power: various from 2W to 130W
- Isolation: 1,500VAC typical. 3,000VAC options.
- Nearly any country type plug or I/O connectors available

Open Frame/Enclosed
- Input Voltage: nominal 115 or 230VAC, 85 - 264VAC
- Power Factor Corrected options
- Output Voltage: *Single:* 3.3, 5, 12, 15, 24, 28 and 48 VDC
  Multiple: various including: ±5, ±12, ±15; 5&±12, 5&±15
  Powerflex: nearly any output from 2.1 to 48VDC on any of 1 - 4 outputs from 50 - 250W total.
- Modular: up to 10 outputs and up to 2,000W
- Output Power: various from 10W to 5,000W
- Isolation: 1,500VAC typical. 3,000VAC options.

Plug-In/Cassette (including VME and Compact PCI)
- Input Voltage: nominal 115 or 230VAC, 85 - 264VAC
- Output Voltage: *Single:* various from: 2.1, to 300 VDC
  Multiple: ±5, ±12, ±15, ±24; 5&±12, 5&±15 and quads
- Output Power: various from 30W to 2,500W
- Redundant and N+1 options & configurations.
- Isolation: 1,500VAC typical. 3,000 VAC options

***Laboratory** and **Stand By** power supplies also available. Call for information.*

FEATURES
- Excellent price/performance ratio
- US, Canada & World-Wide approvals
- High reliability
- 1 year warranty
- Various package options

APPLICATIONS
- Telecommunications
- Medical Instruments (many have IEC601 & UL2601 approvals)
- Computer & Peripherals
- Industrial products
- Robotics

SERVICES & SUPPORT
- Standard Off-The-Shelf Products
- Modified Standard Products
- Custom Design Products
- Value Added Assemblies
- Powerbox World-Wide Support

See our other products in EEM:
Vol. D, Section 4025,
DC/DC Power Supplies &
Vol. C, Section 1400,
Enclosures, Instrument Cases

powerbox - the most viable & cost effective power supply solutions in the world.

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Toll free: (800) 444 1461 E-Mail: info.us@powerbox.se www.powerbox.se

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Call Toll Free: 800/215-7808

Product Overview

DC/DC Products:
Industry standard packages from 1 to 30 watts of output power.

Linear Products:
Industry standard packages with strappable 100/120/230/240 VAC inputs. Output power from 7 Watts through 288 Watts. Regulation (±0.05%); up to 4 fully regulated outputs.

MAP Series™ Products:
High power density power supplies from 30 Watts to 140 Watts. Autoranging input for 115/230 VAC operation. Single, Triple and Quad output models.

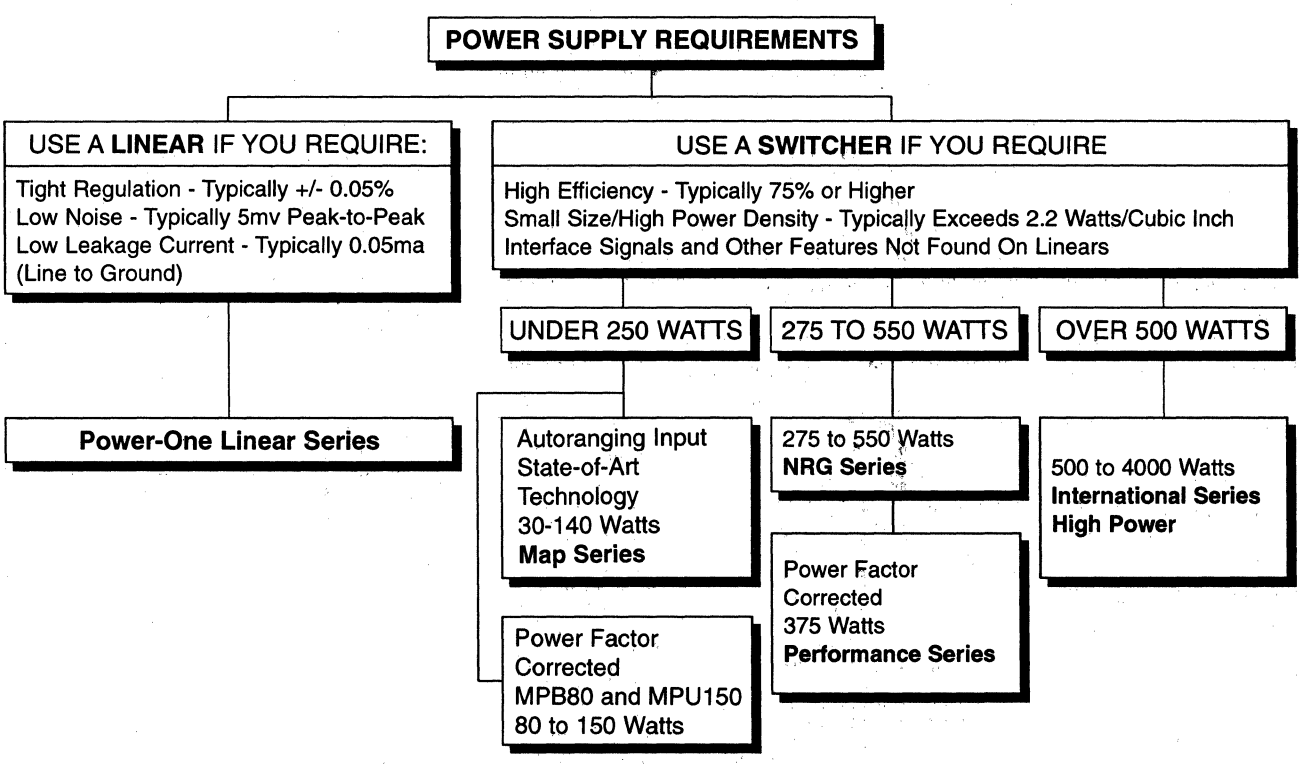
New MPB80 and MPU150 Series
Power Factor Corrected 80 and 150 Watt products

NRG Series™ Products:
Autoranging, mid-power products in modular and non-modular configurations. Non-modular output power from 275 to 350 Watts. Modular output power from 350 to 550 Watts.

PerFormanCe™ Power:
Power Factor Corrected, wide range input 375 Watt switching power supplies. Available in single, triple and quad output configurations.

International Series High Power:
Modular high power switching supplies from 500 Watts through 4000 Watts. Optional Power Factor Correction and Battery Backup.

Product Selector Guide



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Call Toll Free: 800/215-7808

Linear Power Supplies

SPECIFICATIONS

AC Input: 100/120/220/240 VAC +10% -13%. 47-63 Hz. Tolerance for 230 VAC operation is +15%, -10%. Derate output current 10% for 50 Hz operation.

DC Output: See Voltage/Current Rating Chart. Adjustment range ±5% minimum.

Line Regulation: ±.05% for a 10% line change.

Load Regulation: ±.05% for a 50% load change.

Output Ripple: 5V through 15V models: 5.0 mV PK-PK maximum; 24V and 28V models: 0.2% PK-PK maximum.

Transient Response: 50µ seconds for a 50% load change.

Short Circuit and Overload Protection: Automatic current limit/foldback.

Overvoltage Protection: Provided on 5V outputs where indicated. Set at 6.2V ±0.4V. Call factory for optional overvoltage protectors OVP-12 and OVP-24.

Stability: ±0.3% for 24 hours after warm-up.

Temperature Rating: 0°C to 50°C full-rated, derated linearly to 40% at 70°C.

Temperature Coefficient: .01%/°C typical, .03%/°C maximum.

Efficiency: (typical)
- 5V outputs: 45%
- 12V and 15V outputs: 55%
- 24V and 28V outputs: 60%

Vibration: Random vibration from 10 Hz to 2 KHz.

Shock: Operating 20G peak acceleration.

EMI/RFI: These linear power supplies have inherently low conducted and radiated noise levels. For most system applications they will meet the requirements of FCC 47CFR15J and EN55022

Safety Agencies: UL, CSA, TUV, CE marked

VOLTAGE/CURRENT RATING CHARTS

SINGLE OUTPUT MODELS

Model	Voltage/ Current
5 VOLTS	
HA5-1.5/OVP-A*	5V @ 1.5A
HB5-3/OVP-A*	5V @ 3A
HC5-6/OVP-A*	5V @ 6A
HN5-9/OVP-A*	5V @ 9A
HD5-12/OVP-A*	5V @ 12A
HE5-18/OVP-A*	5V @ 18A
F5-25/OVP-A*	5V @ 25A
G5-35/OVP-A*	5V @ 35A
CP197-A*	5V @ 50A
12 VOLTS	
HA15-0.9-A	12V @ 0.9A
HB12-1.7-A	12V @ 1.7A
HC12-3.4-A	12V @ 3.4A
HN12-5.1-A	12V @ 5.1A
HD12-6.8-A	12V @ 6.8A
HE12-10.2-A	12V @ 10.2A
F15-15-A	12V @ 16A
15 VOLTS	
HA15-0.9-A	15V @ 0.9A
HB15-1.5-A	15V @ 1.5A
HC15-3-A	15V @ 3A
HN15-4.5-A	15V @ 4.5A
HD15-6-A	15V @ 6A
HE15-9-A	15V @ 9A
F15-15-A	15V @ 15A
24 VOLTS	
HA24-0.5-A	24V @ 0.5A
HB24-1.2-A	24V @ 1.2A
HC24-2.4-A	24V @ 2.4A
HN24-3.6-A	24V @ 3.6A
HD24-4.8-A	24V @ 4.8A
HE24-7.2-A	24V @ 7.2A
F24-12-A	24V @ 12A
28VOLTS	
HA24-0.5-A	28V @ 0.5A
HB28-1-A	28V @ 1A
HC28-2-A	28V @ 2A
HN28-3-A	28V @ 3A
HD28-4-A	28V @ 4A
HE28-6-A	28V @ 6A
F24-12-A	28V @ 10A
48VOLTS	
HB48-0.5-A	48V @ 0.5A
HC48-1-A	48V @ 1A
HD48-3-A	48V @ 3A
HE48-4-A	48V @ 4A
120 VOLTS	
HB120-0.2-A	120V @ 0.2A
180/200 VOLTS	
HB200-0.12-A	175-210V @ 0.12A
250 VOLTS	
HB250-0.1-A	250V @ 0.1A

*INCLUDES OVERVOLTAGE PROTECTION.

DUAL OUTPUT MODELS

Model	Output #1	Output #2
± 5 VOLTS		
HAA5-1.5/OVP-A	5V @ 1.5A*	-5V @ 1.5A*
HBB5-3/OVP-A	5V @ 3A*	-5V @ 3A*
HCC5-6/OVP-A	5V @ 6A*	-5V @ 6A*
± 12 TO 15 VOLTS		
HAD12-0.4-A	12V @ 0.4A	-12V @ 0.4A
HAD15-0.4-A	15V @ 0.4A	-15V @ 0.4A
HAA15-0.8-A	12V @ 1A OR 15V @ 0.8A	-12V @ 1A OR -15V @ 0.8A OR -5V @ 0.4A
HBB15-1.5-A	12V @ 1.7A OR 15V @ 1.5A	-12V @ 1.7A OR -15V @ 1.5A OR -5V @ 0.7A
HCC15-3-A	12V @ 3.4A OR 15V @ 3A	-12V @ 3.4A OR -15V @ 3A
HDD15-5-A	12V TO 15V @ 5A	(-) 12V TO 15V @5A
5 VOLTS AND 12 TO 15 VOLTS (Isolated Outputs)		
HAA512-A	5V @ 2A*	12 TO 15V @ 0.5A
HBB512-A	5V @ 3A*	12 TO 15V @ 1.25A
HCC512-A	5V @ 6A*	12 TO 15V @ 2.5A
±18 TO 24 VOLTS		
HAA24-0.6-A	18-20V @ 0.4A OR 24V @ 0.6A	(-)18-20V @ 0.4A OR -24V @ 0.6A
HBB24-1.2-A	18-20V @ 0.9A OR 24V @ 1.2A	(-)18-20V @ 0.9A OR -24V @ 1.2A
HCC24-2.4-A	18-20V @ 1.8A OR 24V @ 2.4A	(-)18-20V @ 1.8A OR -24V @ 2.4A

TRIPLE OUTPUT MODELS

Model	Output #1	Output #2	Output #3
HTAA-16W-A	5V @ 2A*	9 TO 15V @ 0.4A	(-)9 TO 15V @ 0.4A OR -5V @ 0.4A
HBAA-40W-A	5V @ 3A*	12V @ 1A OR 15V @ 0.8A	-12V @ 1A OR -15V @ 0.8A OR -5V @ 0.4A
HCAA-60W-A	5V @ 6A*	12 TO 15V @ 1A	(-)12 TO 15V @ 1A OR -5V @ 0.4A
HCBB-75W-A	5V @ 6A*	12V @ 1.7A OR 15V @ 1.5A	-12V @ 1.7A OR -15V @ 1.5A OR -5V @ 0.7A
CP131-A	5V @ 8A*	12V @ 1.7A OR 15V @ 1.5A	-12V @ 1.7A OR -15V @ 1.5A OR -5V @ 0.7A
HDBB-105W-A	5V @ 12A*	12V @ 1.7A OR 15V @ 1.5A	-12V @ 1.7A OR -15V @ 1.5A OR -5V @ 0.7A
HDCC-150W-A	5V @ 12A*	12V @ 3.4A OR 15V @ 3A	-12V @ 3.4A OR -15V @ 3A

HIGH PEAK CURRENT MODELS

Model	Output #1	Output #2	Output #3	Output #4
CP205-A	5V @ 1A*	-5V @ 0.5A*	24V @ 1.5A / 1.7A PK	
CP510-A	5V @ 6A*	12V @ 2.5A / 7.5A PK		
CP323-A	5V @ 2A*	12VDC @ 4A		
CP498-A	5V @ 6A*	12V @ 5A / 10A PK	-12V @ 0.5A OR -5V @ 0.25A	
CP379-A	5V @ 6A*	-5V @1.2A OR -12V @ 1.2A	24V @ 3.5A / 8A PK	
CP503-A	5V @ 6A*	12V @ 1.2A	-12V @ 0.8A	24V @ 2.5A / 4A PK

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MAP Series
30 to 140 Watts

SINGLE OUTPUT MAP SERIES PRODUCTS
SINGLE OUTPUT MODELS

Output Voltage	Current (Amps)			Size	Model
	Continuous	Forced Air (200 LFM)	Peak		
5	6	8	12	See Note 1	MAP30-1005*
5	8	N/A	11	See Note 2	MAP40-1005‡‡
5	8	11	12	See Note 1	MAP42-1005*
5	16	N/A	18	See Note 3	MAP80-1005
5	16	22	22	See Note 4	MAP110-1005*
5	26	N/A	30	See Note 5	MAP130-1005*
12/15	3.4/2.7	4.6/3.7	5	See Note 1	MAP42-1012*
12/15	5/4	N/A	5.8/4.7	See Note 2	MAP55-1012‡
12/15	7.5/6	N/A	9.2/7.3	See Note 3	MAP80-1012‡
12/15	7.5/6	10/8	10/8	See Note 4	MAP110-1012‡*
12/15	12/10	N/A	13.8/11	See Note 5	MAP130-1012‡
12/15	9.2/7.3	12.5/10	**12.5/10	See Note 4	MAP140-1012‡*
24/28	1.7/1.45	2.3/1.9	2.5	See Note 1	MAP42-1024†*
24/28	2.5/2.2	N/A	3/2.5	See Note 2	MAP55-1024†
24/28	3.8/3.2	N/A	4.6/3.9	See Note 3	MAP80-1024†
24/28	3.8/3.2	5/4.3	5/4.3	See Note 4	MAP110-1024†*
24/28	6.2/5.4	N/A	6.8/5.9	See Note 5	MAP130-1024†
24/28	4.6/4	6.3/5.4	**6.3/5.4	See Note 4	MAP140-1024†

*Unit Has Remote Sense Feature
‡‡U-Channel Chassis
‡Adjustable From 11.25V To 15.75V
†Adjustable From 23V To 29V
**300 Watts Peak Rating for 10mSec

Note 1: Board Only. 3.00 X 5.00 X 1.16
Note 2: U Channel Chassis. 3.27 X 6.00 X 1.60
Note 3: U Channel Chassis. 4.20 X 7.20 X 1.80
Note 4: Board Only. 4.25 X 7.00 X 1.80. With Optional L-Bracket and Cover: 4.50 X 7.19 X 2.40
Note 5: U Channel Chassis. 4.50 X 8.50 X 2.00

MULTIPLE OUTPUT MAP SERIES PRODUCTS
MAP SERIES, MULTIPLE OUTPUTS

Watts	Output 1	Output 2	Output 3	Output 4	Size	Model
40	+5V@3A/5Apk	+12V@2.0A/3.5Apk	-12@0.3A/0.5Apk	–	See Note 1	MAP40-3000
40	+5V@3A/5Apk	+15V@1.5A/3.0Apk	-15V@0.2A	–	See Note 1	MAP40-3003
40	+5V@3A/5Apk	+12V@2.0A/3.5Apk	-12@0.3A/0.5Apk	–	See Note 1	MAP40-3100
40	+5V@3A/5Apk	+24V@1A/1.5Apk	-12V@0.3A/0.5Apk		See Note 1	MAP40-3101
40	+5V@3A/5Apk	+12V@2A/3.0Apk	-5V@0.5A	–	See Note 1	MAP40-3105
40	+5V@5A/6Apk	+12V@1.0A/3.5Apk	-12V@0.5A/1.0Apk	–	See Note 1	MAP40-3500
55	+5V@6A	+12V@3A/4Apk	-5V@0.5A	-12V@0.5A	See Note 2	MAP55-4000
55	+5V@6A	+24V@1.5A/2.5Apk	-12V@0.5A	+12V@0.5A	See Note 2	MAP55-4001
55	+5V@6A	+12V@3A/4Apk	-12V@0.5A	+12V@0.5A	See Note 2	MAP55-4002
55	+5V@6A	+15V@2.5A/3.5Apk	-5V@0.5A	-15V@0.5A	See Note 2	MAP55-4003
55	+5V@6A	+24V@1.5A/2.5Apk	-15V@0.5A	+15V@0.5A	See Note 2	MAP55-4004

Note 1: Board Only. 3.00 X 5.00
Note 2: U Channel Chassis. 3.27 X 6.00 X 1.60
Note 3: U Channel Chassis. 4.20 X 7.20 X 1.8
Note 4: Board Only. 4.25 X 7.00 X 1.80. With Optional L-Bracket and Cover: 4.50 X 7.19 X 2.4
Note 5: U Channel Chassis. 4.50 X 8.50 X 2.0

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MAP Series

Multiple Output Switch-Mode Models

VOLTAGE/CURRENT RATING CHARTS (cont.)
MAP SERIES, MULTIPLE OUTPUTS

Watts	Output 1	Output 2	Output 3	Output 4	Size	Model
80	+5V@14A	+12V@4A/7Apk	-5V@1A	-12V@1A	See Note 3	MAP80-4000
80	+5V@14A	+24V@2A/3.5Apk	-12V@1A	+12V@1A	See Note 3	MAP80-4001
80	+5V@14A	+12V@4A/7Apk	-12V@1A	+12V@1A	See Note 3	MAP80-4002
80	+5V@14A	+15V@3.5A/6Apk	-5V@1A	-15V@1A	See Note 3	MAP80-4003
80	+5V@14A	+24V@2A/3.5Apk	-15V@1A	+15V@1A	See Note 3	MAP80-4004
80	+5V@14A	+12V@4A/7Apk	-5V@1A	-12V@3A	See Note 3	MAP80-4010
80	+5V@14A	+12V@4A/7Apk	-12V@1A	-5V@3A	See Note 3	MAP80-4020
110*	+5V@12A/20Apk	+12V@5A/9Apk	-12V@1A	-5V@1A	See Note 4	MAP110-4000
110*	+5V@12A/20Ak	+24V@3A/4Apk	-12V@1A	+12V@1A	See Note 4	MAP110-4001
110*	+5V@12A/20Apk	+12V@5A/9Apk	-12V@1A	+12V@1A	See Note 4	MAP110-4002
110*	+5V@12A/20Ak	+15V@5A/9Apk	-15V@1A	-5V@1A	See Note 4	MAP110-4003
110*	+5V@12A/20Apk	+24V@3A/4Apk	-15V@1A	+15V@1A	See Note 4	MAP110-4004
110*	+5V@12A/20Ak	+12V@3A/9Apk	-5V@1A	-12V@3A/4Apk	See Note 4	MAP110-4010
110*	+5V@12A/20Apk	+12V@5A/9Apk	-12V@1A/1.5Apk	+24V@1A/1.5Apk	See Note 4	MAP110-4011
110*	+5V@12A/20Apk	+12V@5A/9Apk	-15V@1A/1.5Apk	+15V@1A/1.5Apk	See Note 4	MAP110-4015
110*	+12V@5A/9Apk	+24V@4A	-12V@1A	+5v@2A	See Note 4	MAP110-4200
110*	+3.3V@15A/20Apk	+5V@8A/12Apk	-12V@1A	+12V@1A	See Note 4	MAP110-4300
130	+5V@20A	+12V@5A/10Apk	-5V@1A	-12V@1A	See Note 5	MAP130-4000
130	+5V@20A	+24V@3.5A/5Apk	-12V@1A	+12V@1A	See Note 5	MAP130-4001
130	+5V@20A	+12V@5A/10Apk	-12V@1A	+12V@1A	See Note 5	MAP130-4002
130	+5V@20A	+15V@4A/8Apk	-5V@1A	-15V@1A	See Note 5	MAP130-4003
130	+5V@20A	+24V@3.5A/5Apk	-15V@1A	+15V@1A	See Note 5	MAP130-4004
130	+5V@20A	+12V@5A/10Apk	-5V@1A	-12V@3A	See Note 5	MAP130-4010
130	+5V@20A	+12V@5A/10Apk	-12V@1A	-5V@3A	See Note 5	MAP130-4020
140**	+5V@16A/20Apk	+12V@4A/9Apk	-12V@1A/1.5Apk		See Note 4	MAP140-3000P

*110 Watts With 200 LFM Airflow, 80 Watts Convection Cooled
**140 Watts with 200 LFM Airflow, 110 Watts Convection Cooled
Note 1: Board Only. 3.00 X 5.00 X 1.16
Note 2: U Channel Chassis. 3.27 X 6.00 X 1.60
Note 3: U Channel Chassis. 4.20 X 7.20 X 1.80
Note 4: Board Only. 4.25 X 7.00 X 1.80. With Optional L-Bracket and Cover: 4.50 X 7.19 X 2.40
Note 5: U Channel Chassis. 4.50 X 8.50 X 2.00

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Call Toll Free: 800/215-7808

MPB80 - 80 WATTS WITH PFC

Call Power-One for Complete Specifications

FEATURES

- POWER FACTOR CORRECTION MEETS EN61000-3-2
- LOW PROFILE FITS 1U HEIGHT CONSTRAINTS
- HIGH 3.3V AND 5V CURRENT CAPABILITIES AVAILABLE
- CE MARKED TO THE LVD
- AUTORANGING AC INPUT, 85-264VAC
- OVERVOLTAGE PROTECTION ON THE MAIN OUTPUT
- ISOLATED V3 CAN BE USED AS A PLUS OR MINUS OUTPUT

The MPB80 provides a combination of standard features not usually found in this power range. The low profile package fits in 1U height constraints. In addition to UL, CSA, and TUV, regulatory agency compliances include the CE Marking, and harmonic correction compliance to EN61000-3-2. This multiple output product line features a floating third output that can be used as either a plus(+) or a minus(-) output.

65 WATTS CONVECTION COOLED, 80 WATTS WITH 300 LFM FORCED AIR ISOLATED V3 CAN BE USED AS A PLUS OR MINUS OUTPUT

MODEL	OUTPUT VOLTAGE	ADJUST. RANGE	CONVECTION COOLED CURRENT	FORCED AIR CURRENT
MPB80-2000	+5V	5.0V-5.5V	11A	15A
	+12V	N/A	1A	1A
MPB80-3000	+5V	5.0V-5.5V	7A/9.5A PK	8.5A
	+12V	N/A	2.5A/3.5A PK	3A
	12V	N/A	0.65A/1A PK	1A
MPB80-3300	+3.3V	3.0V-3.5A	7A/9.5A PK	8.5A
	+5V	N/A	2.5A/3.0A PK	5A
	12V	N/A	0.4/1A PK	0.65A

NOTES
1. Maximum peak to peak noise, bandwidth limited to 20 Mhz
2. Voltage level adjustable ±5%, factory adjusted to ±1% of nominal

MPU150 - 150 WATTS WITH PFC

Call Power-One for Complete Specifications

FEATURES

- ACTIVE POWER FACTOR CORRECTION MEETS EN61000-3-2
- LOW PROFILE HEIGHT FITS 1U HEIGHT CONSTRAINTS
- DUAL MAIN OUTPUTS PROVIDE 3.3V AND 5V FOR MIXED LOGIC APPLICATIONS.
- SINGLE-WIRE CURRENT SHARING ON OUTPUTS #1 AND #2
- REMOTE SENSE ON OUTPUTS #1 AND #2
- OVER TEMPERATURE, OVERLOAD, AND OVERVOLTAGE PROTECTION
- CE MARKED TO THE LVD
- AUTORANGING AC INPUT, 85-264VAC
- ISOLATED V3 AND V4 CAN BE USED AS PLUS OR MINUS OUTPUTS

The MPU150 is the first product in this power range incorporating PFC in a low profile package that meets 1U height constraints. The MPU150-3300 and the MPU150-4530 provide high current +3.3V and +5V together on a single platform to support mixed-mode, high-speed digital circuitry. All models feature remote sense on V1 and V2 to provide independent compensation of power cable losses.

Power-One's unique dual-converter architecture combines high reliability, achieved through reduced component stresses, with exceptional regulation. Other standard features include CE Marking, current sharing on V1 and V2, thermal shutdown, and remote inhibit. Additionally, only 300 Linear Feet per Minute (LFM) airflow is required to deliver a power density of 3.0 watts per cubic inch.

150 WATTS WITH 300 LFM FORCED AIR COOLING

MODEL	OUTPUT VOLTAGE	ADJUST. RANGE	OUTPUT CURRENT
MPU150-3300	+3.3V	3.15V-3.54V	35A
	+5V	N/A	20A
	12V	N/A	2A
MPU150-4000	+5.1V	5.0V-5.5V	30A
	+12V	N/A	8A
	12V	N/A	3A
	5V	N/A	2A
MPU150-4530	+5.1V	5.0V-5.5V	30A
	+3.3V	3.15V-3.45V	15A
	12V	N/A	3A(NOTE 4)
	12V	N/A	3A(NOTE 4)

NOTES
1. Maximum peak to peak noise, bandwidth limited to 20 Mhz
2. Voltage level adjustable ±5%, factory adjusted to ±1% of nominal
3. Peak ratings for 60 second maximum duration up to a 10% duty cycle
4. Total current between Output #3 and Output #4 should not exceed 5A.

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NRG Non-Modular Series

FEATURES

- AUTORANGING INPUT
- FULLY REGULATED OUTPUTS
- UL1950 AND EN60950 APPROVED
- MAIN OUTPUT REMOTE SENSE
- FAN OPTION - ADD "F" SUFFIX
- FCC 47CFR15J, EN55022

NRG275 AND NRG350

WATTS	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	MODEL
275	+5V@3.5-25A	+12V@10A/16A pk	12V@6A	–	NRG275-3000
275	+5V@3.5-25A	+12V@10A/16A pk	12V@6A	5V@2A	NRG275-4000
275	+5V@3.5-25A	+12V@10A/16A pk	12V@6A	12V@2A	NRG275-4001
275	+5V@3.5-25A	+12V@10A/16A pk	12V@6A	24V@2A	NRG275-4002
275	+5V@3.5-25A	+12V@10A/16A pk	12V@6A	48V@1A	NRG275-4003
350	+5V@3.5-35A	+12V@10A/16A pk	12V@6A	–	NRG350-3000
350	+5V@3.5-35A	+12V@10A/16A pk	48V@6A	–	NRG350-3003
350	+5V@3.5-35A	+12V@10A/16A pk	12V@6A	5V@3A	NRG350-4000
350	+5V@3.5-35A	+12V@10A/16A pk	12V@6A	12V@3A	NRG350-4001
350	+5V@3.5-35A	+12V@10A/16A pk	12V@6A	24V@3A	NRG350-4002
350	+5V@3.5-35A	+12V@10A/16A pk	12V@6A	48V@1A	NRG350-4003
350	+24V@1-10A	+5V@10A/16A pk	12V@4A	12V@4A	NRG350-4200
350	+24V@1-10A	+5V@10A/16A pk	15V@4A	15V@4A	NRG350-4201

Notes: 300 LFM Forced Air Required Unless Fan Option is Selected
Overall Size Without Fan Option Is 9.00 X 5.00 X 2.50 Inches
Overall Size With Fan Option is 10.50 X 5.00 X 2.50 Inches

All NRG non-modular products are non-stocked standards. Call Power-One for availability.

PerFormanCe Series

FEATURES

- WIDE RANGE INPUT
- SINGLE, TRIPLE, AND QUAD OUTPUT, MODELS
- POWER FACTOR CORRECTION MEETS EN60555-2
- FCC 47CFR15J, EN55022
- FAN OPTION - ADD "F" SUFFIX
- CE MARKING
- MAIN OUTPUT REMOTE SENSE
- FULLY REGULATED OUTPUTS
- .98 POWER FACTOR CORRECTION
- UL1950, CSA 22.2 #950, AND EN60950 APPROVED

PerFormanCe Power

WATTS	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	MODEL
200	5V@40A	–	–	–	PFC375-1005
360	12V@30A	–	–	–	PFC375-1012
360	15V@24A	–	–	–	PFC375-1015
360	24V@15A	–	–	–	PFC375-1024
400	48V@8.3A	–	–	–	PFC375-1048
375	+5V@3.5-40A	+12V@10A/16A pk	12V@6A	–	PFC375-3000
375	+5V@3.5-40A	+15V@10A/16A pk	15V@6A	–	PFC375-3001
375	+5V@3.5-40A	+12V@10A/16A pk	5V@6A	–	PFC375-3002
375	+5V@40A	+15V@10A/16A pk	24V@6A	–	PFC375-3004
375	+5V@3.5-40A	+12V@10A/16A pk	12V@6A	5V@3A	PFC375-4000
375	+5V@3.5-40A	+12V@10A/16A pk	12V@6A	12V@3A	PFC375-4001
375	+5V@3.5-40A	+12V@10A/16A pk	12V@6A	24V@3A	PFC375-4002
375	+5V@3.5-40A	+12V@10A/16A pk	15V@4A	15V@4A	PFC375-4004
375	+5V@3.5-40A	+12V@10A/16A pk	24V@4A	24V@2A	PFC375-4005
375	+24V@1-10A	+5V@10A/16A pk	12V@4A	12V@4A	PFC375-4200
375	+24V@1-10A	+5V@10A/16A pk	15V@4A	15V@4A	PFC375-4201

Notes: 300 LFM Forced Air Required Unless Fan Option is Selected
Overall Size Without Fan Option is 9.00 X 5.00 X 2.50 Inches
Overall Size With Fan Option is 10.50 X 5.00 X 2.50 Inches

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NRG Modular Series

350 TO 550 WATT MODULAR NRG SELECTION AND CONFIGURATION

1. Choose a chassis based on the required wattage. NRG3: 350 Watts, NRG4: 450 Watts, NRG5: 550 Watts.
2. Choose the output modules from the list on the following page. A minimum and maximum of one main module must be specified.
3. For standard products, auxiliary modules are configured in a descending power rating. Auxiliary module #1 should have the highest power rating.
4. Decide on the options. Standard options are listed on the next page. Please consult the factory for special requirements such as logic option boards.
5. Isolated outputs are provided on standard products. Consult factory for other interconnect options.
6. Need connector option when ordering any combination that includes dual output modules. Consult factory for proper option.
7. When using a C9 module, Aux. #1 and #2 can only be C9 or K0. A C9 cannot be used in the Aux. #3 position.

CONSULT THE FACTORY FOR ADDITIONAL CONFIGURATION INFORMATION.

MODULE SELECTOR GUIDE

DC OUTPUT MODULE SELECTOR GUIDE; NRG3, NRG4, AND NRG5				
NOMINAL VOLTAGE	MAXIMUM CURRENT	OUTPUT POWER	PART	
VDC	ADC	WATTS @ 50°C	NUMBER	LOCATION
SINGLE OUTPUT MODULES				
2	10	20	F1	AUX.
3.3	10	33	H1	AUX.
5	4	20	A4	AUX.
5	8	40	A8	AUX.
5	10	50	A1	AUX.
5	35	175	A35	MAIN
5	50	250	A50	MAIN
5	70	350	A70	MAIN
12	4	48	B4	AUX.
12	10	120	B1	AUX.
12	30	360	B30	MAIN
13.5	10	135	BA	AUX.
15	4	60	C4	AUX.
15	9	135	C9	AUX.
15	24	360	C24	MAIN
24	4	96	D4	AUX.
24	7	168	D7	AUX.
24	15	360	D15	MAIN
5 to 12	5	25-60	V5	AUX.
12 to 24	3	36-72	W3	AUX.
28	13	364	E13	MAIN
DUAL OUTPUT MODULES; fully isolated, can be referenced as plus or minus				
5/5	1/1	10	A2	AUX.
12/12	1/1	24	B2	AUX.
15/15	1/1	30	C2	AUX.
24/5	1/.5	26	D2	AUX.
12/12	2/1	–	N2	AUX.

Example outputs selected: 5V @ 70A, 12V @ 10A, 12V @ 4A, with fan option.

SERIES **MODULES** **OPTION CODE(S)**

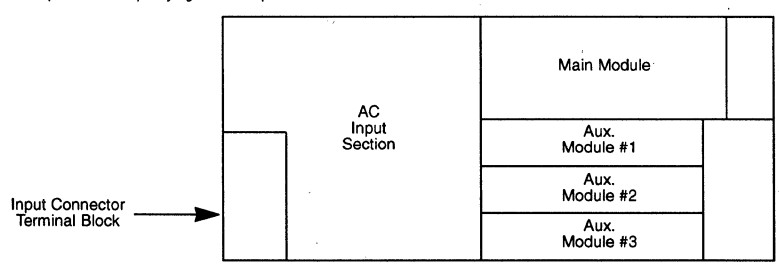
N R G 4 A 7 0 B 1 B 4 K 0 F

Main Module | Aux Module #1 | Aux Module #2 | Aux Module #3

NRG3: 350 Watts Max.
NRG4: 450 Watts Max.
NRG5: 550 Watts Max.

NOTE: The standard terminal block output connector is replaced with a 14-PIN Molex (Part #26-60-4140) when dual output modules are specified. Please consult factory for connector options when specifying a dual output module.

F - Fan. Add "F" to part number suffix.
AA - Special output connection or interface logic. (A = any alpha letter assigned by Power-One).
SXXX - Modified standard model. (X = any number assigned by Power-One). Needs safety resubmittal.
V"X" - Molex connector option. Must be used for auxiliary outputs when dual output modules are used. See page 38 for details.



Physical location of Modules in the Chassis
Top View

OVERALL SIZE

WITHOUT FAN
10.5" X 5" X 2.5"

WITH FAN
12" X 5" X 2.5"

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- VIBRATION TESTED AT 6GRMS, 3 AXIS, 10HZ TO 2000HZ.
- TWO YEAR WARRANTY
- MODULAR CONSTRUCTION; OVER 10 MILLION CONFIGURATIONS AVAILABLE
- UP TO 21 OUTPUTS PER POWER SUPPLY FROM 1.5 TO 48VDC.
- PARALLELABLE OUTPUTS WITH CURRENT SHARING
- SYSTEM INHIBIT AND INDIVIDUAL MODULE OUTPUT INHIBIT CAPABILITY
- BATTERY BACK-UP OPTION AVAILABLE ON SELECTED CHASSIS
- ALL OUTPUTS FULLY REGULATED AND ISOLATED
- .99 PFC MEETS EN60555 ON HPF/SPF MODELS
- EN60950, UL1950, CSA22.2-950
- CE Marked to LVD 73/23/EEC
- NO MINIMUM LOADS REQUIRED ON MOST OUTPUTS

OVER 75 SINGLE, DUAL, AND TRIPLE OUTPUT MODULES AVAILABLE FROM 1.5 TO 48VDC. CALL POWER-ONE TECHNICAL SUPPORT FOR A CHASSIS/MODULE CONFIGURATION TO MEET YOUR POWER REQUIREMENTS

PRODUCT OVERVIEW

CHASSIS SERIES	SPF3	SPF6	HPF3	HPF5	SPM2	SPM3	SPM5	HPM5	HPM7	RPM5
OUTPUT POWER AND POWER FACTOR										
.99 PFC to meet EN 60555	Yes	YES	YES	YES	N/A	N/A	N/A	N/A	N/A	N/A
Max output wattage at high range line input	1350	1500	2000	2000	500	1000	1500	2000	2500	4000
Max output wattage at low range line input*	1000	1300	1500	1500	500	1000	1500	N/A	N/A	N/A
INPUT VOLTAGE SPECIFICATIONS**										
High range VAC input	160-264	160-264	160-264	160-264	175-264	175-264	175-264	180-264	180-264	180-264
Low range VAC input	85-159	85-159	85-159	85-159	90-132	90-132	90-132	N/A	N/A	N/A
VAC input selection	Autorange	Autorange	Autorange	Autorange	Manual	Manual	Manual	N/A	N/A	N/A
VAC input phases	single	single	single	single	single	single	single	single	single	three
OUTPUT MODULE SPECIFICATIONS										
Max# of outputs	9	18	9	15	6	9	15	15	21	15
# of module slots	3	6	3	5	2	3	5	5	7	5
Battery back-up power rating, Watts	N/A	1000	N/A	consult factory	N/A	N/A	100o	N/A	N/A	N/A
MECHANICAL SPECIFICATIONS										
Chassis size H x W x L, inches	5 x 5.5 x 12.5	5 x 11 x 11	5 x 5.5 x 12.5	5 x 8 x 11	5 x 3 x 11	5 x 5.5 x 11	5 x 8 x 11	5 x 8 x 11	5 x 11 x 13	5 x 8 x 15
Chassis size H x W x L, millimeters	127 x 140 x 318	127 x 280 x 280	127 x 140 x 318	127 x 203 x 280	127 x 76 x 280	127 x 140 x 280	127 x 203 x 280	127 x 203 x 280	127 x 280 x 330	127 x 203 x 381
INPUT TRANSIENT PROTECTION SPECIFICATIONS										
ESD IMMUNITY EN61000-4-2	Level 4 15kV/8kV	Level 4 15kV/8kV	Level 4 15kV/8kV	Level 4 15kV/8kV	Consult Factory	Level 4 15kV/8kV	Level 4 15kV/8kV	Level 4 15kV/8kV	Level 4 15kV/8kV	Level 4 15kV/8kV
RF Susceptibility EN61000-4-3	Level 3 10V/m	Level 3 10V/m	Level 3 10V/m	Level 3 10V/m	Consult Factory	Level 3 10V/m	Level 3 10V/m	Level 3 10V/m	Level 3 10V/m	Level 3 10V/m
Fast Transient/Burst EN61000-4-4	Level 3 ±2kV	Level 3 ±2kV	Level 3 ±2kV	Level 3 ±2kV	Consult Factory	Level 3 ±2kV	Level 3 ±2kV	Level 3 ±2kV	Level 3 ±2kV	Level 3 ±2kV
Surge Immunity EN61000-4-5(Line-Line)	Level 4 2kV	Level 4 2kV	Level 4 2kV	Level 4 2kV	Consult Factory	Level 4 2kV	Level 4 2kV	Level 4 2kV	Level 4 2kV	Level 4 2kV
Surge Immunity EN61000-4-5(line-GND)	Level 4 4kV	Level 3 2kV	Level 4 4kV	Level 4 4kV	Consult Factory	Level 4 4kV	Level 4 4kV	Level 4 4kV	Level 4 4kV	Level 4 4kV

* Maximum wattage above 100VAC input for SPF/HPF ** Autorange input denotes continuous operation from 85 to 264 VAC

THE POWER SOLUTION™

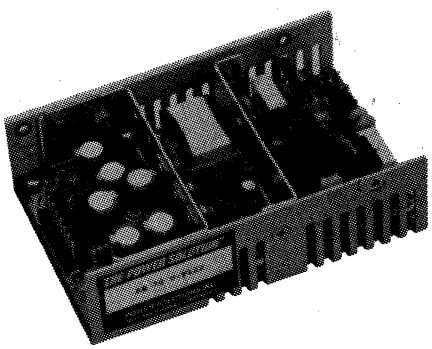
EASYMOD® and MINIMOD® SWITCHERS

Power Solutions really means "IF WHAT YOU SEE IS WHAT YOU DON'T WANT, IT CAN EASILY BE CHANGED." The **EASYMOD** and **MINIMOD** families of low and medium power (presently to 350 watts) switching power supplies have been designed with two precepts; (1) the laws of physics are immutable, and (2) the satisfaction of customer requirements and needs is paramount.
A host of modifications, only some of which are listed below, can and will be performed on products for customer programs requiring as few as 100 units per year. These mods are available at nominal premium (if any), normally without non-recurring engineering costs (although a one time documentation fee may be incurred), and usually **with all safety agency approvals in place** (some DC input models currently in approval process). This minimizes both product development cost and new product time to market. Effectively, **MINIMODS** and **EASYMODS** allow small program requirements the luxury of costly custom power supply designs.
World-wide safety agency approvals to UL 1950, CSA 22.2, IEC 601, EN 60950, plus UL 544, UL 2601 and IEC 601 for Medical and Dental applications, BABT, ISO 9000 certification, Universal 85-264 VAC input as well as exact replications of all AC input models available with DC input plus Bellcore TR-NWT-000078 compliance make these power supplies ideal for use in *any application around the globe.*

AVAILABLE MODIFICATIONS

- **Unique Output Combinations from 3 to >48 volts**
- Power Fail /Power Good Signals
- **Enable / Inhibit**
- Low Output Ripple and Noise
- **Extended Temperature Operating Range**
- Unique Connectors
- **2 : 1 Range DC Inputs @ 12, 24 or 48 VDC**
- 3 : 1 & 4 : 1 Range DC Inputs
- **BABT Factory Approval**
- Customized Input/Output Harnesses
- **Isolated Outputs**
- Cover & Fan Assembly
- **-40°C Start-Up**
- Remote Sense
- **Medical Approvals -- Most Models**
- Unique Sheet Metal

EASYMOD® AD 50 WATT - AE 70 WATT - AM 100 WATT FAMILY



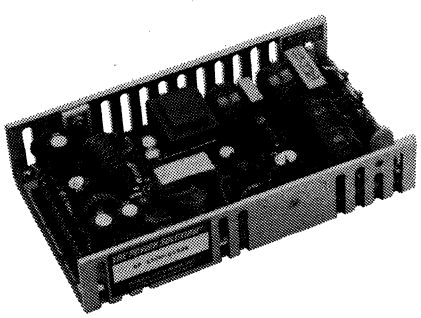
AD= 3" x 5" x 1.2" as PC CARD
AE= 3.2" 5" x 1.5" AM= 3.3" x 5" x 1.5"

AVAILABLE STEADY STATE CURRENT[1] @ 50°C AMBIENT

	MULTIPLE OUTPUT [2]				SINGLE OUTPUT			
MODELS	V1	V2	V3	V4	5V	12V	15V	24V
AD - 050 [3]	5A	2A	1A	1A	6A	3.3A	2.6A	1.6A
50 WATT [4]	8A	4A	2.5A	4A	10A	4.2A	3.3A	2.0A
AE - 070 [5]	--	--	--	--	--		---	--
70 WATT [4]	10A	5A	3A	4A	10A	5.0A	4.3A	2.7A
AM - 100 [3]	10A	4A	2A	2A	10A	6.5A	5.3A	3.0A
100 WATT [4]	15A	6A	3A	3A	15A	8.0A	6.4A	4.0A

(1)...Higher current available
(2)...Full Power Out: V2-V4 with minimal 5V loading--Option.
(3)...Convection cooling.
(4)...Forced air cooling.

EASYMOD® AF 150 WATT SERIES



AVAILABLE STEADY STATE CURRENT @ 50°C AMBIENT

OUTPUT	VOLTAGE[1]	MINIMUM[2]	MAXIMUM[3]	MAXIMUM[4]	PEAK[4,5]
V1	3.3 to 48[7] V V	3 A	18 A	25 A	30 A
V2	2.0 to 48[8] V	0 A	1.0 A	2.0 A	2.5 A
V3	2.0 to 48[8] V	0 A	1.0 A	2.0 A	2.5 A
V4	2.0 to 48[8] V	0 A	4.0 A	8.0 A	10 A

(1)...Full Power out on V2-V4 with minimal V1 loading--Option
(2)...20% Minimum Load for stated regulation
(3)...Convection cooling
(4)...30 CFM forced air cooling
(5)...30 sec. Duration
(7)...Specify 0.1V increments
(8)...Specify 0.75V increments
(9)....6.8" x 3.8" x 1.5"

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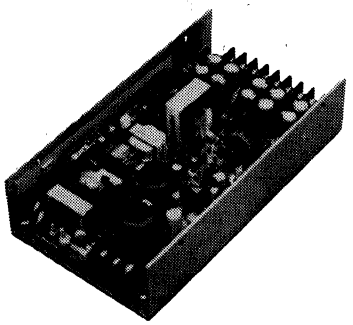
EASYMOD® AG 250 WATT SERIES

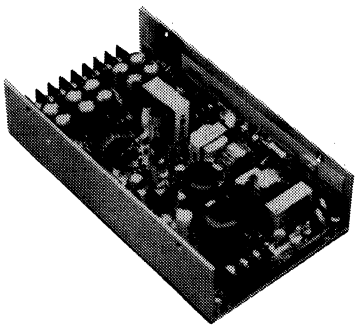


AVAILABLE STEADY STATE CURRENT @ 50°C AMBIENT

OUTPUT	OUTPUT[1]	MINIMUM[2]	MAXIMUM[3]	MAXIMUM[4]	PEAK[4,5]
V1	3.3 to 48[7] V	6 A	25 A	40 A	40 A
V2	2.0 to 48[8] V	0 A	2 A	3.5 A	
V3	2.0 to 48[8] V	0 A	3.5 A	3.5 A	
V4	2.0 to 48[8] V	0 A	8 A	12 A	15 A

(1)...Full P out on V2-V4 with minimal V1 loading--Option
(2)...20% Minimum Load for stated regulation
(3)...Convection cooling
(4)...30 CFM forced air cooling
(5)...30 seconds maximum duration
(7)...Specify 0.1V increments
(8)...Specify 0.75V increments
(9)... 8" x 4.5" x 2"

EASYMOD® AG 300 WATT SERIES

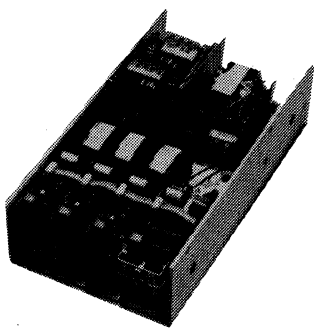


AVAILABLE STEADY STATE CURRENT @ 50°C AMBIENT

OUTPUT	OUTPUT[1]	MINIMUM[2]	MAXIMUM[3]	MAXIMUM[4]	PEAK[4,5]
V1	3.3 to 48[7] V V	6	25	50	60
V2	2.0 to 48[8] V	0	15	20	25

(1)...Full P out on V2-V4 with minimal V1 loading-Option
(2)...20% Minimum Load for stated regulation
(3)...Convection Cooling
(4)...30 CFM forced air cooling
(5)...30 sec maximum duration
(7)...Specify 0.1V increments
(8)...Specify 0.75V increments
(9)... 8" x 4.5" x 2"

EASYMOD® AN 350 WATT SERIES

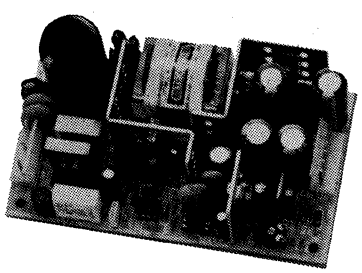


AVAILABLE STEADY STATE CURRENT @ 50°C AMBIENT

OUTPUT	VOLTAGE	MINIMUM	MAXIMUM	PEAK[3]
V1	0.5A	0.5A	60A	60A
V2	2.0 to 48VDC[2]	0.5A	20A	25A
V3	2.0 to 48VDC[2]	0.5A	20A	25A
V4	2.0 to 48VDC[2]	0.5A	20A	25A

(1)...Forced air cooling... 55CFM required
(3)...30 seconds maximum duration
(2)...Specify: 0.1V increments
(4)...Most output combinations: 2 to >48 Volts

MINIMOD® AK 40 WATT & AL 65 WATT FAMILY



AVAILABLE STEADY STATE CURRENT[1] @ 50°C AMBIENT

	MULTIPLE OUTPUT			SINGLE OUTPUT				
MODELS	V1	V2	V3	5V	12V	15V	24V	48V
AK -040A[3] Min	0.6A	0.2A	0.0A	0.8A	0.4A	0.3A	0.2A	0.1A
40 WATT Max	6.0A	2.0A	1.2A	8.0A	3.3A	2.6A	1.6A	0.8A
AL - 065[4] Min	0.1A	0.2A	0.2A	1.0A	0.6A	0.5A	0.3A	0.2A
65 WATT Max	10A	3.0A	2.2A	13A	5.4A	4.3A	2.7A	1.3A

(1)...Higher Current Options available
(3)...Convection cooling
(5)...3" x 5" x 1" high
(2)...Full Power Out: V2-V3 with <10% V1 loading
(4)...Forced Air cooling-----20 CFM Required
(6)...Peak Currents: Imax +20% for 30 seconds duration

POWER Solutions INC.
The Six Sigma Company™

POWER SOLUTIONS INC.
4699 North Federal Highway
Pompano Beach, FL 33064 ❖ USA
Voice: 954 - 943 - 4110 ❖ Fax: 954 - 943 - 6068

THE POWER SOLUTION™

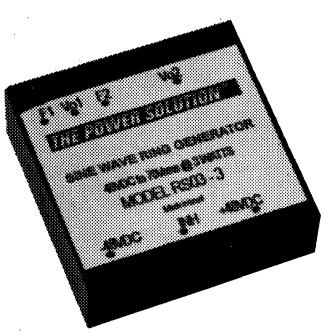
FONMOD® HIGH REN RING GENERATORS
1 TO 30 WATTS SINE WAVE DC/AC INVERTERS

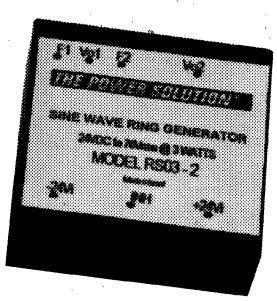
The **FONMOD®** family of 1, 3, 10 and 30 watt SINE WAVE OUTPUT and 5 watt SQUARE WAVE, HIGH REN CAPACITY RING GENERATORS has all the features required for trouble-free and continuous ringing of multi-phone systems world-wide.

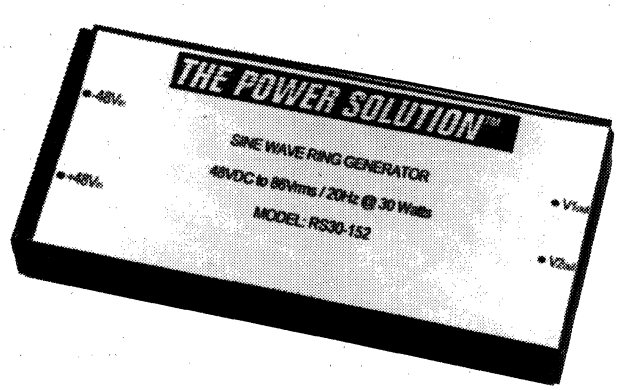
- *Surface Mount Construction*
- *Short Circuit Protection*
- *Input Over Voltage Protection*
- *UL 1950: EN 60 950: IEC 950*
- *Unique Power Limit Operation*
- *External Frequency Control*
- *External Inhibit Control*
- *Output Overload Protection*
- *Internal EMI Filtration*
- *Low Total Harmonic Distortion*
- *Soft Transition Turn-On/Off*
- *External Output Voltage Control*

MODEL	POWER WATTS	REN CAPACITY	WAVE FORM	OUTPUT VOLTAGE AC RMS	FREQUENCY Hz	FOOTPRINT L x W x H INCHES
RS 01	1[A]	3	SINE	50	17, 20, 25	1.16 x 1.16 x .49
RS 03	3[B]	8	SINE	70	17, 20, 25	1.53 x 1.53 x .55
RQ 05	5	5	SQUARE	86	17, 20, 25	1.3 x 1.3 x .5
RS 10	10	20	SINE	65 - 86[D]	17, THRU 25[D]	5.4x 2.5 x .75
RS 10A	10	20	SINE	65 - 86[C]	17, THRU 25[C]	5.4x 2.5 x .75
RS 30	30	50	SINE	65 - 86[D]	17, THRU 25[D]	5.4x 2.5 x .75
RS 30A	30	50	SINE	65 - 86[C]	17, THRU 25[C]	5.4x 2.5 x .75

(A)...1.3 watts peak @ 50% duty cycle
(B)...4 watts peak @ 50% duty cycle
(C)...Externally adjustable through the range
(D)...Factory preset through the range







POWER Solutions inc.
The Six Sigma Company™

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Voice: 954-943-4110 ◆ Fax: 954-943-6068
E-mail: sales@powersolutions.com
Visit us on the web @ www.powersolutions.com

DESKMOD® EXTERNAL SWITCHERS

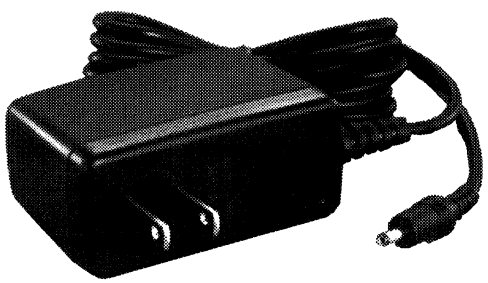
2 TO 100 WATTS

The **DESKMOD®** family of 2 watt through 100 watt external (DESK TOP and WALL PLUG) switching power supplies has been designed and engineered to provide the maximum freedom of choice for the end user. Wall Plug models are available in single and dual output versions while desk top models have from 1 to 4 outputs depending on power level.
World-wide safety agency approvals to UL 1950, CSA 22.2, IEC 601, EN 60950, plus UL 544, UL 2601 and IEC 601 for Medical and Dental applications, ISO 9000 factory certification, and Universal 85-264 VAC input as well as exact replication of all AC input models available with DC input plus CISPR 22 compliance (CE) make these power supplies ideal for use in any application around the globe.

AVAILABLE MODIFICATIONS

- ***Unique Output Combinations from 3.3 to >48 volts***
- ***-40°C Start Up***
- ***Customized Output Harnesses***
- ***2 : 1 Range DC Input @ 12, 24 or 48 VDC***

DESKMOD WP 02 - 15 WALL PLUG FAMILY[1]



2.87" x 1.33" x 2" Wall Plug

Maximum Output Current (amps) @ Voltage[2]

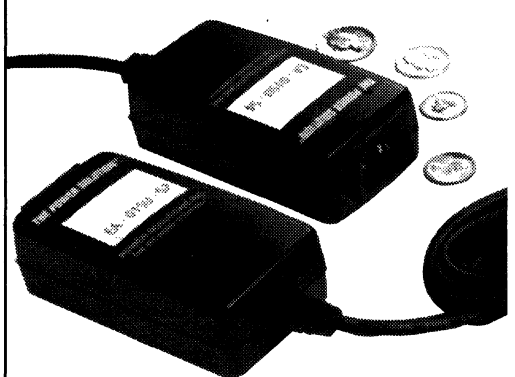
MODEL	5V	6V	7.5V	9V	10V	12V	13.5V	15V
WP - 03	0.5	0.5	0.4	03	–	–	–	–
WP - 05	1	0.8	0.6	0.5	0.5	–	–	–
WP - 07	1.5	1.2	1	0.8	0.7	0.5	0.5	0.5
WP - 10	2	1.5	1.3	1	1	0.8	0.7	0.7
WP - 12	2.2	2	1.6	1.2	1.2	1	0.8	0.8
WP - 15	3	2.5	2	1.6	1.5	1.2	1	1

(1)...100 - 120 VAC or Universal 90-264 VAC input versions available
(2)...Output voltages from 3.3 to 48+ Volts available
(3)...UL, CSA, TUV certified; FCC Class B; VDE Class B; "CE"

DESKMOD EA 10 -100 DESK TOP FAMILY

Maximum[1] Output Current (amps) @ 40°C

POWER	OUTPUT[2] V1	OUTPUT[2] V2	OUTPUT[2] V3	OUTPUT[2] V4	SIZE L x W x H (in.)
10 watt	2	0.5	–	–	4 x 2.1 x 1.26
15 watt	3	0.7	0.4	–	4 x 2.1 x 1.26
20 watt	4	1	0.5	–	4.3 x 2.3 x 1.3
30 watt	6	2	0.8	–	4.3 x 2.3 x 1.3
40 watt	8	2	1.2	–	5.2 x 2.7 x 1.6
50 watt	8	4	2.5	4	5.2 x 2.7 x 1.6
100 watt	20	6	3	4	7 x 3.6 x 2



(1)...Peak currents approximately 20% higher; 30 seconds maximum duration
(2)...Any output voltage from 3.3 to 48 VDC available
(3)...UL, CSA, TUV certified; FCC Class B; VDE Class B; "CE"

POWER Solutions INC.
The Six Sigma Company™

POWER SOLUTIONS INC.
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PSC

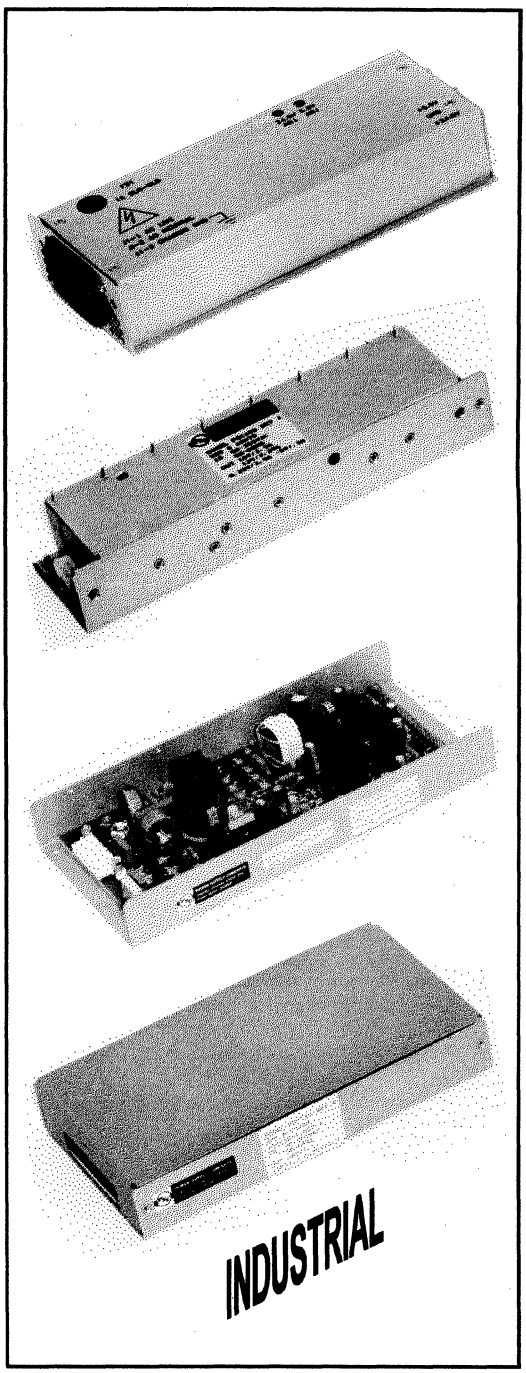
CUSTOM INDUSTRIAL AND MILITARY POWER SUPPLIES

CUSTOM

DOES ***NOT*** HAVE TO MEAN EXPENSIVE

WE OFFER *COMPETITIVE PRICING* AT LOW AND MEDIUM VOLUMES

OVER 1500 MODIFIABLE DESIGNS IN HOUSE



OUR SERVICES:-

POWER SUPPLY DESIGN & MANUFACTURE

FOR INDUSTRIAL & MILITARY APPLICATIONS.

VALUE ADDED POWER PRODUCTS

TYPICAL FEATURES:-

A.C. AND D.C. INPUTS AND OUTPUTS

POWER FACTOR CORRECTION

VOLTAGE AND CURRENT SOURCES

MIL STANDARD WORKMANSHIP AND INSPECTION

POWER SUPPLY CONCEPTS INC.

840 JUPITER PARK DRIVE, UNITS 103-104,

JUPITER ,FL., 33458-8947

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PSC

CUSTOM INDUSTRIAL AND MILITARY POWER SUPPLIES

PRODUCT RANGE:-

MAXIMUM OUTPUT:-

10,000 VOLTS—200 AMPS—5KW—20 OUTPUTS

MAXIMUM INPUT:-

800V D.C.——500V A.C. SINGLE OR THREE PHASE

CAPABILITY:-

A.C. AND D.C. INPUTS ON ONE SUPPLY

REMOTE SENSE

REMOTE ON-OFF

COMPLETE OUTPUT PROTECTION

TEMPERATURE MONITORING AND SHUTDOWN

BYTE INFORMATION

ULTRA LOW NOISE HYBRID DESIGNS

LATEST SAFETY AND EMI STANDARDS

MIL STANDARD DESIGNS

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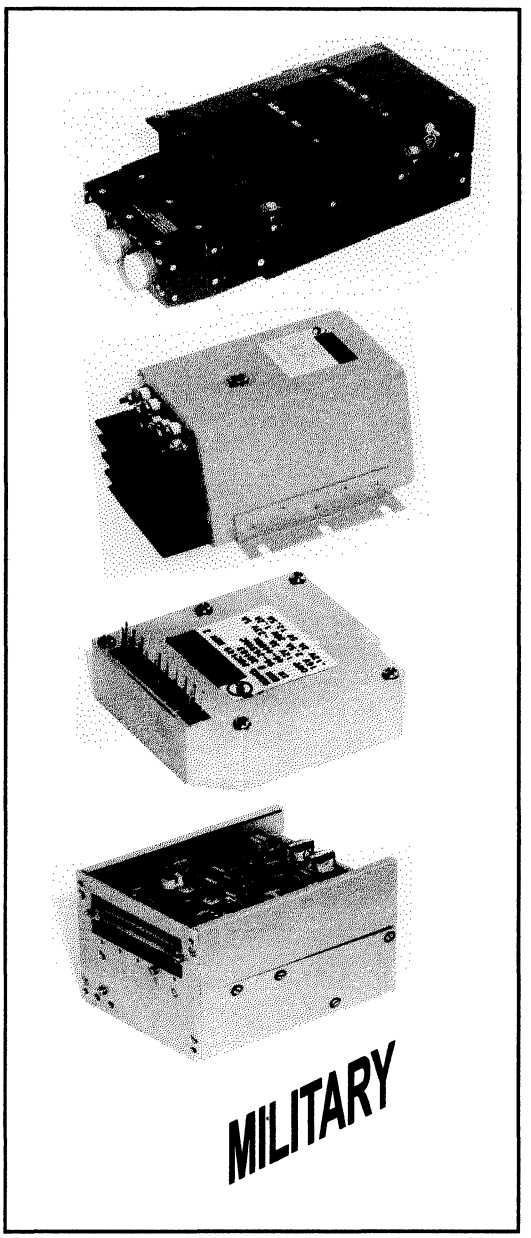

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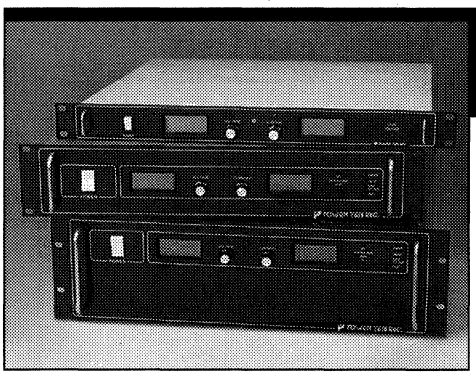
POWER TEN INC.



Single Output Models

PROGRAMMABLE POWER SUPPLIES
HIGH POWER • 600W TO 30KW

Single Phase

3300 Series...600W & 1,000W • 1 3/4" H • < 15lbs.

P62 Series...2,000W & 3,000W • 3 1/2" H • < 45lbs.

5-Year Warranty
Made in USA

Three Phase

P63 Series...3,300W, 6,600W & 10,000W • 5 1/4" H • < 80lbs.

D3 Series...6,600W(Total), • 5 1/4" H • < 60lbs.

P86 Series...20,000W, 25,000W & 30,000W • 10 1/2" H • < 160lbs.

Power Ten power supplies are your best choice for high-power applications that demand high reliability and efficiency—in the smallest size and for the lowest price!

- 10-turn voltage and current control.
- Adjustable overvoltage protection.
- LCD voltmeter and ammeter.
- Remote sensing and programming.
- Remote on/off and output current/voltage monitor.
- High Efficiency, 80-85% typical.
- Power factor correction on 3,000W models.
- Optional IEEE-488.2 programming.

- ***Regulation (line/load):*** 0.1% of rated output, voltage & current.
- ***Transient Response:*** Recovery from 30% step load within 2% of setting within 10 ms.
- ***Stability:*** ±0.05% of setting after 8 hour warm up.
- ***Temperature Coefficient:*** 0.02% of rated output voltage/°C. 0.03% of rated output current /°C.
- ***Operating Temperature:*** 0 to +50°C, no derating.
- **Cooling:** Internal blower.

Agency Approvals: UL, CE, CSA available.

	3300		3300		P62B		P62B		P63C		P63C		P63C	
	600 W		1,000 W		2,000 W		3,000 W		3,300 W		6,600 W		10,000 W	
V-Out	Amps	Ripple*	Amps	Ripple*	Amps	Ripple	Amps	Ripple	Amps	Ripple	Amps	Ripple	Amps	Ripple
5					325	50 mV	450	50 mV	500	50 mV	1,000	50 mV	1,500	50 mV
8	75	30 mV	125	30 mV	250	50 mV	350	50 mV	400	50 mV	800	50 mV	1,200	50 mV
10	60	30 mV	100	30 mV	200	50 mV	300	50 mV	330	50 mV	660	50 mV	1,000	50 mV
15					130	50 mV	200	50 mV	220	50 mV	440	50 mV	660	50 mV
20	30	30 mV	50	30 mV	100	75 mV	150	75 mV	166	75 mV	330	75 mV	500	75 mV
30	20	30 mV	33	30 mV	66	75 mV	100	75 mV	110	75 mV	220	75 mV	330	75 mV
40	15	30 mV	25	30 mV	50	75 mV	75	75 mV	83	75 mV	166	75 mV	250	75 mV
50	12	30 mV	20	30 mV	40	75 mV	60	75 mV	66	75 mV	133	75 mV	200	75 mV
60	10	30 mV	16	30 mV	33	75 mV	50	75 mV	55	75 mV	110	75 mV	166	75 mV
80	6	50 mV	12	50 mV	25	100 mV	37	100 mV	40	100 mV	83	100 mV	125	100 mV
100			10	50 mV	20	125 mV	30	125 mV	33	125 mV	66	125 mV	100	125 mV
120			8	50 mV	16	135 mV	25	135 mV	27	135 mV	55	135 mV	83	135 mV
150			7	50 mV	13	150 mV	20	150 mV	22	150 mV	44	150 mV	66	150 mV
200					10	175 mV	15	175 mV	16	175 mV	33	175 mV	50	175 mV
250					8	200 mV	12	200 mV	13	200 mV	26	200 mV	40	200 mV
300					6.6	200 mV	10	200 mV	11	200 mV	22	200 mV	33	200 mV
400					5	225 mV	7.5	225 mV	8	225 mV	16	225 mV	25	225 mV
Input**					190-253 V, 1 Phase				190-253 V, 3 Phase					
Size					3.5 x 19 x 18, <45 lbs.				5.25 x 19 x 22, <80 lbs.					

* RMS ripple and Additional output voltage and current combinations available. Consult factory.
** Optional input voltage available. Consult factory.

- **Excellent Reliability**
- **High Efficiency, Typically 80-85%**
- **5 Year Warranty**
- **Power Factor Correction on 3kW Models**

POWER TEN INC.

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POWER TEN INC.

PROGRAMMABLE POWER SUPPLIES
HIGH POWER • 600W TO 30KW

5-Year Warranty
Made in USA

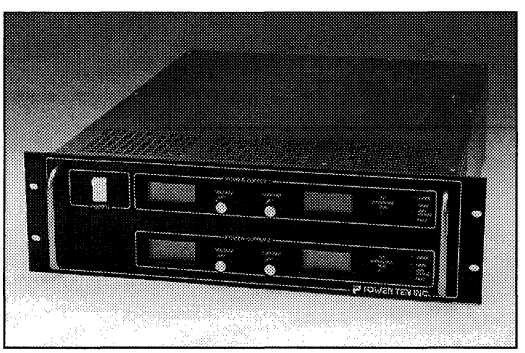
	P86		P86		P86	
	20,000 W		25,000 W		30,000 W	
V-Out	Amps	Ripple	Amps	Ripple	Amps	Ripple
80	250	100 mV	312	100 mV	375	100 mV
100	200	125 mV	250	125 mV	300	125 mV
130	150	135 mV	190	135 mV	230	135 mV
150	133	150 mV	166	150 mV	200	150 mV
200	100	175 mV	125	175 mV	150	175 mV
250	80	200 mV	100	200 mV	120	200 mV
300	66	200 mV	83	200 mV	100	200 mV
400	50	225 mV	62	225 mV	75	225 mV

P86 Models

D3C Series Dual Output (Mix or Match)

	PS1		PS2	
	3,300 W		3,300 W	
V-Out	Amps	Ripple	Amps	Ripple
5	500	50 mV	500	50 mV
8	400	50 mV	400	50 mV
10	330	50 mV	330	50 mV
15	220	50 mV	220	50 mV
20	166	75 mV	166	75 mV
30	110	75 mV	110	75 mV
40	83	75 mV	83	75 mV
50	66	75 mV	66	75 mV
60	55	75 mV	55	75 mV
Input*	190-253 V, 3 Phase			
Size	5 1/4 x 19 x 22, <60 lbs.			

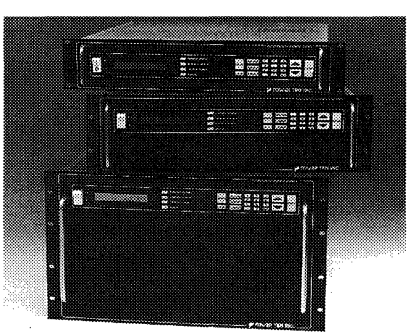
* Optional input voltage available. Consult factory.



Dual Output Models

Microprocessor Controlled Power Supplies 2kW to 30kW

Over 150 models of Microprocessor Controlled DC power supplies are available in the P70 Series family of supplies. Each model features Key Pad Entry, CC, CV or Constant Power, Power-Off Memory, Auto-Step Internal Programming. Optional IEEE 488.2 and RS232. All models are CE certified, UL & CSA recognized. Contact factory for complete list of output voltage and current ratings.



- **Excellent Reliability**
- **High Efficiency, Typically 80-85%**
- **5 Year Warranty**
- **Power Factor Correction on 3kW Models**

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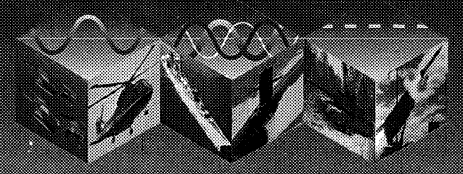
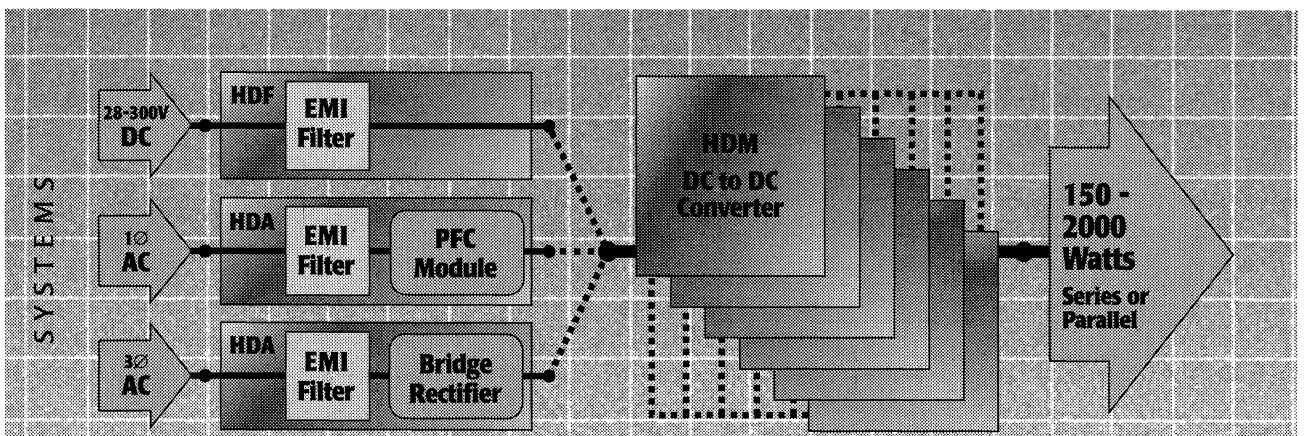
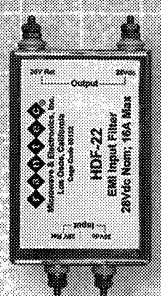


Power Solutions for Today's Military

Custom Power Systems from COTS+ Building Blocks



MODULES



HDF
DC EMI Filters

- Single-Phase Three-Phase or DC
- MIL-STD-461C
- CE01, CE03
- Isolated Case

HDA
PFC Modules

- Single Phase
- Power Factor = 0.99
- Low Harmonic Distortion
- 85 to 265 VAC
- 47 to 63 Hz
- Overvoltage Protection
- Overcurrent Protection
- Efficiency > 90%

HDM
DC-DC Converters

- Inputs: 28, 48, 300 VDC
- Outputs: 2.1 to 28 VDC Single (250W) Triple (185W)
- Line / Load Reg < 1%
- Ripple (0-20MHz) < 2%
- Overvoltage Protection
- Overcurrent Protection
- Efficiency >80%
- Isolated
- Op Temp: -40°C to +95°C

SERVICES

Power Teaming

Using the team approach, Rantec's Power Team members provide essential technical assistance in configuring the "Off-the-Shelf" building blocks into custom military power systems...

...Economically ...Quickly.

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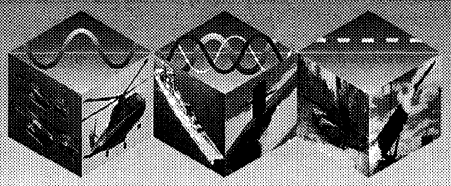
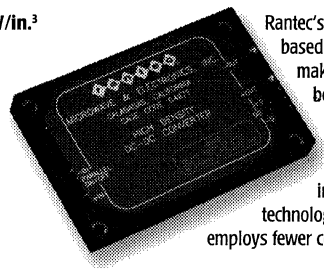


Power Solutions for Today's Military

Custom Power Systems from COTS+ Building Blocks

HDM Series — DC-DC Converters

- **Outputs: 250W Single; 185W Triple; up to 58W/in.³**
- **Constant Frequency Operation**
- **Parallel ability with Current Sharing**
- **Output Good Signal**
- **External Synchronization Capability**
- **Logic On/Off**
- **Suitable for PC or Chassis Mounting**
- **Extremely Low Thermal Resistance**
- **Ruggedized - meet MIL-STD-810C**
- **Operating Temp: -40°C to +95°C Baseplate**

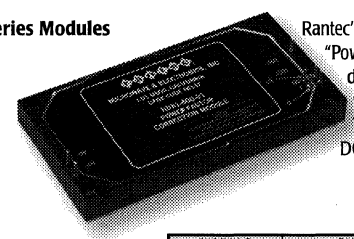


Rantec's HDM Series is the basic building block used to develop performance based "Power System Solutions." Its compact size and high performance make it an ideal element for a distributed power system. Modules can also be configured in series or parallel combinations to develop custom solutions. Standard features include: output good signal, remote on/off, remote sense of main output, overload and overvoltage protection. Using constant frequency switching technology, HDM Series converters incorporate power MOSFETs, planar magnetics, and surface mount technology onto a metal clad PC board. The forward converter topology employs fewer components, which translate into enhanced reliability

INPUT	Single Output (250W max.)								Triple Output (185W max.)		
	2.1V@60A	3.3V@50A	5V@40A	8V@30A	12V@20A	15V@16A	24V@10A	28V@9A	5V@35A;±12V@3A	5V@35A;±15V@3A	12V@10A;12V@3A; 5V@3A
28 VDC	HDM-2S-2-01	HDM-2S-3-01	HDM-21	HDM-2S-8-01	HDM-22	HDM-23	HDM-24	HDM-25	HDM-22T	HDM-23T	
48 VDC	HDM-4S-2-01	HDM-4S-3-01	HDM-41	HDM-4S-8-01	HDM-42	HDM-43	HDM-44	HDM-45	HDM-42T	HDM-43T	
300 VDC	HDM-3S-2-01	HDM-3S-3-01	HDM-301	HDM-3S-8-01	HDM-302	HDM-303	HDM-304	HDM-305	HDM-302T	HDM-303T	HDM-3T-12-01

HDA Series — Single-phase PFC Modules

- **Matched to Rantec's HDM Series Modules**
- **Power Factor Corrected .99**
- **Harmonic Distortion <5%**
- **85VAC to 256VAC Input**
- **47Hz to 63Hz, 440Hz**
- **Overvoltage and Overcurrent Protection**
- **Efficiency 90/94%**
- **Output power 600W, 1200W**
- **Operating Temp: -40°C to +95°C Baseplate**

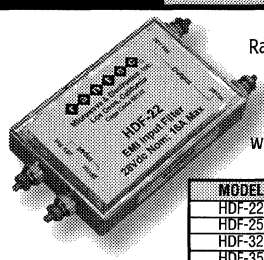


Rantec's HDA Series are complementary building blocks used to develop performance based "Power System Solutions." Rantec's HDA Series PFC modules allow system designers to develop power systems which comply with the stringent requirements of MIL-STD-461C, while employing the cost and schedule philosophies of commercial-off-the-shelf (COTS). These AC front ends are specifically designed to interface with Rantec's HDM Series DC-DC converters providing both differential and common mode filtering.

MODELS	OUTPUT	CURRENT	INRUSH	DIMENSIONS	WEIGHT (MAX)
HDA-16	380VDC @ 600W	1.7A	15A	4.6" x 2.4" x .5"	9 oz.
HDA-1200	380VDC @ 1200W	3.2A	30A	4.6" x 2.4" x .5"	9 oz.

HDF Series — DC Input EMI Filters

- **28VDC, 300VDC input**
- **Matched to Rantec's HDM Series Modules**
- **MIL-STD-461C (CE01, CE03)**
- **Low Input Voltage Drop**
- **Low Internal Dissipation**
- **Isolated Case**
- **Operating Temp: -40°C to +95°C Baseplate**



Rantec's HDF Series are complementary building blocks used to develop performance based "Power System Solutions." Rantec's HDF EMI filters allow system designers to develop power systems which comply with the stingent requirements of MIL-STD-461C, while employing the cost and schedule philosophies of Commercial-Off-The-Shelf (COTS). These filters are specifically designed to interface with Rantec's HDM Series DC-DC converters providing both differential and common mode filtering.

MODEL	RANTEC P/N	CURRENT	DISSIPATION	POWER (MAX)	DIMENSIONS	WEIGHT (MAX)
HDF-22	23896	16.0A	<6W	250W	3.6" x 2.4" x 0.70"	11 oz.
HDF-25	23467	32.0A	<12W	500W	4.6" x 2.4" x 1.00"	20 oz.
HDF-32	24370	1.5A	<2W	250W	3.6" x 2.4" x 0.75"	12 oz.
HDF-35	23918	3.0A	<4W	500W	4.6" x 2.4" x 0.75"	15 oz.
HDF-310	24373	6.0A	<8W	1000W	4.6" x 3.6" x 0.75"	22 oz.

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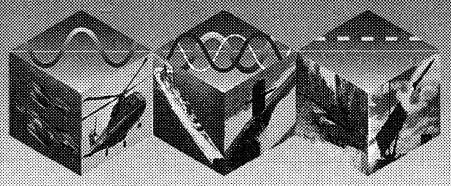
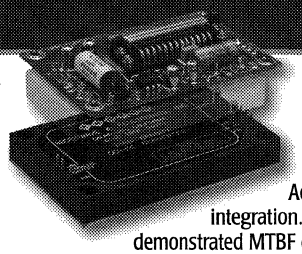


Power Solutions for Today's Military

Custom Power Systems from COTS+ Building Blocks

Power Systems *Block-by Block Solutions*

Tailored Modules



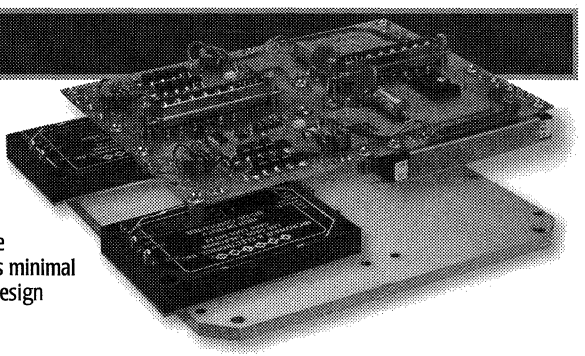
Rantec's most popular configurations are HDM DC to DC converter modules, tailored with a custom adapter board and EMI shield. Unique performance specifications are easily accommodated with differential and/or common mode filtering of both input and output, remote sense, isolated enable, trim adjust, and converter sync. Also many user-defined options such as I/O connectors can be incorporated.

Add-on circuitry and I/O connectors make the basic module truly plug-&-play, improving the ease of system integration. Its great performance/cost ratio and proven reliability has made it a hit with several military customers. Its demonstrated MTBF of 1,300,000 hours and substantial fielded quantities is a great testimonial to the basic reliability of Rantec's COTS+ core building block, the HDM Module. The combination of compact size and high performance make it an ideal plug-&-play candidate for a distributed power system. Modules can be in series or parallel configurations.

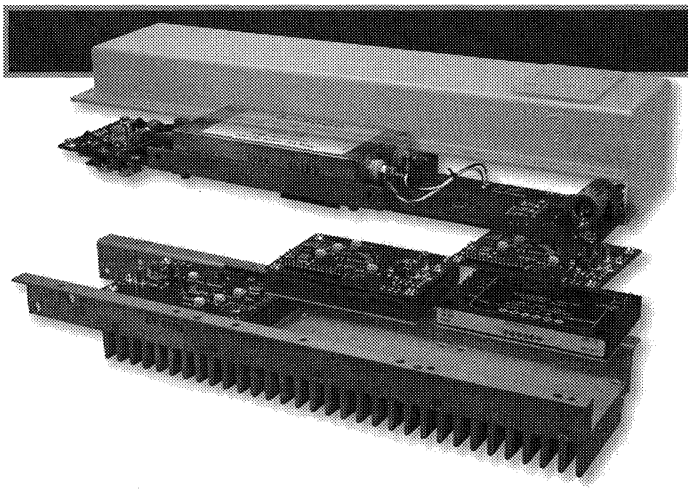
Power Micro-Systems

Power Microsystems are simple, cost-effective assemblies, typically custom designed, which provide the necessary functions to operate as a stand-alone power subsystem (i.e. distributed power) which requires features and/or power requirements beyond the scope of standard modules.

In the example above, 4 standard High Density Modules are combined via the motherboard forming a dual output, along with additional features such as reverse polarity output diodes and BITE circuitry and custom I/O connectors. The NRE was minimal with delivery of the first article within 8 weeks. This simple yet elegant modular design approach exemplifies the accomplishments of Power Teaming.



Power Systems



Several of Rantec's COTS+ Building Blocks can be combined with a power micro-system to develop a centralized power system. The example above shows three tailored HDM modules providing +5VDC and 8VDC outputs while the +300VDC input power is conditioned by the HDF-35 Power Micro-system.

The unit provides:

- EMI filtering on input and all outputs.
- Power-up and power-down sequencing.
- Fail-safe remote sense lines.
- On/Off control.
- Status indicators.

The custom enclosure provided required EMI shielding protection per MIL-STD-461 with convection cooling via heat sink.

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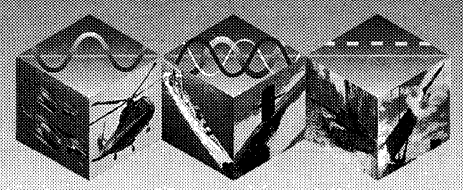
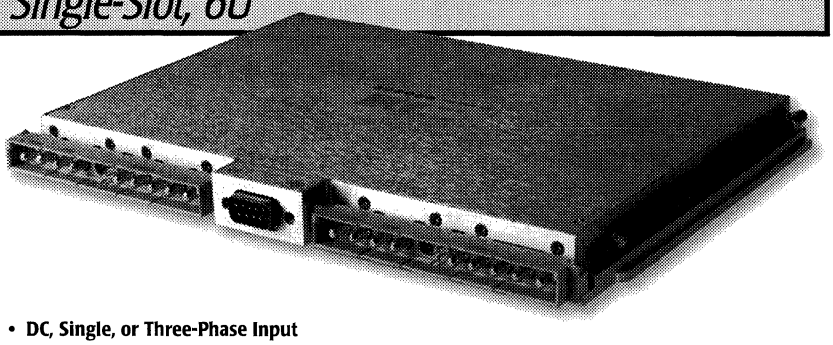


Power Solutions for Today's Military

Custom Power Systems from COTS+ Building Blocks

VME Series — Single-Slot, 6U

	DC Diagram 1	1-Phase Diagram 2	3-Phase Diagram 3
ELECTRICAL INPUT			
Voltage/Freq.	SEE HDM data sheet	115VAC 47 to 440Hz	200VAC 400Hz
V range	SEE HDM data sheet	105 to 264VC	90VAC to 160VAC
Efficiency	75% typical – 70% Minimal		
Power Factor	Not Applicable	>.98	>.90
Other	2) Loss of phase: a) no damage; b) mandiatory shutdown		
ELECTRICAL OUTPUT			
Voltage/Currents /Regulation	See applicable model. Refer to HDM Data Sheet for specifications other than those listed below		
Noise/Ripple	<50mV p-p		
Overvoltage Protection	120% Nominal		
Current Limiting	120% Typical		
Maximum Power	1,000 Watts	500 Watts	720 Watts
Switching Frequency	Fixed @ 370Khz		
EMI	As required	1 slot = None 2 slots = Optional	MIL-STD-46-1D
Return Isolation	>100,000 ohms		
MECHANICAL			
Physical	Single-slot, 6U		
Connectors	Input: 9-pin D-Connector Output: Type-M style		
Weight	3 lbs. typical		
ENVIRONMENTAL			
Temperature	Operating: -40°C to +95°C. Storage: -55°C to +125°C		
Cooling	1 slot = Conduction 2 slots = Convection		
Altitude	Up to 70,000 feet		
Humidity	100% Condensing		
Shock & Vibration	Specific Environment will be addressed		



- **DC, Single, or Three-Phase Input**
- **Multiple Output (5)**
- **Conduction or Convection Cooling**
- **Excellent EMI Management**

The VME Series of high-power, multiple-output power supplies addresses the needs of today's military marketplace. Our single-slot, conduction cooled, multiple-output version is truly an "enabling product." Operating on 200VAC 3-phase, these units can provide up to 5 outputs, generating up to 700 watts, and comply with MIL-STD-461D requirements. For air-cooled applications, an additional slot accommodates fins for convection cooling. Features include BIT, external control, and a LED status report display. All versions have an output interface board to provide additional filtering. Shown below are three basic versions.

MODEL	DESCRIPTION	DIAGRAM	INPUT	OUTPUT	
VME-R-28DC-31-1001	Single slot, conduction cooled, 28VDC input, 4 outputs, 380 watts	1	28VDC	HDM-Triple	+15VDC @ 35W -15VDC @ 35W +5VDC @ 60W
				HDM-Single	-5VDC @ 250W
VME-C-115AC1-11-1001	Single-slot, conduction cooled, 115VAC, 1-phase input, 2 outputs, 300 watts	2	115VAC 1 Phase	HDM-Single	+28VDC @ 300W
VME-C-200AC3-311-1001	Single-slot, conduction cooled, 200VAC, 3-phase input, 3 outputs, 450 watts	3	200VAC 3 PHASE	HDM-Triple	+12VDC @ 100W -12VDC @ 50W
				HDM-Single	+5VDC @ 300W

DIAGRAM 1: DC INPUT

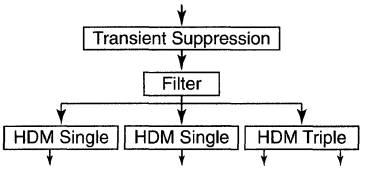


DIAGRAM 2: SINGLE-PHASE INPUT

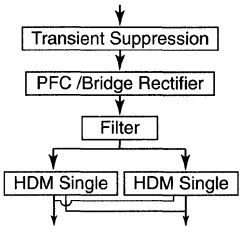
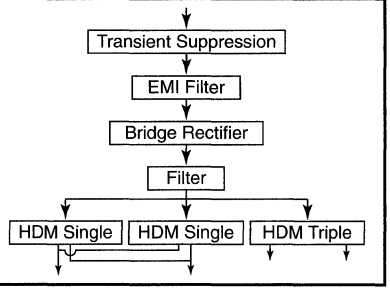


DIAGRAM 3: THREE-PHASE INPUT



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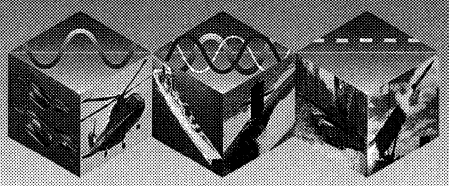


Power Solutions for Today's Military

Full Military Capability – "Off-The-Shelf" Availability

MIL 3-Phase — *Low-Profile, High-Density, AC-DC*

- 400 Hz three-phase or 270 Vdc Input
- 300 watt output
- Overcurrent foldback/assessment
- Overvoltage protection
- High efficiency
- MIL-C-24308 input auxiliary connectors
- Bus Bar output electrical interface
- 95°C baseplate operating temperature
- Tri-service qualified
- Full MIL components (JANTX)
- Component derating per NAVMAT P-4855-1A
- MTBF to 335,000 hours

Rantec Series HD (high-density) power supplies, utilizing current mode, constant-frequency switching technology, individually provide output capability to 300 watts. Additionally, they may be directly paralleled with up to four identical units to provide redundant or extended capabilities. Full component derating is in effect at a baseplate temperature of 95° C.

Series HD interfaces with three-phase, 400 Hz or 270 VDC prime power in accordance with MIL-STD-704 and incorporates an internal EMI filter compliant with MIL-STD-461C, Part 2, including CE01. Capability is provided to externally synchronize the power supply switching frequency to a system clock. Series HD is field-repairable.

MIL-Qualifications

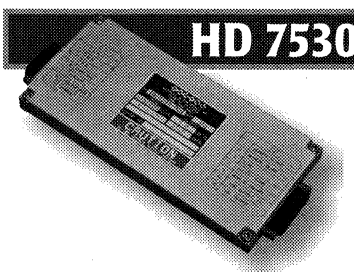
All HD Models

EMI:	**MIL-STD-461C, Part 2 (CE01, CE03, CS01, CS02,CS06, RE02, RE03)**
Op. Temp:	**-55° to 95° C**
Shock:	**MIL-STD-901D high impact**
Vibration:	**SINE/MIL-E-5400T RANDOM/MIL-STD-810E, Method 514.4**
Altitude:	**70,000 ft.**
Humidity:	**MIL-STD-810E, Method 507.3**
Salt Spray:	**MIL-STD-810E, Method 509.3**

Applications

- Tactical Avionics
- Helicopter-Dipping Sonar
- ECM/Jamming Pod
- SIGINT/EW/Communication

HD 7530 — *75 Watt, Single-Output*



Input:	**200V L-L, 3 phase, 400 Hz**
Output Power:	**75W, Single**
Voltages:	**5, 12, 15, 24 or 28V**
Efficiency:	**78 - 81% typical**
Ripple/Noise:	**75mV or 0.5% mV p-p max**
Size:	**6.0" x 2.9" x 0.5"**
Weight:	**8 oz.**

HD 7530D — *75 Watt, Dual-Output*

Input:	**200V L-L, 3 phase, 400 Hz**
Output Power:	**75W, Dual**
Voltages:	**±12V or ±15V**
Efficiency:	**68% typical**
Ripple/Noise:	**75mV or 0.5% mV p-p max**
Size:	**6.0" x 4.0" x 0.5"**
Weight:	**16 oz.**

HD 30030 — *300 Watt, Single-Output*

Input:	**200V L-L, 3 phase, 400 Hz**
Output Power:	**300W, Single**
Voltages:	**5, 12, 15, 24 or 28V**
Efficiency:	**80 - 83%**
Ripple/Noise:	**75mV or 0.5% mV p-p max**
Size:	**6.0" x 5.5" x 0.63"**
Weight:	**2 lbs.**

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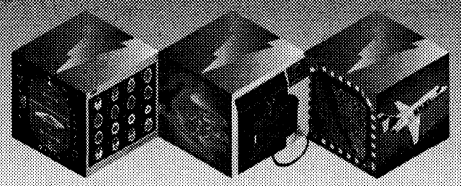
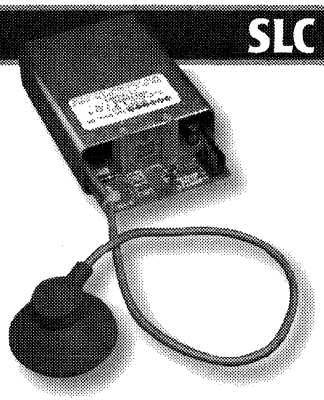


High Voltage Power Supplies

Commercial • Industrial • COTS+ • Ruggedized • Militarized

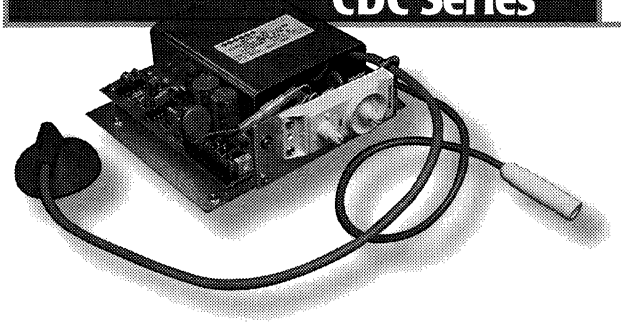
Commercial — *For High-Resolution CRTs*

SLC Series — *Super Low Cost Monochrome*



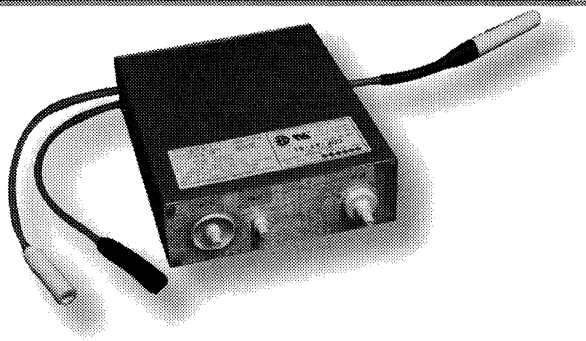
- Anode: up to 21kV
- Two auxiliary outputs to 1.4kV
- Up to 10 watts total output
- Low ripple, tightly regulated
- Extremely compact
- Hi-Rel/MTBF>350,000 hours
- UL recognized models
- Overvoltage safety circuitry (DHHS compliant)

CDC Series — *Low Cost Color Shadow Mask*



- Anode: up to 29kV
- Adjustable Focus & G2-
- AC coupled dynamic focus
- B+, G1 fixed
- Low Ripple, tightly regulated
- Extremely compact
- Hi-Rel/MTBF>68,000 hours
- UL & CSA recognized, TUV certifiable
- On/Off, OVP, bean sense, anode monitor

CDF Series — *Bi-potential Color Shadow Mask*



- Anode: 27kV @1.2mA
- Dual focus outputs(independently adjustable)
- AC coupled dynamic focus (DC restored)
- Multiple Outputs: G2, G1
- Remote on/off
- Low Ripple, tightly regulated
- UL & CSA recognized
- Overvoltage safety circuitry (DHHS compliant)
- Beam current sense

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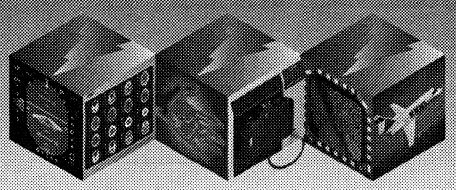
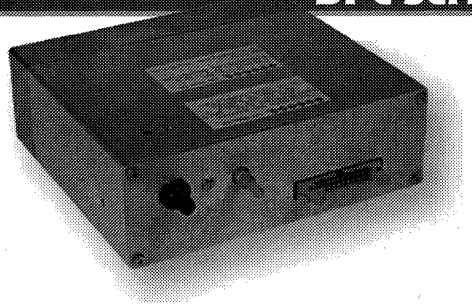


High Voltage Power Supplies

Commercial • Industrial • COTS+ • Ruggedized • Militarized

Industrial — *Broad Range of Applications*

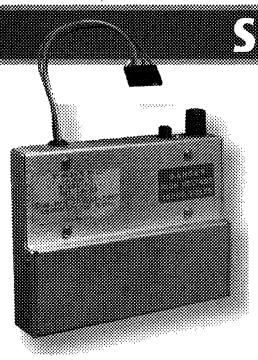
BPC Series — *Bi-Polar Mass Spectrometer*



- ±1 to 8kV in Voltage Mode
- TTL Selectable Regulation mode (Voltage or Current)
- Very Low Ripple
- Current Monitor
- Remote Shutdown
- 0 to 100uA in Current Mode
- TTL Selectable Polarity (No Relays)
- Voltage Monitor
- Polarity Indicators
- Protection Reference Output

COTS+ — *Tailored for Military Applications*

SMI Series — *General Avionics Color Shadow Mask*

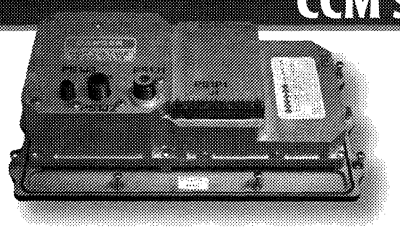


SMI-18-03 (Commercial Avionics Display)

- 18kV @ 1.2mA
- Four outputs, including adj. Anode. Focus, G2, and G1
- Remote on/off
- Lightweight, compact

Military — *Custom Designs*

CCM Series — *Custom Compact Military*



CCM-25-05 (Military Avionics Display)

- 25kV @ 1.8mA
- Adjustable focus & G2
- Buffered focus & G2 Monitors
- Bit circuitry
- Full Mil-qualified -54°C @ 70,000 feet

r a n t e c®

RANTEC MICROWAVE & ELECTRONICS, INC.

A Subsidiary of ESCO Electronics Corporation

1173 LOS OLIVOS AVE. • LOS OSOS CA 93402
TEL 805 596 6000 • FAX 805 596 6006
www.rantec.com • EMAIL powersys@rantec.com

800 235 4148
(outside California)

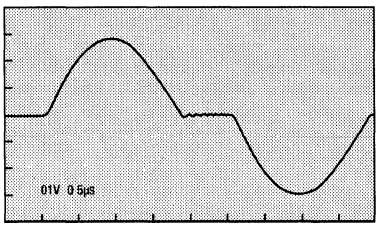
Resonant Power Technology, Inc.

470 South Hillview Drive • Milpitas, CA 95035-5464
(800) 767-6715 • Tel: (408) 957-0600 • Fax: (408) 957-0660 • E-mail: respwrtech@worldnet.att.net • www.respwrtech.com

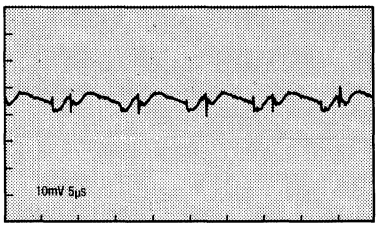
The Future is Now... True Series Resonant Technology Today

Technology and Determination:

Resonant Power Technology is an industry leader in the design and manufacture of high technology medical grade linear and switching power supplies. In 1985, the founders of RPT began their work towards developing the first commercially available, off-line, series resonant switching power supply. Series resonance provided a smaller, lighter highly reliable and quieter (both in EMI and output noise & ripple) product that also was able to produce significant surge currents.

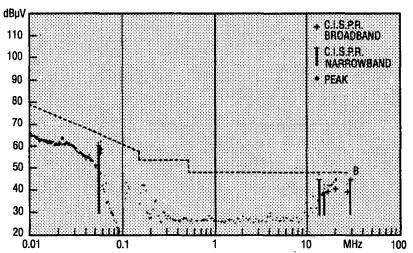


Resonant Circuit Sinusoidal Current Waveform



12 Volt Output Noise Waveform

Radio-Interference Voltage
frequency range: 0.01-30 MHz



RP-130
Series Perfomance Against VDE Class B Limits

■ **Medical Electronics equipment** demands *reliable, compliant, well made, cost effective* and *innovative* power sources.

■ **Resonant Power Technology's series resonant topology** offers a number of performance advantages. Switching sinusoidal currents at the zero cross-over point eliminates the peak switching stress, typically in the multiple kilowatt region, experienced by pulse width modulated products. Very low switching stress combined with inherent peak current limiting and thermal limiting circuitry results in a power converter whose durability exceeds that indicated by calculated **MTBFs** in excess of **150,000 hours.** RPT's products have been specifically designed for the medical electronics industry using premium quality components, derated conservatively, thereby enhancing the reliability of its power supplies.

■ As in our **standard RPM** series, each of Resonant Power Technology's medical grade products is certified to the most stringent international safety and emission standards, i.e. **UL** 544/2601/1950, **CSA** 601.1/950, **EN** 60601.1/60950, **CISPR 11** Class **B** and is eligible to bear the European CE mark. Our **RPF** and **RTM series** are compliant with the **2001 European Medical Directive** for line harmonics, EN61000-3-2. Should your system require floating applied part isolation, RPT also has experience designing EN60601.1 **Type BF** products.

■ Resonant Power Technology manufactures all of its products in **ISO 9001** certified, **FDA** approved facilities to the more rigorous **IPC610 Class III** workmanship standard.

■ Our **RSM** series offers our customers **cost effective 40 to 80 Watt** ac/dc converters conservatively designed but targeted at applications where cost is a major consideration. The **RLM series** provides updated low cost **linear power supplies** for those applications where both cost and noise are important.

■ When size and weight are serious design parameters, RPT's **RHD** series offers **4 Watt/cubic inch** power density for medical grade, patient contact applications.

■ When it comes to medical grade power conversion, from 10W to 1.5kW, **Resonant Power Technology** is **the place** to satisfy your requirement.

■ Input Specifications

Input Voltage Range .....90-132 Vac or 180-264 Vac
Input Frequency .....47-440 Hz
Input Protection .....internal fuse
Inrush Current Limit:
40-500 Watts (117Vac/230Vac) ...20A max/40A max
Input EMI Filter .....CISPR 11 Class B

■ Output Specifications

Line/Load Regulation .....(outputs 1 & 2) 1% nominal
.....(outputs 3 & 4) 3% nominal
Ripple all outputs .....20 mV peak-to-peak
Hold-Up Time.....30 mSec
Temperature Coefficient.....0.05%/degree C
Overload Protection .....Fold back with automatic recovery
Thermal Protection.....Fold back with automatic recovery
OverVoltage Protection .....on all outputs
Power Good Signal.....optional
AC Power Fail Detect .....optional
Remote Sense .....optional

■ Environmental Specification

Operational Temperature .....0 to 70 C
Storage Temperature.....-25 to 75 C
Humidity .....5-95%, non-condensing
Altitude .....10,000 feet with appropriate cooling
Vibration: MIL-STD-810C, Method 514.2, Category f, Procedure VIII, 2.0G maximum at 5-200 Hz.
Shock: MIL-STD-810C, Method 516.2, Category f, Procedure I, 3 shocks per axis/ each direction, 11 mSec half sine at 15 Gs peak

■ General Specifications

Transient Response: 500 uSec to settle to within 1% of the final value after a 25% load step
Frequency .....250 kHz Resonant Frequency
Safety Agency Certifications ..... UL 544/2601/1950
..... CSA 601.1/950
..... EN 60601.1/60950
..... CE

Resonant Power Technology, Inc.

470 South Hillview Drive • Milpitas, CA 95035-5464

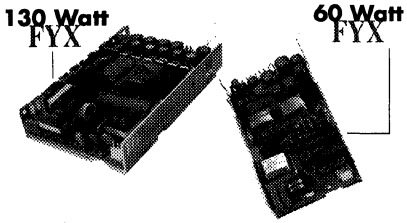
(800) 767-6715 • Tel: (408) 957-0600 • Fax: (408) 957-0660 • E-mail: respwrtech@worldnet.att.net • www.respwrtech.com

Specifications

RPT Model Number	Output 1 Volts DC @ Watts	Output 2 Volts DC @ Amperes	Output 3 Volts DC @ Amperes	Output 4 Volts DC @ Amperes	Operating Free Air @ 40 C	Operating Forced Air w/200 LFM @ 40 C	Auto Ranging or Wide Range Input	UL544/2601 IEC/EN 60601.1 CE Certified	UL544/2601 IEC/EN 60601.1 EN 61000-3-2 CE Certified	Form Factor
RSM-40	5-24 Vdc @ 40 W				40W	40W	YES	YES		3"x5"x1.75"
RSM-40/2	5-24 Vdc @ 40 W	12/15/24 @ 2.2/1A		N/A	40W	40W	YES	YES		3"x5"x1.75"
RSM-40/3	5-24 Vdc @ 40 W	12/15/24 @ 2.2/1A	-5/-12/-15 @ 0.3A		40W	40W	YES	YES		3"x5"x1.75"
RSM-65	5-24 Vdc @ 65 W				65W	65W	YES	YES		3.5"x6"x2"
RSM-65/2	5-24 Vdc @ 65 W	12/15/24 @ 3/3/2A			65W	65W	YES	YES		3.5"x6"x2"
RSM-65/3	5-24 Vdc @ 65 W	12/15/24 @ 3/3/2A	-5/-12/-15 @ 0.5A		65W	65W	YES	YES		3.5"x6"x2"
RSM-65/4	5-24 Vdc @ 65 W	12/15/24 @ 3/3/2A	-5/-12/-15 @ 0.5A	-5 @ 0.5A	65W	65W	YES	YES		3.5"x6"x2"
RSM-80	5-24 Vdc @ 80 W				80W	80W	YES	YES		4.25"x7"x2.25"
RSM-80/2	5-24 Vdc @ 80 W	12/15/24 @ 5/4/3A			80W	80W	YES	YES		4.25"x7"x2.25"
RSM-80/3	5-24 Vdc @ 80 W	12/15/24 @ 5/4/3A	-5/-12/-15 @ 1A		80W	80W	YES	YES		4.25"x7"x2.25"
RSM-80/4	5-24 Vdc @ 80 W	12/15/24 @ 5/4/3A	-5/-12/-15 @ 1A	5/12/24 @ 1A	80W	80W	YES	YES		4.25"x7"x2.25"
RPM-140	12-24 Vdc @ 140 W				80W	140W	YES	YES		5.9"x3.1"x1.6"
RPM-100/2	12-24 Vdc @ 100 W	5/12/15 @ 12/5/4A			80W	130W	YES	YES		7.2"x4.0"x1.6"
RPM-100/3	12-24 Vdc @ 100 W	5/12/15 @ 12/5/4A	5/12/15 @ 1A		80W	130W	YES	YES		7.2"x4.0"x1.6"
RPM-100/4	12-24 Vdc @ 100 W	5/12/15 @ 12/5/4A	5/12/15 @ 1A	5/12/15 @ 1A	80W	130W	YES	YES		7.2"x4.0"x1.6"
RPM-200	12-24 Vdc @ 200 W				80W	230W	YES	YES		7.25"x4.7"x2.1"
RPM-200/2	12-24 Vdc @ 200 W	5/12/15 @ 20/8/7A			80W	230W	YES	YES		7.25"x4.7"x2.1"
RPM-200/3	12-24 Vdc @ 200 W	5/12/15 @ 20/8/7A	5/12/15 @ 1A		80W	230W	YES	YES		7.25"x4.7"x2.1"
RPM-200/4	12-24 Vdc @ 200 W	5/12/15 @ 20/8/7A	5/12/15 @ 1A	5/12/15 @ 1A	80W	230W	YES	YES		7.25"x4.7"x2.1"
RPM-300	12-24 Vdc @ 300 W				100W	300W	YES	YES		8.75"x4.7"x2.1"
RPM-300/2	12-24 Vdc @ 300 W	5/12/15 @ 20/8/7A			100W	300W	YES	YES		8.75"x4.7"x2.1"
RPM-300/3	12-24 Vdc @ 300 W	5/12/15 @ 20/8/7A	5/12/15 @ 3A		100W	300W	YES	YES		8.75"x4.7"x2.1"
RPM-300/4	12-24 Vdc @ 300 W	5/12/15 @ 20/8/7A	5/12/15 @ 3A	5/12/15 @ 3A	100W	300W	YES	YES		8.75"x4.7"x2.1"
RTM-500	3.3-48 Vdc @ 500 W					500W	YES		YES	10.5"x5"x2.5"
RTM-500/2	3.3-48 Vdc @ 500 W	3.3-24 Vdc @ < 200W				500W	YES		YES	10.5"x5"x2.5"
RTM-500/3	3.3-48 Vdc @ 500 W	3.3-24 Vdc @ < 200W	3.3-24 Vdc @ < 100W			500W	YES		YES	10.5"x5"x2.5"
RTM-500/4	3.3-48 Vdc @ 500 W	3.3-24 Vdc @ < 200W	3.3-24 Vdc @ < 100W	3.3-24 Vdc @ < 100W		500W	YES		YES	10.5"x5"x2.5"
RPF-140	12-24 Vdc @ 140 W				80W	140W	YES		YES	6"x3.1"x1.6"
RPF-100/2	12-24 Vdc @ 100 W	5/12/15 @ 12/5/4A			80W	130W	YES		YES	7.5"x4"x1.6"
RPF-100/3	12-24 Vdc @ 100 W	5/12/15 @ 12/5/4A	5/12/15 @ 1A		80W	130W	YES		YES	7.5"x4"x1.6"
RPF-100/4	12-24 Vdc @ 100 W	5/12/15 @ 12/5/4A	5/12/15 @ 1A	5/12/15 @ 1A	80W	130W	YES		YES	7.5"x4"x1.6"
RPF-200	12-24 Vdc @ 200 W				80W	230W	YES		YES	7.5"x4.7"x2.1"
RPF-200/2	12-24 Vdc @ 200 W	5/12/15 @ 20/8/7A			80W	230W	YES		YES	7.5"x4.7"x2.1"
RPF-200/3	12-24 Vdc @ 200 W	5/12/15 @ 20/8/7A	5/12/15 @ 1A		80W	230W	YES		YES	7.5"x4.7"x2.1"
RPF-200/4	12-24 Vdc @ 200 W	5/12/15 @ 20/8/7A	5/12/15 @ 1A	5/12/15 @ 1A	80W	230W	YES		YES	7.5"x4.7"x2.1"
RPF-300	12-24 Vdc @ 300 W				100W	300W	YES		YES	9"x4.7"x2.1"
RPF-300/2	12-24 Vdc @ 300 W	5/12/15 @ 20/8/7A			100W	300W	YES		YES	9"x4.7"x2.1"
RPF-300/3	12-24 Vdc @ 300 W	5/12/15 @ 20/8/7A	5/12/15 @ 3A		100W	300W	YES		YES	9"x4.7"x2.1"
RPF-300/4	12-24 Vdc @ 300 W	5/12/15 @ 20/8/7A	5/12/15 @ 3A	5/12/15 @ 3A	100W	300W	YES		YES	9"x4.7"x2.1"

Shindengen America, Inc.

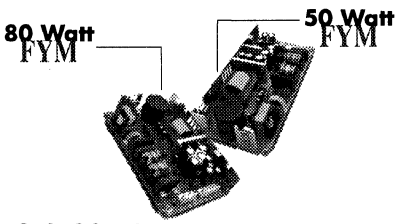
A C / D C M U L T I P L E O U T P U T



60 & 130 Watt FYX series

features

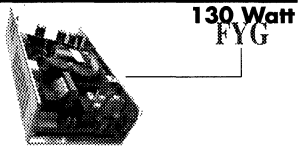
- High Power Density
- U channel with optional cover
- Universal Input
- Power Factor Corrected to IEC 1000-3-2
- UL 1950/CSA 22.2 No. 234/EN60950 (IEC1000-3-2)
- FCC/VDE Level B EMI Filter
- Quad Output, Various output combinations
- Molex pin connector



50 & 80 Watt FYM series

features

- Universal Input
- Power Factor Corrected — IEC555-2
- UL 1950/CSA 22.2 No. 234/EN60950 (IEC1000-3-2)
- FCC/VDE Level B EMI Filter
- Triple-Output
- Choice of Pin-Type or Terminal Block Connections

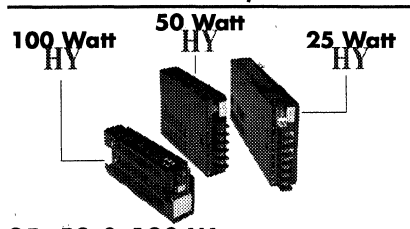


80 & 130 Watt FYG series

features

- Compatible with Power One* MAP* Series
- Meets International Safety & Conducted Noise Specifications
  - UL 1950 Recognized
  - CSA 22.2 No. 234 Level 3 Certified
  - EN60950 (TUV Certified)
  - Independently Tested to FCC Part 15, Level A, VDE 0871 Level A, VCCI Class 1
- Wide Range Input
- MTBF>500,000 Hours
- Four Outputs/Multiple Combinations
- Molex Connectors or Terminal Block

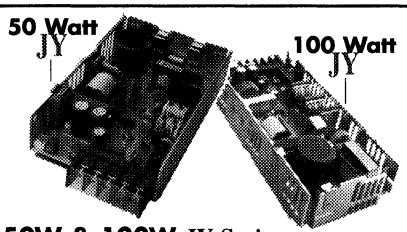
A C / D C S I N G L E O U T P U T



25, 50 & 100 Watt HY series

features

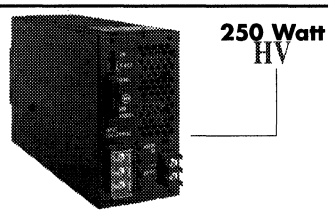
- Low Profile
- Universal Input
- Meets International Safety & EMI Specifications
  - UL 1950 Recognized
  - CSA 22.2 No. 234 Certified
  - EN60950 (TUV Certified)
  - Independently Tested to FCC Part 15, Class B, VDE 0871 Class B & VCCI Class 2
- MTBF>300,000 Hours
- 5, 12, or 24 Volt Models
- Totally Enclosed
- Hyper-Resonant Converter
- Remote Sense, Remote On/Off (100 W)



50W & 100W JY Series

features

- Active power factor correction (PFC) — 0.99 typ.
- Compliant to IEC1000-3-2
- Continuous wide-range input voltage
- Meets international safety standards
  - — UL1950 Recognized
  - — CSA C22.2 No. 950 Certified
  - — IEC950/EN60950 (TUV Certified)
- CE Mark (LVD)
- Built-in EMI filter (conducted)
- Surge immunity to 4kV (Input to Chassis)
- LED operating indicator
- Remote ON/OFF (optional)
- Remote sense (100W)

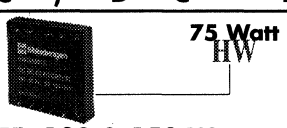


250 & 500 Watt HV series

features

- Meets International Safety & Conducted Noise Specifications
  - UL 1950 Recognized
  - CSA 22.2 No. 234 Certified
  - EN60950 (TUV Certified)
  - Independently Tested to FCC Part 15, Level A, VDE 0871 Level A, VCCI Class 1
- Wide Range Input Voltage
- MTBF>300,000 Hours
- PFC — IEC555-2 (IEC1000-3-2)
- Overtemperature, Overload and Overvoltage Alarm
- Parallel Operation; Remote ON/OFF; Power Fail

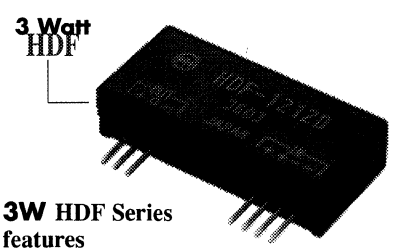
D C / D C I S O L A T E D



30, 50, 75, 100 & 150 Watt HW series

features

- Wide-Range Input Voltage
- Industry-Standard Pin Out
- Adjustable Output Voltage (60% - 110%)
- Remote ON/OFF
- Remote Sense
- Constant Frequency
- Thermal Shutdown
- High Power Density (Up to 27.4 W/in^3)

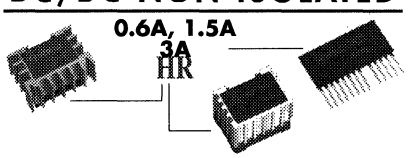


3W HDF Series

features

- UL1950 Recognized
- Input-Output Isolation
- Compact, Single In-Line Package
- Single and Dual Output
- Wide-Range Input
- Input and Output Filters

DC/DC NON-ISOLATED



0.6A, 1.5A, 3A HR Series

features

- High Reliability
- Thermal Protection
- Small Packaging
- Standard Output Voltage Adjustment (With External Potentiometer)
- Custom Control Chip Yields Compact Size with Low Cost
- Integrated Heat Sink (some models)

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SAMSUNG ELECTRO-MECHANICS

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SAMSUNG ELECTRO-MECHANICS AMERICA, INC.
85 TASMAN DRIVE, SAN JOSE, CA,
95134 U.S.A
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SAMSUNG ELECTRO-MECHANICS GmbH.
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AM KRONBERGER HANG 6,
65824 SCHWALBACH/TS, GERMANY
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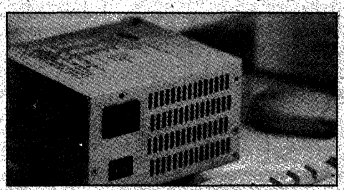
FAX:(49-6196)66-7766

POWER SUPPLIES



Tel : 82-331-210-6079
E-mail : kwhgkim@samsung.co.kr

NLX Power Supply

Model Name		NLX 200W					
Wattage		200W					
Input Voltage		90VAC~132VAC / 180VAC~264VAC					
Input Frequency		47Hz~63Hz					
Inrush Current		Shall not damage					
Efficiency		70% Minimum / 60%(Energy Star)					
Hold-up Time		20mSec Min at 115VAC & 230VAC					
OVP & OCP		Good					
Output	Voltage	+3.3V	+5V	+12V	-12V	-5V	+5VSB
	Current(A)	12	20	6	0.8	0.3	0.72
Ripple & Noise(mV)		50	50	120	120	100	50
Overall Regulation(%)		±5	±5	±5	±10	±10	±5
Weight(g)		1,500 Max					
Dimension	mm	140×150×85					
	inch	5.51×5.9×3.35					

ATX Power Supply

Model Name		ATX 200W					
Wattage		200W					
Input Voltage		90VAC~132VAC / 180VAC~264VAC					
Input Frequency		47Hz~63Hz					
Inrush Current		Shall not damage					
Efficiency		70% Minimum / 60%(Energy Star)					
Hold-up Time		20mSec Min at 115VAC & 230VAC					
OVP & OCP		Good					
Output	Voltage	+3.3V	+5V	+12V	-12V	-5V	+5VSB
	Current(A)	12	20	6	0.8	0.3	0.1
Ripple & Noise(mV)		50	50	120	120	100	50
Overall Regulation(%)		±5	±5	±5	±10	±10	±5
Weight(g)		1,500 Max					
Dimension	mm	140×150×85					
	inch	5.51×5.9×3.35					

AC Adapter

Model Name	AD40W Series	AD45W Series	AD60W Series
Wattage	40W	45W	60W
Input Voltage	90VAC ~ 256VAC		
Input Frequency	47Hz~63Hz		
Inrush Current	50A Max (220VAC)		
Efficiency	85% Min		
OVP & OCP	Good		
Feed Back	C.V	C.V	C.V
Overall Regulation	±5%		
Ripple & Noise	±1%		
Operating Temp.	0~40 ℃		
Weight(g)	180	250	250
Dimension(mm)	102×45×26	105×48×22	110×60×29
Safety	UL, SCA, TUV Dentori...	UL, CSA, TUV SEMKO, CE	UL, CSA, TUV SEMKO
Remark	2Pin Inlet	2Pin Inlet	2Pin Inlet

Note) C.V. : Constant Voltage, C.C. : Constant Current, C.P. : Constant Power

Server Power Supply

- PFC 0.95 at nominal Input (IEC 555 & IEC 1000-3-2)
- Remote voltage sensing, Auto Restart
- Hot Swappable Function
- Power Good Signal

- Dynamic Load Operation
- High Reliability, High Efficiency
- Fan Speed Control, No load operation
- N+1 Redundant & load sharing

- Baby AT size 300W
- AT size 450W
- Hot Swappable 660W

SPEAKERS

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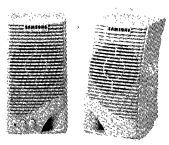
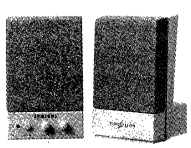
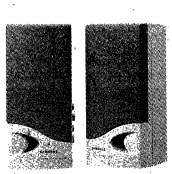
Stand-alone



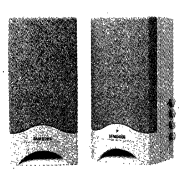
SMS 100D (1WAY, 4W RMS)



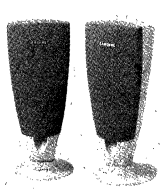
SMS 7840 (1WAY, 10W RMS)



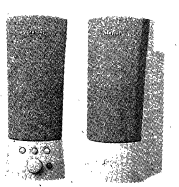
SMS 7630 (2WAY, 30W RMS)



SMS 7640 (2WAY, 30W RMS)

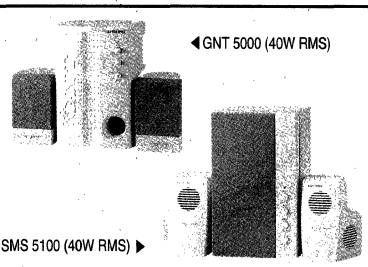


SMS 8320 (2WAY, 30W RMS)



SMS 7750 (3WAY, 30W RMS)

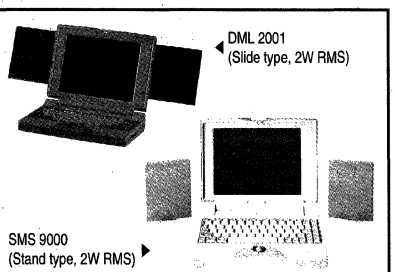
3 Piece System



◀ GNT 5000 (40W RMS)

SMS 5100 (40W RMS) ▶

Super Slim Speaker for Notebook



◀ DML 2001
(Slide type, 2W RMS)

SMS 9000
(Stand type, 2W RMS) ▶

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Kansas, Missouri, Nebraska, Iowa, S. Illinois	Tradewise Dave Reese	(913)782-8702	(913)782-8641	dduwe@atsks.com
Other Areas in North America (7a.m. to 5p.m. Pacific time)	American Skynet Ming Liu	(408)945-6355	(408)945-6357	sales@skynetusa.com

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General Purpose

Standard Feature

* 90 to 264 VAC wide range universal input
* Build-in line filter for FCC B or VDE B or EN55022 B
* Custom PWM IC
* High Efficiency
* No minimum load required
* Compact and low cost
* LXF, low ESR, extra long life, 105 °C capacitor

MODEL	OUTPUT				EMI	SIZE(WxLxH)	MOUNTING	NOTE
20W								
SNP-9021	5V/1A	12V/1A	-12V/0.3A		FCC B	60 X 120 X 27.1MM	50 X 110MM	
SNP-9021-1	5V/1A	12V/1A	-12V/0.3A		VDE B	60 X 120 X 27.1MM	50 X 110MM	
SNP-9023	5V/1A	12V/1A	Molex base		FCC B	60 X 110 X 27.1MM	50 X 100MM	
SNP-9023-1	5V/1A	12V/1A	Molex base		VDE B	60 X 110 X 27.1MM	50 X 100MM	
SNP-902M	5V/1.5A	12V/1A	AMP connector		FCC B	60 X 110 X 27.1MM	50 X 100MM	
SNP-902L	5V/1.5A	12V/1A	Molex connector		FCC B	60 X 110 X 27.1MM	50 X 100MM	
SNP-9026	5V/4A				FCC B	60 X 110 X 27.1MM	50 X 100MM	
SNP-9026-1	5V/4A				VDE B	60 X 110 X 27.1MM	50 X 100MM	
SNP-9027	12V/2A				FCC B	60 X 110 X 27.1MM	50 X 100MM	
SNP-9027-1	12V/2A				VDE B	60 X 110 X 27.1MM	50 X 100MM	
SNP-9029	24V/1A				FCC B	60 X 110 X 27.1MM	50 X 100MM	
SNP-9029-1	24V/1A				VDE B	60 X 110 X 27.1MM	50 X 100MM	
30W								
SNP-9031	5V/2A	12V/1.5A	-12V/0.3A		Vfg 243	70 X 130 X 32.1MM	60 X 120MM	
SNP-9033	5V/2A	12V/1.5A			Vfg 243	70 X 130 X 32.1MM	60 X 120MM	
SNP-9034	5V/1.5A	15V/1.2A	-15V/0.3A		Vfg 243	70 X 130 X 32.1MM	60 X 120MM	
SNP-9035	5V/2A	24V/0.75A			Vfg 243	70 X 130 X 32.1MM	60 X 120MM	
SNP-9036	5V/6A				Vfg 243	70 X 130 X 32.1MM	60 X 120MM	
SNP-9037	12V/2.5A				Vfg 243	70 X 130 X 32.1MM	60 X 120MM	
SNP-9038	15V/2A				Vfg 243	70 X 130 X 32.1MM	60 X 120MM	
SNP-9039	24V/1.3A				Vfg 243	70 X 130 X 32.1MM	60 X 120MM	
40W								
SNP-9541	5V/3A	12V/2A	-12V/0.3A		Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9542	5V/3A	12V/2A	-5V/0.3A		Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9543	5V/3A	12V/2A			Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9544	5V/3A	15V/1.5A	-15V/0.3A		Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9546	5V/8A				Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9547	12V/3.3A				Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9548	15V/2.6A				Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9549	24V/1.7A				Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
65W								
SNP-9061	5V/3.5A	12V/4A	-12V/0.3A		Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9063	5V/3.5A	12V/4A			Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9066	5V/13A				Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9067	12V/5A	5V/0.5A			Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9068	15V/4A	5V/0.5A			Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9069	24V/2.5A	5V/0.5A			Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
80W "U" Shape								
SNP-8080	5V/6A	12V/3.5A	-12V/0.5A	5V/0.5A	EN55022B	3.3 X 6.0 X 1.7"	2.7 X 2.7"	
SNP-8083	5V/6A	12V/4A			EN55022B	3.3 X 5.25 X 1.5"	2.7 X 2.7"	*
SNP-8084	5V/6A	15V/2A	-15V/0.5A	24V/0.5A	EN55022B	3.3 X 6.0 X 1.7"	2.7 X 2.7"	*
SNP-8085	5V/6A	24V/1.5A	-12V/0.5A	12V/0.5A	EN55022B	3.3 X 6.0 X 1.7"	2.7 X 2.7"	*
SNP-8086	5V/12A	12V/1A			EN55022B	3.3 X 5.25 X 1.5"	2.7 X 2.7"	
SNP-8087	12V/6A	5V/1.5A			EN55022B	3.3 X 5.25 X 1.5"	2.7 X 2.7"	
SNP-8089	24V/3A	5V/1.5A			EN55022B	3.3 X 5.25 X 1.5"	2.7 X 2.7"	

Note * - Developing priority depends on R&D department status.

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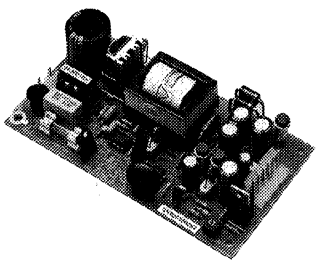
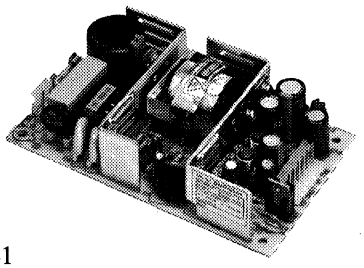
General Purpose



SNP-9031



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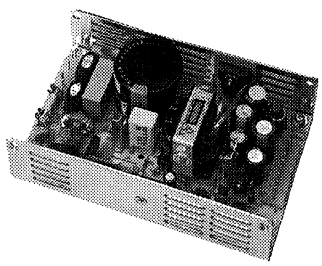

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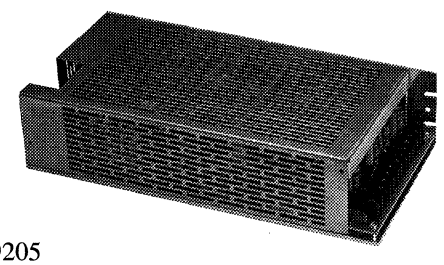

SNP-9205

MODEL	OUTPUT				EMI	SIZE(WxLxH)	MOUNTING	NOTE
80W								
SNP-9080	5V/8A	12V/3A	-12V/0.5A	-5V/0.5A	Vfg 243	4.0 X 6.0 X 2.24"	3.61 X 5.61"	*
SNP-9083	5V/6A	12V/4.5A			Vfg 243	4.0 X 6.0 X 2.24"	3.61 X 5.61"	
SNP-9085	5V/4A	15V/0.5A	-15V/0.5A	24V/2A	Vfg 243	4.0 X 6.0 X 2.24"	3.61 X 5.61"	*
SNP-9086	5V/16A				Vfg 243	4.0 X 6.0 X 2.24"	3.61 X 5.61"	
SNP-9087	12V/6.5A	5V/1A			Vfg 243	4.0 X 6.0 X 2.24"	3.61 X 5.61"	
SNP-9089	24V/3.3A	5V/1A			Vfg 243	4.0 X 6.0 X 2.24"	3.61 X 5.61"	
SNP-9089-T	30V/3A				Vfg 243	4.0 X 6.0 X 2.24"	3.61 X 5.61"	
100W								
SNP-9100	5V/10A	12V/3.5A	-5V/0.5A	-12V/0.5A	Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
SNP-9102	5V/15A	12V/2A	-5V/2A		Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
SNP-9105-6	5V/5A	24V/2A	12V/2A	-12V/0.3A	Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
SNP-9106	5V/20A				Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
SNP-9107	12V/9A	5V/1A			Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
SNP-9109	24V/4.5A	5V/1A			EN55022B	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
SNP-F106	5V/22A (30CFM forced air)				EN55022B	4.00 X 7.00 X 1.89"	3.50 X 6.50"	
130W~150W								
SNP-9130	5V/15A	12V/4A	-12V/0.3A	-5V/0.3A	FCC B	5.0 X8.5 X 2.0"	1.0 X 8.0"	
SNP-9134	5V/13A	15V/4A	-15V/0.3A	-5V/0.3A	FCC B	5.0 X 8.5 X 2.0"	1.0 X 8.0"	
SNP-9159	5V/1A	24V/6A			Vfg 243	5.0 X 8.5 X 2.0"	1.0 X 8.0"	
180W								
SNP-9185	5V/3A	24V/3.5A	24V/2.5A	5.4V/3A	Vfg 243	5.0 X 10.5 X 2.5"	Multi-Position	
200W								
SNP-9200	5V/20A	12V/7.5A	-12V/0.5A	-5V/0.5A	Vfg 243	5.0 X 10.5 X 2.5"	Multi-Position	
SNP-9200-A	5V/20A	12V/7.5A	-12V/0.5A	-5V/0.5A	Vfg 243	5.0 X 10.5 X 2.5"	Multi-Position	
SNP-9200-B	5V/15A	12V/5A	-12V/0.5A	-5V/0.5A	Vfg 243	5.0 X 10.5 X 2.5"	Multi-Position	
SNP-9200-C	5V/15A	12V/5A	-12V/0.5A	-5V/0.5A	Vfg 243	5.0 X 10.5 X 2.5"	Multi-Position	
SNP-9205	5V/3A	24V/5A	24V/2.5A	5V/3.2A	Vfg 243	5.0 X 10.5 X 2.5"	Multi-Position	*
SNP-9205-A	5V/3A	24V/5A	24V/2.5A	5V/3.2A	Vfg 243	5.0 X 10.5 X 2.5"	Multi-Position	*
SNP-9205-B	5V/3A	24V/3A	24V/2A	5V/3A	Vfg 243	5.0 X 10.5 X 2.5"	Multi-Position	*
SNP-9205-C	5V/3A	24V/3A	24V/2A	5V/3A	Vfg 243	5.0 X 10.5 X 2.5"	Multi-Position	*

Note * - Developing priority depends on R&D department status.
"-A" : With option of auto ranging.
"-B" : With option of auto ranging and cover.
"-C" : With option of cover only.

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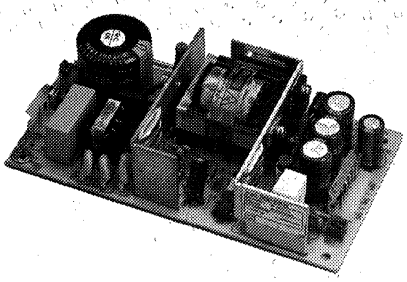
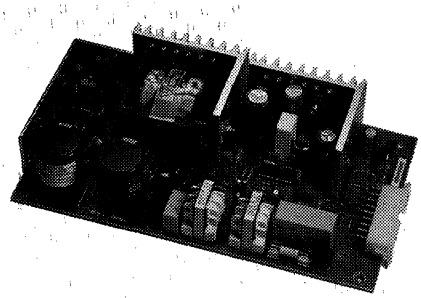
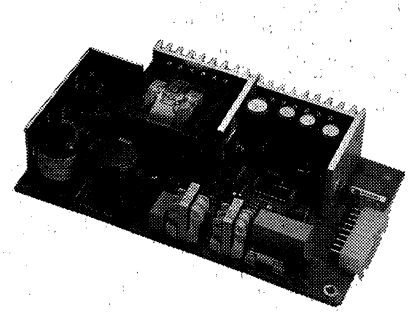
General Purpose


SNP-G335


SNP-R106


SNP-R109

-40°C Outdoor

MODEL	OUTPUT	EMI	SIZE(WxLxH)	MOUNTING	NOTE
30W					
SNP-G335	24V/1.25A 5V/1A	Vfg 243	3.0 X 5.5 X 1.46"	2.55 X 5.05"	

This series can be started up even under the environment of -40°C; it's suitable to be put outdoor since it is guaranteed to work properly in severe winter.

Hot Swap

MODEL	OUTPUT	\EMI	SIZE(WxLxH)	MOUNTING	NOTE
100W					
SNP-R106	5V/20A	Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
SNP-R107	12V/9A 5V/1A	Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	*
SNP-R109	24V/4.5A 5V/1A	Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	*

Note * - Developing priority depends on R&D department status.

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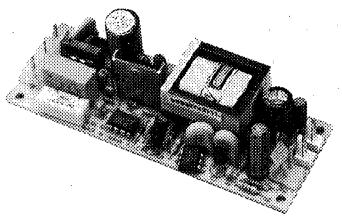
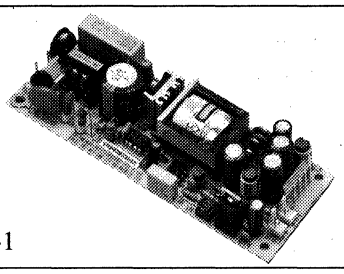
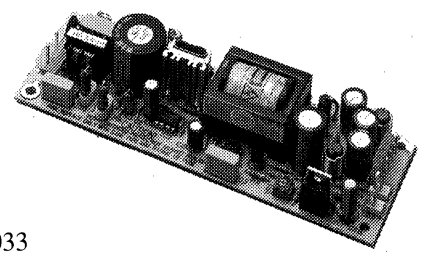
SubSystem



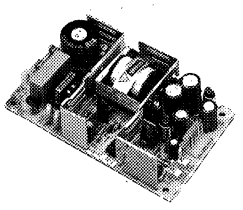
SNP-0502



SNP-5023-1



SNP-6033



SNP-9543

MODEL	OUTPUT			EMI	SIZE(WxLxH)	MOUNTING	NOTE
10W							
SNP-0502	5V/2A			Vfg 243	40 X 110 X 27.1MM	32.0 X 102.0MM	
SNP-8013	5V/1A	12V/0.7A		FCC B	46 X 98 X 27.1MM	40.0 X 90.0MM	
SNP-8016	5V/3A			EN55022B	46 X 98 X 27.1MM	40.0 X 90.0MM	
SNP-9013	5V/0.75A	12V/0.75A		Vfg 243	40 X 120 X 27.1MM	32.0 X 112.0MM	
SNP-9013-C	5V/1A	12V/1A		Vfg 243	40 X 120 X 27.1MM	32.0 X 112.0MM	
20W							
SNP-5023-1	5V/1.5A	12V/1.2A		VDE B	50.8 X 139.7 X 27.1MM	40.8 X 129.7MM	
SNP-6023-1	5V/1.5A	12V/1.2A		VDE B	50.8 X 152.4 X 27.1MM	40.8 X 142.4MM	
SNP-7023	5V/1.5A	12V/1.5A		FCC B	50.5 X 177.5 X 27.1MM	40.5 X 167.5MM	
SNP-7023-1	5V/1.5A	12V/1.5A		VDE B	50.5 X 177.5 X 27.1MM	40.5 X 167.5MM	
SNP-8023	5V/1.5A	12V/1.5A		EN55022B	40.0 X 120.0 X 27.1MM	32.0 X 112.0MM	
SNP-9023	5V/1A	12V/1A		FCC B	60.0 X 110.0 X 27.1MM	50.0 X 100.0MM	
SNP-9023-1	5V/1A	12V/1A		VDE B	60.0 X 110.0 X 27.1MM	50.0 X 100.0MM	
SNP-902M	5V/1.5A	12V/1A	AMP connector	FCC B	60.0 X 110.0 X 27.1MM	50.0 X 100.0MM	
SNP-902L	5V/1.5A	12V/1A	Molex connector	FCC B	60.0 X 110.0 X 27.1MM	50.0 X 100.0MM	
30W							
SNP-6033	5V/2A	12V/1.5A		FCC B	50.8 X 152.4 X 32.1MM	40.8 X 142.4MM	
SNP-6033-1	5V/2A	12V/1.5A		Vfg 243	50.8 X 152.4 X 32.1MM	40.8 X 142.4MM	
SNP-6033-H	5V/3A	3.3V/3.5A		EN55022B	50.8 X 152.4 X 32.1MM	40.8 X 142.4MM	
SNP-6033-T	5V/2A	12V/1.5A		Vfg 243	50.8 X 152.4 X 32.1MM	40.8 X 142.4MM	
SNP-7033	5V/2A	12V/1.5A		FCC B	50.5 X 177.5 X 32.1MM	40.5 X 167.5MM	
SNP-7033-1	5V/2A	12V/1.5A		Vfg 243	50.5 X 177.5 X 32.1MM	40.5 X 167.5MM	
SNP-9033-1	5V/2A	12V/1.5A		Vfg 243	70.0 X 130.0 X 32.1MM	60.0 X 120.0MM	
SNP-9433	5V/2A	12V/1.8A		FCC B	76.0 X 101.0 X 35.9MM	60.0 X 91.0MM	
SNP-9433-1	5V/2A	12V/1.8A		VDE B	76.0 X 101.0 X 35.9MM	60.0 X 91.0MM	
SNP-9533	5V/2A	12V/2.0A		Vfg 243	76.2 X 127.0 X 32.1MM	64.8 X 115.6MM	
SNP-9533-2	5V/2A	12V/2.0A		FCC B	76.2 X 127.0 X 32.1MM	64.8 X 115.6MM	
40W							
SNP-6043	5V/2.4A	12V/2.4A		Vfg 243	2.0 X 6.0 X 1.63"	1.61 X 5.61"	
SNP-7043-T	5V/3A	12V/2A		EN55022B	2.0 X 7.0 X 1.26"	1.59 X 6.59"	
SNP-9543-T	5V/3A	12V/3A		EN55022B	3.0 X 5.0 X 1.30"	2.55 X 4.55"	

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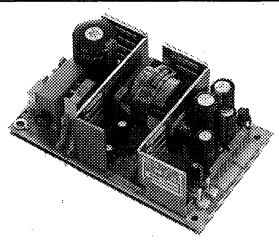
SubSystem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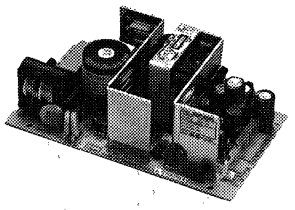
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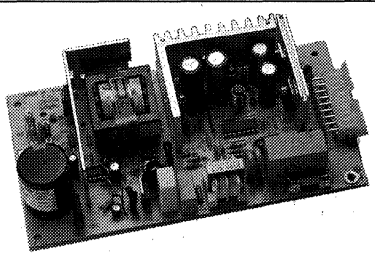
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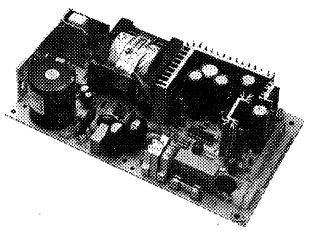
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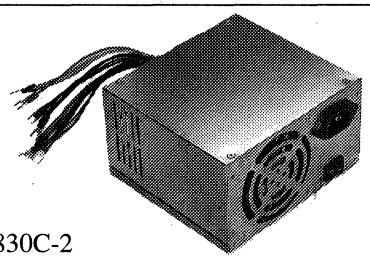
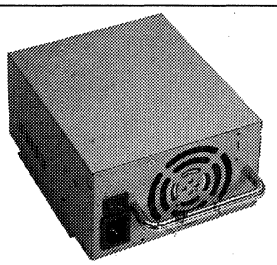

SNP-830C-2


SNP-R203

MODEL	OUTPUT				EMI	SIZE(WxLxH)	MOUNTING	NOTE
60W								
SNP-3163-2	5V/6A	12V/3A			FCC B	3.5 X 6.0 X 1.78"	3.15 X 4.80"	
SNP-7063	5V/3.5A	12V/4A			Vfg 243	2.0 X 7.0 X 1.66"	1.59 X 6.59"	
SNP-9563	5V/3.5A	12V/4A			Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
90W								
SNP-C083	5.7V/7.1A	12.7V/4.13A			Vfg 243	89 X 152.5 X 57MM	80 X 122MM	
100W								
SNP-9103	5V/4A	12V/7A			Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
150W								
SNP-8153	5V/6A	12V/10A			EN55022B	4.25 X 7.75 X 1.85"	3.74 X 7.25"	*
300W								
SNP-830C-2	5V/30A	12V/14V			EN 55022 B	140 X 150 X 86.2MM	Baby AT Mounting	
Hot Swap SubSystem								
60W								
SNP-R063	5V/3.5A	12V/4A			Vfg 243	3.74 X 7 X 1.62"	3.24 X 6.5"	
80W								
SNP-R083	5V/7A	12V/4A			Vfg 243	3.74 X 7 X 1.62"	3.24 X 6.5"	
120W								
SNP-R123	5V/6A	12V/7.5A			Vfg 243	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
150W								
SNP-R153	5V/6A	12V/10A			EN55022	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
SNP-R153-R	5V/6A	12V/10A			EN55022	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
SNP-R153-K	5V/11A	12V/8A			EN55022	4.25 X 7.75 X 1.85"	3.74 X 7.25"	
200W								
SNP-R203	5V/10A	12V/14A			EN55022	150 X 170 X 85MM	Slide-in	*
SNP-R230	5V/20A	12V/10A	-12V/0.5A	-5V/0.5A	EN55022	41 X 115 X 122.2MM	Slide-in	*
300W								
SNP-R303	5V/20A	12V/19A			EN55022	150 X 170 X 85MM	Slide-in	*

Note * - Developing priority depends on R&D department status.

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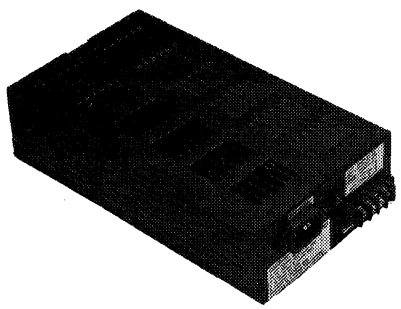
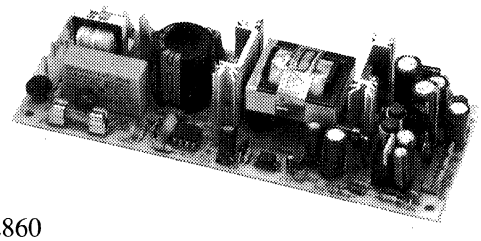
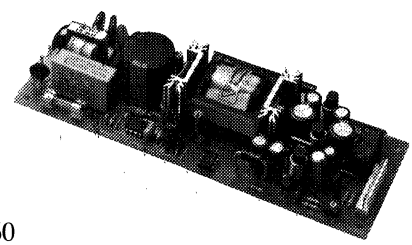
Moving Sign & Fax Machine



SNP-9166



SNP-2860



SNP-2960

Moving Sign

MODEL	OUTPUT	EMI	SIZE(WxLxH)	MOUNTING	NOTE
140W					
SNP-9166	5V/25A	Vfg 243 FCC B	128 X 236 X 68MM	Desk Top	*
SNP-9167	12V/12A	Vfg 243 FCC B	128 X 236 X 68MM	Desk Top	
SNP-9169	24V/6A	Vfg 243 FCC B	128 X 236 X 68MM	Desk Top	

Note * - Developing priority depends on R&D department status.

Fax Machine

MODEL	OUTPUT					EMI	SIZE(WxLxH)	MOUNTING	NOTE
SNP-2860	5V/0.7A	12V/0.25A	-12V/0.1A	24V/1.25A		CISPR 22"B"	165 X 60 X 36.1MM	155 X 50MM	Universal
SNP-2860-1	5V/0.7A	12V/0.25A	-12V/0.1A	24V/1.25A		FCC A	165 X 60 X 35.0MM	155 X 50MM	110Vac only
SNP-2860-2	5V/0.7A	12V/0.25A	-12V/0.1A	24V/1.25A		CISPR 22"B"	165 X 60 X 35.0MM	155 X 50MM	220Vac only
SNP-2960	5V/0.7A	12V/0.7A	-12V/0.1A	+24VA/0.7A	+24VB/1A	VDE B	185 X 60 X 36.1MM	175 X 50MM	
SNP-2962	5V/0.8A	12V/0.2A	-12V/0.1A	+24VA/0.6A	+24VB/1A	FCC B	190 X 58 X 36.1MM	178 X 46MM	
SNP-2965	5V/0.7A	12V/0.2A	-12V/0.1A	+24VA/0.7A	+24VB/1A	Vfg 243	185 X 60 X 36.1MM	175 X 50MM	
SNP-2966	5V/0.7A	12V/0.4A	-12V/0.1A	+24VA/0.7A	+24VB/1A	VDE B	185 X 60 X 36.1MM	175 X 50MM	

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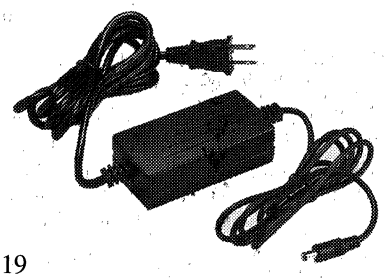
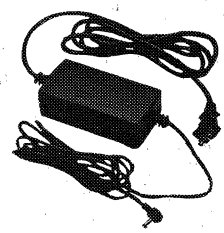
Adapter


SNP-Q219


SNP-V039

SNP-K039

SNP-T031

MODEL	OUTPUT	EMI	CASE / SIZE(mm)
10W Class II			
SNP-Q216	5V/2A	Vfg 243	Q 50.8 X 101.6 X 31.8MM
SNP-Q217	12V/1A	Vfg 243	Q 50.8 X 101.6 X 31.8MM
SNP-Q219	24V/0.5A	Vfg 243	Q 50.8 X 101.6 X 31.8MM
10W Class I			
SNP-Q316	5V/2A	Vfg 243	Q 50.8 X 101.6 X 31.8MM
SNP-Q317	12V/1A	Vfg 243	Q 50.8 X 101.6 X 31.8MM
SNP-Q318	15V/0.8A	Vfg 243	Q 50.8 X 101.6 X 31.8MM
SNP-Q319	24V/0.5A	Vfg 243	Q 50.8 X 101.6 X 31.8MM
20W			
SNP-K033	5V/1A 12V/1A	EN55022B	K 60.0 X 120.0 X 38.1MM
SNP-K037*	12V/1.5A	EN55022B	K 60.0 X 120.0 X 38.1MM
SNP-K039	24V/1A	EN55022B	K 60.0 X 120.0 X 38.1MM
20W			
SNP-T021	5V/1A 12V/1A -12V/0.3A	VDE B	T 75.0 X 150.0 X 43.0MM
SNP-S021-1	5V/1A 12V/1A -12V/0.3A	VDE B	S 75.0 X 150.0 X 43.0MM
SNP-T024-1	5V/1A 15V/0.25A -15V/0.25A	Vfg 243	T 75.0 X 150.0 X 43.0MM
SNP-T026	5V/4A	VDE B	T 75.0 X 150.0 X 43.0MM
25W			
SNP-V036*	5V/4A	CISPR 22 Level B	V 60.0 X 120.0 X 38.1MM
SNP-V037	12V/2A	Vfg 243	V 60.0 X 120.0 X 38.1MM
SNP-V039	24V/1.25A	CISPR 22 Level B	V 60.0 X 120.0 X 38.1MM
30W			
SNP-T031	5V/2A 12V/1.5A -12V/0.3A	Vfg 243	T 75.0 X 150.0 X 43.0MM
SNP-T033	5V/2A 12V/2A	Vfg 243	T 75.0 X 150.0 X 43.0MM
SNP-T035	18V/2A	VDE B	T 75.0 X 150.0 X 43.0MM
SNP-T037	12V/2.5A	VDE B	T 75.0 X 150.0 X 43.0MM
SNP-T038	15V/2A	Vfg 243	T 75.0 X 150.0 X 43.0MM
SNP-T039	24V/1.5A	VDE B	T 75.0 X 150.0 X 43.0MM
SNP-T03M	9V/1.7A -9V/1.7A	Vfg 243	T 75.0 X 150.0 X 43.0MM
SNP-T03N	5V/3A -5V/3A	EN55022B	T 75.0 X 150.0 X 43.0MM

* - Developing priority depends on R&D department status.

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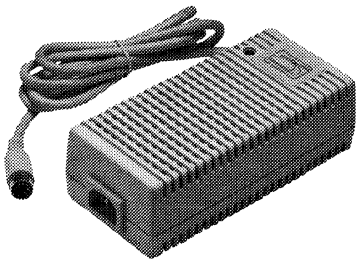
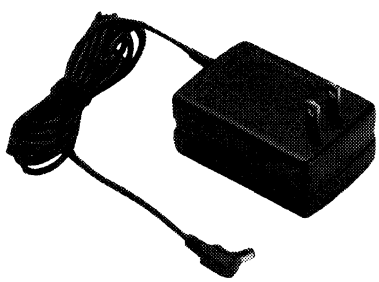


SNP-PA51



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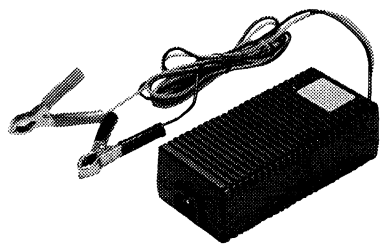

SNP-L124

MODEL	OUTPUT			EMI	CASE / SIZE
50W					
SNP-PA51	5V/3A	12V/2.5A	-12V/0.3A	VDE B	P 80 X 165 X 57MM
SNP-PA53	5V/3.5A	12V/2.5A		VDE B	P 80 X 165 X 57MM
SNP-PA54	5V/3A	15V/1.5A	-15V/0.3A	VDE B	P 80 X 165 X 57MM
SNP-PA55	18V/3A			VDE B	P 80 X 165 X 57MM
SNP-PA57	12V/4.2A			VDE B	P 80 X 165 X 57MM
SNP-PA58	15V/3.5A			VDE B	P 80 X 165 X 57MM
SNP-PA58-C	13.8V/3.5A			VDE B	P 80 X 165 X 57MM
SNP-PA59	24V/2.3A			VDE B	P 80 X 165 X 57MM
SNP-PA5T	48V/1.1A			EN55022B	P 80 X 165 X 57MM
70W					
SNP-A075*	18V/4A			EN55022B	A 95 X 180 X 63MM
SNP-A077	12V/6A			EN55022B	A 95 X 180 X 63MM
SNP-A07T	48V/1.5A			EN55022B	A 95 X 180 X 63MM
SNP-A078	15V/5A			EN55022B	A 95 X 180 X 63MM
SNP-A079	24V/3A			EN55022B	A 95 X 180 X 63MM

Wall Mount

MODEL	OUTPUT	EMI	CASE / SIZE(mm)
10W Class II			
SNP-W216	5V/2A	FCC B	W 50.8 X 76.2 X 31.8MM
SNP-W21C	8V/1.1A	FCC B	W 50.8 X 76.2 X 31.8MM
SNP-W217	12V/1A	FCC B	W 50.8 X 76.2 X 31.8MM

Lead Acid Charger

MODEL	OUTPUT	EMI	CASE / SIZE (mm)
SNP- L124	13.8V/ 4A	FCC B Vfg 243	P 80 X 165 X 57MM
SNP- L128*	13.8V/ 8A	FCC B Vfg 243	P 127 X 220 X 68MM
SNP- L242*	27.6V/2A	FCC B Vfg 243	P 80 X 165 X 57MM
SNP- L244*	27.6V/4A	FCC B Vfg 243	P 127 X 220 X 68MM
SNP- L482*	55.2V/2A	FCC B Vfg 243	P 127 X 220 X 68MM

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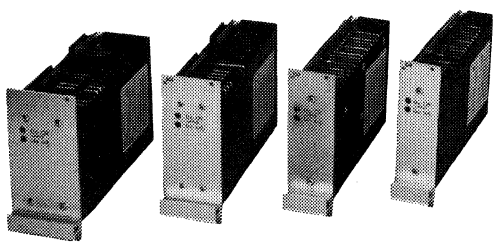
Eurocard & Medical
(Patient disconnection)

Eurocard

MODEL	OUTPUT			EMI	SIZE	PANEL MOUNTING	NOTE
SEC-9041	5V/3A	12V/2A	-12V/0.5A	VDE B	3U7TE (HP)	4HP	
SEC-9046	5V/8A			VDE B	3U7TE (HP)	4HP	
SEC-9047	12V/3.5A	5V/0.5A		VDE B	3U7TE (HP)	4HP	
SEC-9049	24V/2A	5V/0.5A		VDE B	3U7TE (HP)	4HP	
SEC-9061	5V/ 5A	12V/3A	-12V/0.5A	Vfg 243	3U8TE (HP)	5HP	
SEC-9066	5V/13A			Vfg 243	3U8TE (HP)	5HP	
SEC-9067	12V/5.5A	5V/0.5A		Vfg 243	3U8TE (HP)	5HP	
SEC-9069	24V/2.7A	5V/0.5A		Vfg 243	3U8TE (HP)	5HP	
SEC-9101	5V/8A	12V/4A	-12V/0.5A	Vfg 243	3U10TE (HP)	7HP	
SEC-9106	5V/20A			Vfg 243	3U10TE (HP)	7HP	
SEC-9107	12V/8A	5V/0.5A		Vfg 243	3U10TE (HP)	7HP	
SEC-9109	24V/4.5A	5V/0.5A		Vfg 243	3U10TE (HP)	7HP	
SEC-9121	5V/9A	12V/6A	-12V/0.5A	Vfg 243	3U12TE (HP)	9HP	*
SEC-9126	5V/24A			Vfg 243	3U12TE (HP)	9HP	*
SEC-9127	12V/10A	5V/0.5A		Vfg 243	3U12TE (HP)	9HP	
SEC-9129	24V/5A	5V/0.5A		Vfg 243	3U12TE (HP)	9HP	

1U = 44.45MM, 1TE (HP) = 5.08MM, PCB Thickness : 1.6MM, HP - Horizontal Pitch
Note * - Developing priority depends on R&D department status.



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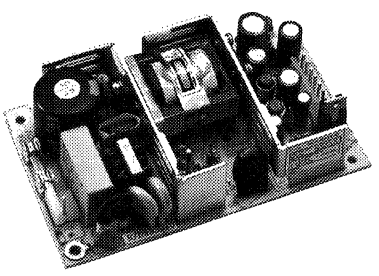

SNP-9541-M

Medical (Patient disconnction)

MODEL	OUTPUT				EMI	SIZE(WxLxH)	MOUNTING	NOTE
40W								
SNP-9541-M	5V/3A	12V/2A	-12V/0.3A		Vfg 243	3.0 X 5.0 X 1.32"	2.55 X 4.55"	
SNP-9544-M	5V/3A	15V/1.5A	-15V/0.3A		Vfg 243	3.0 X 5.0 X 1.32"	2.55 X 4.55"	
SNP-9546-M	5V/8A				Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9547-M	12V/3.3A				Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9548-M	15V/2.6A				Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-9549-M	24V/1.7A				Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
SNP-954A-M	13.8V/3A				Vfg 243	3.0 X 5.0 X 1.30"	2.55 X 4.55"	
60W								
SNP-9561-M	5V/5A	12V/2.3A	-12V/0.5A		Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9563-M	5V/5A	12V/2.8A			Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9566-M	5V/12A				Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9567-M	12V/5.5A				Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9568-M	15V/4.5A				Vfg 243	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
SNP-9569-M	24V/2.75A				EN55022B	3.0 X 5.0 X 1.66"	2.55 X 4.55"	
110W								
SNP-9108-M	15V/7.5A				EN55022B	4.25 X 7.0 X 1.73"	3.74 X 6.49"	
SNP-9107-M	12V/9.2A				EN55022B	4.25 X 7.0 X 1.73"	3.74 X 6.49"	
SNP-9109-M	24V/5A				EN55022B	4.25 X 7.0 X 1.73"	3.74 X 6.49"	
50W Adaptor								
SNP-PA59-M	24V/2.3A				EN55022B	P 80 X 165 X 57MM		
PC for Medical								
SNP-925C-M	5V/22A	12V/7A	-12V/1A	-5V/1A	EN55022B	150 X 140 X 86.2MM	PS2 Mounting	

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Telecommunication

MODEL	OUTPUT	EMI	SIZE(WxLxH)	MOUNTING	NOTE
SNP-902T	48V/0.5A	EN55022	60 X 110 X 27.5MM	50 X 100MM	
SNP-904T	48V/0.85A	Vfg 243	3.0 X 5.0 X 1.28"	2.55 X 4.55"	
SNP-906T	48V/1.4A	Vfg 243	3.0 X 5.0 X 1.55"	2.55 X 4.55"	

Industrial PC

MODEL	OUTPUT					EMI	SIZE(WxLxH)(mm)	MOUNTING
SNP-915C	5V/17A	12V/4.5A	-12V/0.3A	-5V/0.3A		FCC B	150 X 140 X 86.2	PS2 Mounting
SNP-915C-1	5V/17A	12V/4.5A	-12V/0.3A	-5V/0.3A		VDE B	150 X 140 X 86.2	PS2 Mounting
SNP-917C	5V/21.3A	12V/4.4A	-12V/0.3A	-5V/0.3A		FCC B	150 X 140 X 86.2	PS2 Mounting
SNP-917C-1	5V/21.3A	12V/4.4A	-12V/0.3A	-5V/0.3A		VDE B	150 X 140 X 86.2	PS2 Mounting
SNP-918C	5V/18A	12V/4.5A	-12V/0.5A	-5V/0.4A	3.3V/7.6A	Vfg 243	150 X 140 X 86.2	PS2 Mounting
SNP-920C	5V/20A	12V/7.5A	-5V/0.3A	-12V/0.3A		FCC B	150 X 140 X 86.2	PS2 Mounting
SNP-920C-1	5V/20A	12V/7.5A	-5V/0.3A	-12V/0.3A		VDE B	150 X 140 X 86.2	PS2 Mounting
SNP-930C	5V/20A	12V/14A	-12V/0.3A	-5V/0.5A		CISPR B	150 X 140 X 86.2	PS2 Mounting
SNP-925T	5V/25A	12V/10A	-12V/0.3A	-5V/0.3A		FCC B	212.4 X 150 X 150	AT Mounting
SNP-925T-1	5V/25A	12V/10A	-12V/0.3A	-5V/0.3A		VDE B	212.4 X 150 X 150	AT Mounting
SNP-930T	5V/30A	12V/12A	-12V/0.5A	-5V/0.5A		FCC B	212.4 X 150 X 150	AT Mounting
SNP-825A	5V/25A	12V/10A	-12V/0.5A	-5V/0.5A		CISPR B	150 X140 X 86.2	PS2 Mounting
	3.3V/8A	5Vsb/0.72A						
DC to DC						**INPUT**		
SNP-425C	5V/25A	12V/10A	-12V/1A	-5V/1A		-40Vdc~-57Vdc	150 X 140 x 86.2	PS2 Mounting
FAS-425C	5V/25A	12V/10A	-12V/1A	-5V/1A		+19Vdc~+32Vdc	150 X 140 X 86.2	PS2 Mounting

Network

MODEL	OUTPUT			EMI	SIZE(WxLxH)	MOUNTING
SNP-9531-7	5V/4A	12V/0.5A	-12V/0.3A	FCC B	76 X 127.3 X 32.1MM	64.8 X 115.6MM
SNP-9533-7	5V/5A	12V/0.5A		FCC B	76 X 127.3 X 32.1MM	66 X 116.5MM
SNP-9546	5V/8A			Vfg 243	76.2 X 127 X 33.1MM	64.8 X 115.6MM
SNP-9551	5V/4.5A	12V/2A	-12V/0.3A	Vfg 243	76.2 X 127 X 36.4MM	64.8 X 115.6MM
SNP-9066	5V/13A			Vfg 243	76.2 X 127 X 41.1MM	64.8 X 115.6MM
SNP-8013	5V/1A	12V/0.7A		FCC B	46 X 98 X27.1MM	40 X 90MM
SNP-8023-J	5V/3A	12V/0.75A		EN55022B	40 X 120 X 27.1MM	32 X 112MM
SNP-H023	5V/3A	12V/0.75A		FCC B	52 X 100 X 25.4MM	43 X 91MM
SNP-C081	5V/15A	12V/0.5A	-12V/0.5A	Vfg 243	89 X 152.5 X 57MM	80 X 122MM
SNP-N643	5V/7A	12V/0.3A		EN55022B	80 X 152.5 X 32.4MM	67 X 142.5MM
SNP-N413*	5V/1A	3.3V/3A		CISPR22B	46 X 98 X 27.1MM	40 X 90MM

* - Developing priority depends on R&D department status.

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Compatible With Competitor

MODEL	OUTPUT	EMI	SIZE	MOUNTING	COMPETITOR
SNP-J039	24V/1.3A	FCC A VCCI A	50 X 132.5 X 27.1MM	40 X 122.5MM	N. L. Japan
SNP-J107	12V/8.5A	FCC A VCCI A	62 X 222 X 33MM	52 X 212MM	N. L. Japan
SNP-J109	24V/4.5A	FCC A VCCI A	62 X 222 X 33MM	52 X 212MM	N. L. Japan
SNP-AS41	5V/3A 12V/2A -12V/0.3A	Vfg 243	90 X 137.5 X 32.1MM	80 X 122.5MM	A. brand in H.K.

Enclosed Types

MODEL	P.S.U. FITTED/OUTPUT	EMI	SIZE(WxLxH)	MOUNTING	NOTE
Complete Enclosure : AC-IEC 320 Inlet / DC - Wire Harness					
SNP-5531	SNP-9031	Vfg 243	75 X 160 X 40MM	45 X 135MM	Molex 5239-06
SNP-5533	SNP-9033	Vfg 243	75 X 160 X 40MM	45 X 135MM	AMP 1-480424-0
SNP-5536	SNP-9036	Vfg 243	75 X 160 X 40MM	45 X 135MM	Molex 5239-04
SNP-5537	SNP-9037	Vfg 243	75 X 160 X 40MM	45 X 135MM	Molex 5239-04
SNP-5541	SNP-9541	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-06
SNP-5542	SNP-9542	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-06
SNP-5543	SNP-9543	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	AMP 1-480424-0
SNP-5544	SNP-9544	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-06
SNP-5546	SNP-9546	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-04
SNP-5547	SNP-9547	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-04
SNP-5548	SNP-9548	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-04
SNP-5549	SNP-9549	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-04
SNP-5561	SNP-9061	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-06
SNP-5563	SNP-9063	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	AMP 1-480424-0
SNP-5566	SNP-9066	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-06
SNP-5567	SNP-9067	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-06
SNP-5569	SNP-9069	Vfg 243	85 X 160 X 45.2MM	93 X 110MM	Molex 5239-06
End Open Bracket W/Cover : Pin Header Input & Output					
SNP-9541-A	SNP-9541	Vfg 243	90 X 143 X 40MM	63 X 110MM	Molex 5239-06
SNP-9542-A	SNP-9542	Vfg 243	90 X 143 X 40MM	63 X 110MM	Molex 5239-06
SNP-9543-A	SNP-9543	Vfg 243	90 X 143 X 40MM	63 X 110MM	AMP 1-480424-0
SNP-9544-A	SNP-9544	Vfg 243	90 X 143 X 40MM	63 X 110MM	Molex 5239-06
SNP-9546-A	SNP-9546	Vfg 243	90 X 143 X 40MM	63 X 110MM	Molex 5239-04
SNP-9547-A	SNP-9547	Vfg 243	90 X 143 X 40MM	63 X 110MM	Molex 5239-04
SNP-9548-A	SNP-9548	Vfg 243	90 X 143 X 40MM	63 X 110MM	Molex 5239-04
SNP-9549-A	SNP-9549	Vfg 243	90 X 143 X 40MM	63 X 110MM	Molex 5239-04
SNP-3C80	SNP-3180	FCC B	4.41 X 8 X 2.36"	Multi-Position	
SNP-3C83	SNP-3183	FCC B	4.41 X 8 X 2.36"	Multi-Position	
SNP-3C85	SNP-3185	FCC B	4.41 X 8 X 2.36"	Multi-Position	
SNP-3C89	SNP-3189	FCC B	4.41 X 8 X 2.36"	Multi-Position	
SNP-9100-C*	SNP-9100	Vfg 243	4.41 X 8 X 2.36"	Multi-Position	
L Bracket W/Cover : Terminal Blocks Input & Output					
SNP-9200-C	SNP-9200	Vfg 243	5 X 10.5 X 2.5"	Multi-Positions	P.F./P.G.
SNP-9205-C	SNP-9205	Vfg 243	5 X 10.5 X 2.5"	Multi-Positions	P.F./P.G.
L Bracket : Pin Header Input & Output					
SNP-R063-L*	SNP-R063	Vfg 243	5 X 7.25 X 2"	Slide	
SNP-R083-L*	SNP-R083	Vfg 243	5 X 7.25 X 2"	Slide	
SNP-R123-L*	SNP-R123	Vfg 243	5.5 X 8 X 2.5"	Slide	
SNP-R153-L*	SNP-R153	Vfg 243	5.5 X 8 X 2.5"	Slide	

* - Tooling is pending.

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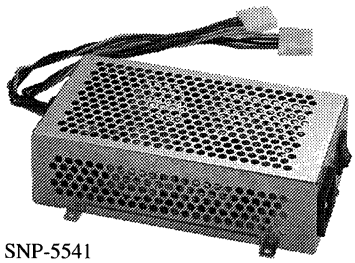
SNP-5531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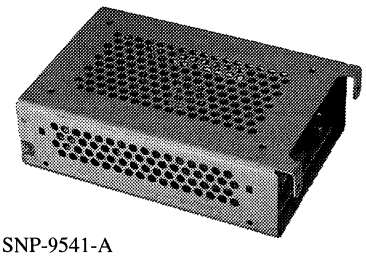
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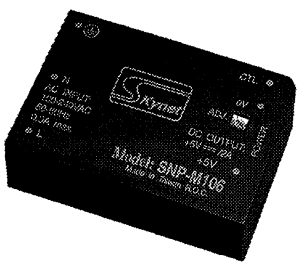
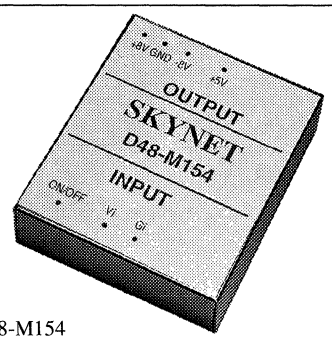


SNP-M106

D24-M026



D48-M154

AC to DC Module

MODEL	OUTPUT	EMI	SIZE(WxLxH)	NOTE
SNP-M056	5V/1A	CISPR 22 "B"	45 X 58 X 19.5MM	
SNP-M058	15V0.33A	CISPR 22 "B"	45 X 58 X 19.5MM	
SNP-M106	5V/2A	CISPR 22 "B"	45 X 65 X 21.3MM	

DC to DC Module

MODEL		INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	SIZE(WxLxH)
I/O 3000VAC	I/O 500VDC	VDC	VDC	mA	mm
2W					
D05-M026	D05-M021	5V ± 10%	5V	400	20.5 X 32.0 X 10.2
D05-M027	D05-M22	5V ± 10%	12V	166	20.5 X 32.0 X 10.2
D05-M028	D05-M023	5V ± 10%	15V	133	20.5 X 32.0 X 10.2
D05-MD27	D05-MD22	5V ± 10%	± 12V	± 83	20.5 X 32.0 X 10.2
D05-MD28	D05-MD23	5V ± 10%	± 15V	± 66	20.5 X 32.0 X 10.2
D12-M026	D12-M021	12V ± 10%	5V	400	20.5 X 32.0 X 10.2
D12-M027	D12-M022	12V ± 10%	12V	166	20.5 X 32.0 X 10.2
D12-M028	D12-M023	12V ± 10%	15V	133	20.5 X 32.0 X 10.2
D12-MD27	D12-MD22	12V ± 10%	± 12V	± 83	20.5 X 32.0 X 10.2
D12-MD28	D12-MD23	12V ± 10%	± 15V	± 66	20.5 X 32.0 X 10.2
D24-M026	D24-M021	24V ± 10%	5V	400	20.5 X 32.0 x 10.2
D24-M027	D24-M022	24V ± 10%	12V	166	20.5 X 32.0 X 10.2
D24-M028	D24-M023	24V ± 10%	15V	133	20.5 X 32.0 X 10.2
D24-MD27	D24-MD22	24V ± 10%	± 12V	± 83	20.5 X 32.0 x 10.2
D24-MD28	D24-MD23	24V ± 10%	± 15V	± 66	20.5 X 32.0 X 10.2
25W					
D48-M154		36V - 72V	± 5V, ± 8V	1.5A X 2, 0.45A X 2	65.0 x 76.2 X 21.1

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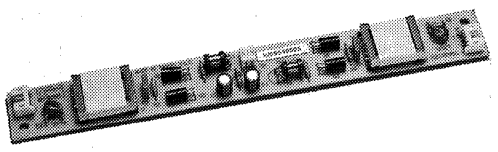

DC to AC Inverter

Linear Power Supply

DC to AC Inverters

MODEL	INPUT VOLTAGE (V)	OUTPUT VOLTAGE (Vms)	OUTPUT CURRENT (mAac)	FREQUENCY TYP.	SIZE	NOTE
DTA-0505	5 ± 10%	450 (max.)	5 X1	50KHz	95 X 21 X 10MM	
DTA-1205	12 ± 10%	450 (max.)	5 X 1	50KHz	95 X 21 X 10MM	
DTA-2405	24 ± 10%	450 (max.)	5 X 1	50KHz	95 X 21 X 10MM	
DTA-0510	5 ± 10%	450 (max.)	5 X 2	50KHz	190 X 21 X 10MM	
DTA-1210	12 ± 10%	450 (mzx.)	5 X 2	50KHz	190 X 21 X 10MM	
DTA-2410	24 ± 10%	450 (max.)	5 X 2	50KHz	190 X 21 X 10MM	

Linear Power Supply

MODEL	INPUT VOLTAGE	OUTPUT	NOTE
WLT-2408-1	110VAC/60HZ	27V/0.8A	
DAD-1215-A	120VAC/60HZ	12V/1.5A	
DAF-2410-A	230VAC/60HZ	24V/1.0A	
DAC-2410-A	115VAC/60HZ	24V/1.0A	
DAD-1203-A	198~250VAC / 90~130VAC SWITCH SELECT	± 12V/0.5A	
WAD-0520-A	120VAC/60HZ	5V/1.5A	

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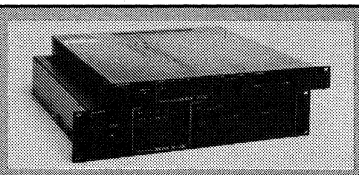


DCS Series

- 1 kW, 3 kW and 4kW
- Low profile, light weight
- Optional internal IEEE-488/RS-232 interface

CE

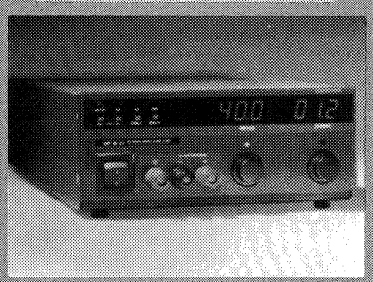
State of the art programmable units with high power density. Current mode switching rates up to 100kHz, ideal for complex ATE and burn-in applications.

L Series

- 90W to 375W
- Single and triple output
- 3-1/2 digit LED display
- Universal ac input

CE

Designed as manually operated laboratory power supplies to be used in benchtop or portable applications.

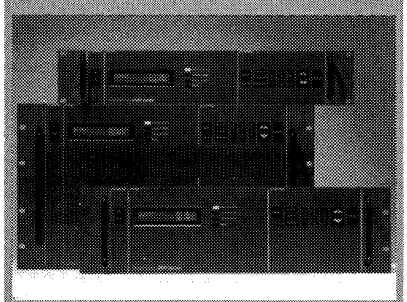


LHP Series

- Universal ac input (85 - 250 VAC)
- Power Factor Correction (PFC)
- Optional Internal IEEE-488 interface
- Optional Internal RS-232 interface
- CE Mark

CE

1000 watt programmable power supplies designed for bench-top applications. They feature universal input and power factor correction (PFC). Occupies less than 3.5 inches of vertical height. Both front and rear output connectors are available.

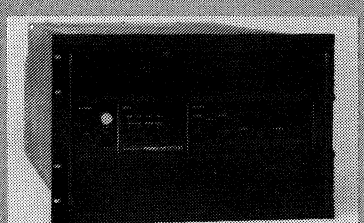


DHP SERIES

- Compact size of 2U for 6kW, 4U for 12kW and 6U for 18kW
- A rich menu front panel programming capability. GPIB IEEE 488.2 and RS 232 options are available
- Ease of paralleling. Only requires adjusting the voltage and current level at the master supply
- Passive Power Factor Correction is standard 0.94
- Calibration does not require removing chassis covers or adjusting potentiometers as a result of firmware calibration constants
- Extensive master/slave capability. Up to 31 supplies can be remotely operated from a single IEEE-488 address using a daisy chained cable

CE

The Magnum series power supplies are designed to provide high power from a trim rackmount profile.



PRO-T Series

- 10 kW
- 80% efficiency
- Optional internal IEEE-488/RS-232 interface
- EMI-protected ac line

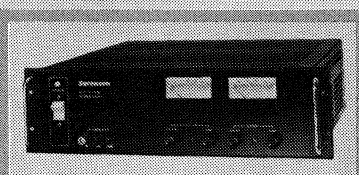
CE

New 10 kW units with internal IEEE-488/RS-232 programming for high-power burn-in and ATE applications.

DCR-T Series

- 5 kW
- EMI-protected ac line
- Automatic V/I crossover with indicators
- Optional IEEE-488 interface

High power burn-in and ATE applications requiring programmable power supplies with manual and remote controls.



DCR-B2 Series

- 400W to 2800W
- 0.05% line and load regulation
- Analog remote programming
- OVP standard

SCR pre-regulatory topology provides performance suitable for nearly all burn-in and test applications.

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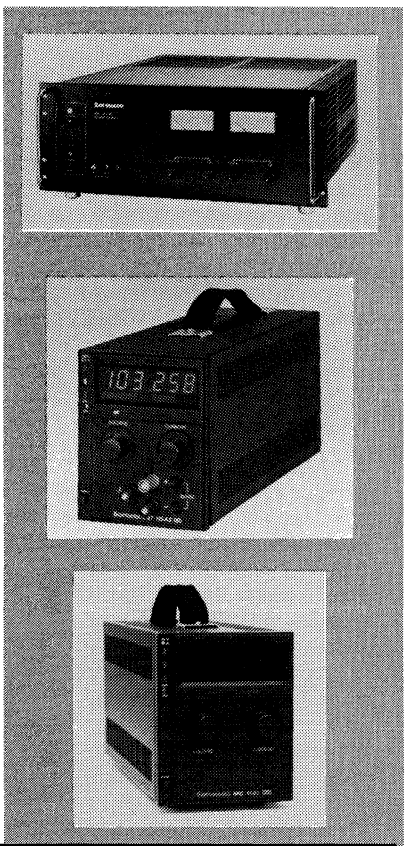
SRL Series

- 240-2100W
- 0.2 - 0.7 mV ripple (PARD) RMS
- 0.5 - 30 mA ripple (PARD) RMS
- Analog remote programming

Designed for applications requiring excellent regulation, low noise and fast transient response.



XT Series

- 60W, quarter-rack
- Modular packaging
- Optional internal IEEE-488 and SAMI interface
- Optional Analog remote programming

CE

Designed for bench top, ATE and portable applications, requiring affordable, low noise and low ripple performance.

HPD Series

- 300W, quarter-rack, modular power supplies
- High power density
- Optional internal IEEE-488 and SAMI interface
- Optional Analog remote programming

CE

Benchtop, ATE and other instrument-controlled applications where high power density is required.

Model	XT	L	HPD	SRL	DCR-B2	LHP	DCS	DCR-T	PRO-T	DHP
Topology	Linear	Linear	Switching Pre-Regulator	Linear, SCR Pre-Regulator	SCR Controlled Regulator	Switch Mode	Current Mode Switcher	SCR Controlled Regulator	SCR Controlled Regulator	Switch Mode
Maximum Power	60W	90-375W	300W	240-2100W	400-2800W	1000W	1kW, 2kW & 3kW	5kW	10kW	30kW
Maximum Voltage	0-120V	0-300V	0-60V	0-60V	0-600V	0-600V	0-600V	0-600V	0-600V	0-400V
Maximum Current	0-6A	0-30A	0-20A	0-50A	0-120A	0-130A	0-350A	0-800A	0-625A	0-1500A
Voltage Regulation Line & Load	0.02% + 4mV	0.01%	0.02% + 4mV	0.01% or 2mV	0.03%	0.01% + 2mV	0.2%	0.1%	0.1%	0.1%
Current Regulation Line & Load	0.02% + 500µA	0.2%	0.02% + 2mA	0.02% + 6mA	0.25%	0.05%+ 1mA	0.2%	0.1%	0.1%	0.1%
Voltage Ripple (PARD) RMS	1mV	1mV	5mV	0.2-0.7mV	65-1200mV	5-35mV	10-100mV	20-150mV	30-150mV	30-225mV
Current Ripple (PARD) RMS	2mA	3-10mA	5mA	0.5-30mA	2-785mA	—	1-870mA	0.1-3A	0.1-2A	—
Transient Response Time	100µs	100µs	<500µs	70-150µs	50ms	1ms	500µS	40ms	40ms	10ms
Input Power	1ø	1ø	1ø	1ø	1ø	1ø W/PFC	1ø (1ø or 3ø)	3ø	3ø	1ø or 3ø
Optional Interface	IEEE-488 SAMI, Analog	N/A	IEEE-488 SAMI, Analog	N/A	N/A	IEEE-488 RS-232, SAMI	IEEE-488/ RS-232	IEEE-488	IEEE-488/ RS-232	IEEE-488/ RS-232/ Analog

*** Contact Sorensen for availability of additional interfaces.**

ISO

Spellman
High Voltage Electronics Corporation

ADVANCING HIGH VOLTAGE TECHNOLOGY FOR TOMORROW'S APPLICATIONS

Spellman High Voltage Electronics Corporation, established in 1947, designs and manufactures high frequency, high voltage dc power supplies. Our goal is to enable scientific, medical and industrial communities to more easily utilize the benefits of high voltage dc power to improve performance in suitable applications.

Responding to our customers' needs has led to the development and production of Spellman's cost effective power supplies for many applications including X-ray, medical diagnostic, industrial microwave and radiography, semiconductor manufacturing, electron beam welding, high resolution information display, and analytical instrumentation.

We've enlarged our new headquarters to 100,000 sq. ft. and migrated to a new ERP system to accommodate our 15% annual sales growth. Internationally, we've opened sales and service facilities in Japan and The Netherlands, formed an alliance to create Start-Spellman in the United Kingdom, and added a new manufacturing facility in Mexico.

A BROAD LINE OF HIGH VOLTAGE SOLUTIONS

Spellman offers the industry's most extensive line of standard and configurable high voltage power supplies, at power levels from 120mW to 150kW, and voltages up to 500kV. Spellman configurations include rack-mounted, modular and PCB mounted units. Programmability can be provided through remote analog or digital computer interfaces. Performance enhancement options include very low ripple, high stability and superior regulation. Other optional features include multiple outputs, power factor correction and specialized control and safety features.

ENGINEERING EXCELLENCE

Engineering excellence is the key to designing optimal solutions for each customer's unique high voltage power requirements. Fifty years of experience in varied high voltage applications provides us with in-depth knowledge of high voltage design techniques for layout, spacing, insulation and arc-suppression. Spellman provided the world's first commercially available high frequency, 3kW, series resonant, high voltage power supply in 1982. Resonant power conversion has intrinsic advantages, permitting higher power densities, less radiated and emitted noise, and improved efficiencies. Since then we have led the field in applied resonant power conversion, obtaining key patents in resonant inverter topologies and control circuitry.

INTEGRATED MANUFACTURING

Our integrated manufacturing process has proven to be very effective in insuring high efficiency, quality and on-time delivery. Spellman is a vertically-integrated manufacturer with a fully equipped, highly automated metal shop and magnetics department. Our ability to produce many of our own critical components provides us the flexibility to respond to orders whether for one or thousands of units - while controlling costs and maintaining delivery commitments.

PRODUCT RELIABILITY TESTING

As an integral part of our design verification process, Spellman performs extensive standard tests including overvoltage, overcurrent, and overpower. We also conduct Environmental Stress Screening (ESS) during the design layout phase to insure the highest level of product reliability. Highly Accelerated Life Tests (HALT) are performed on all new designs and Highly Accelerated Stress Screens (HASS) on production units.

Spellman facilitates end system approvals with testing for:

-CE mark (Low Voltage Directive 72/23/EEC and EMC Directive 89/336/EEC)

-Worldwide safety agency approvals per UL, CSA and VDE

-100% electrical strength testing, as well as protective earth impedance tests per European Standards EN61010 and EN60950.

SPELLMAN QUALITY - ISO 9001 CERTIFIED

Quality demands commitment at all levels in our organization. Members of the Spellman team are trained to use quality tools to identify problems, look for root causes, devise improvements and evaluate their effectiveness. Spellman's quality system is ISO 9001 certified, covering product development, manufacturing, and customer service. ISO 9001 insures that we document what we do and follow our procedures throughout every phase of our operations.

SERVICE AND SUPPORT

Dedicated, knowledgeable service and support representatives are ready to provide quick comprehensive assistance. Product repair, upgrades, and calibration are available to maximize the long-term, high quality performance of all Spellman products.We are devoted to meeting the needs and exceeding the expectations of our customers, both in the products we design and manufacture, and in the support and service we provide.

NEW CHALLENGES

Spellman looks forward to new challenges and opportunities to expand our industry-leading line of power supplies. Our platforms can be modified to fulfill many diverse application requirements.

We cordially invite you to call and speak with us directly, or visit our web site. We believe the better you know us, the more convinced you will become that Spellman can be relied upon to provide you with the best solutions for your high voltage power supply needs. The following pages illustrate and provide data on some of our most widely used products. Please call us with your specific high voltage needs as we specialize in designing custom high voltage power supplies and are eager to work with you to meet your unique product requirements.

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HV Power Supply Selector

RACK MOUNTED POWER SUPPLIES

Power	Model	MAXIMUM VOLTAGE (KV)												
		≤0.5	1	2	3	10	15	30	40	60	70	80	≥120	Page
10W	CZE1000R													D-1811
10W-1.2kW	SL													D-1802-3
4kW-12kW	SA4													D-1801
6kW-18kW	SR6													D-1800
36kW-120kW	MG													D-1798

MODULES AND PC MOUNTS

Power	Model	MAXIMUM VOLTAGE (KV)												
		≤0.5	1	2	3	10	15	30	40	60	70	80	≥120	Page
120mW	MC													D-1813
1.5W	MD													D-1813
1.5W, 2.5W	MM													D-1812
2W	MHV													D-1817
3W	MS													D-1812
8W, 10W	MP													D-1811
10W	CZE 2000													D-1811
30W	EPM													D-1810
60W	SMS													D-1809
120W	PCM													D-1809
200W, 350W	PTV													D-1808

X-RAY POWER SUPPLIES

Power	Model	MAXIMUM VOLTAGE (KV)												
		≤0.5	1	2	3	10	15	30	40	60	70	80	≥120	Page
50W	XRM													D-1810
3W-260W	XLG													D-1806
600W, 1200W	XLF													D-1807
3kW, 4kW	DF3, FF3, FF4													D-1804
18kW	XR18													D-1805
24kW	XTS													D-1805

CUSTOM INSTRUMENTS AND MODULES

Power	Model	MAXIMUM VOLTAGE (KV)												
		≤0.5	1	2	3	10	15	30	40	60	70	80	≥500	Page
1W-150kW	Custom													D-1799, D-1814-D-1816

Specifications are subject to change without notice. Contact factory for additional information on all products.

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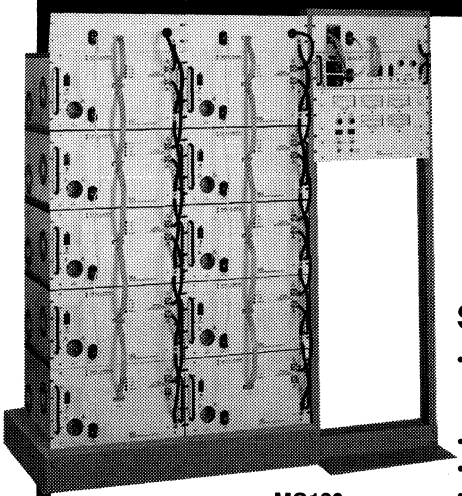
1kV to 20kV
36kW to 120kW

MG Series Magnetron HV Power Supplies



MG120
120kW Supply

The Spellman MG Series Magnetron HV power supplies are high frequency, high efficiency units designed specifically to power CW magnetrons ranging from 36kW to 120kW. They contain the filament and optional magnet control supplies necessary to provide a complete drive system for each magnetron. These rugged designs deliver reliable power to magnetrons used for varied applications including Industrial Cooking, Powder Drying, Rubber Vulcanization, Sintering of Ceramics, Processing of Radioactive Waste, and Plasma Generation.

Features

- Current Output Source
- Low stored energy
- Fast Fault Shutdown (<30µsec)
- Provision to limit microwave reflected power
- Programmable Filament Supply
- Overvoltage, Overcurrent, Arc, and Short Circuit Protection
- Magnet Supply
- Low Cost
- Compact design
- Light weight

Specifications

- Input Vottage: 480Vac ±10%, 3 phase, 50/60Hz. 400Vac optional. Specify with order.
- Output Voltage: See Table.
- Output Current: See Table.
- Output Power: See Table.
- Voltage Regulation:
  Load: 0.5% for 0-100% change in output current.
  Line: ±0.1% for a ±10% change in line voltage.
- Temperature Range:
  Operating: 0°C to +40°C.
  Storage: -40°C to +85°C.
- Current Regulation:
  Load: 0.5% of rated current for any voltage change.
  Line: ±0.1% of rated current over the specified input range.
- Current Ripple: 5% rms.
- Lower ripple available on special order.
- Front Panel Metering:
  Voltage and current meters optional.
- Voltage and Current Programming:
  0 to 10V = 0 to full output.
- Voltage and Current Monitors:
  0 to +10V = 0 to full output,
- Filament Supply: The power supply provides a regulated filament current at the secondary of an external filament isolation transformer supplied with each unit.
- Magnet Power Supply: See Table.

Model		MG36	MG72	MG120
RF Power max	kWatt	20	60	100
DC Power max	kWatt	36	72	120
V max	-kV	15	17	20
I max	Ampere	2.5	5	6
V Fil Preheat	Volt	10	12.6	14
I Fil Preheat	Ampere	50	115	115
Time Preheat	Seconds	180	180	180
I Fil @ I max	Ampere	20	86	74
I Magnet	Ampere	5	5	5
V Magnet	Volt	50	50	50
Height	in (mm)	36.75 (93.4)	72 (183)	63 (160)
Width & Depth		19" x19" (48.26 x 48.26cm)		2 times 19" x 19"
Weight	lbs (kg)	160 (72.5)	310 (141.2)	600 (275)

These models can be customized to fit your OEM applications and special requirements.

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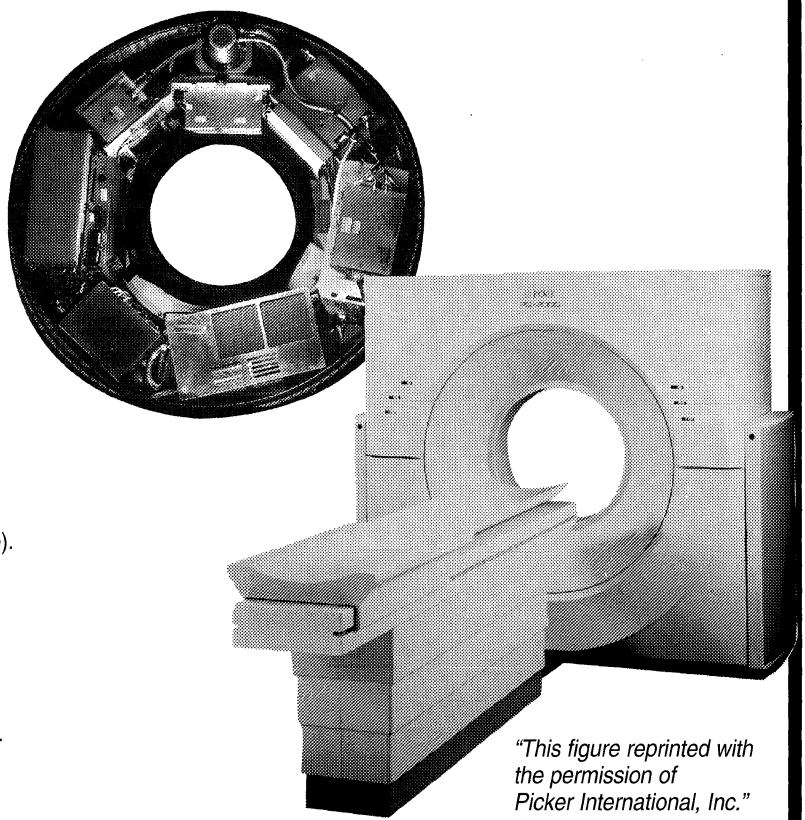
Custom Models

165kV, 400mA, 60kW CT Scanner Supply

Spellman has produced CT Scanner X-ray generators for over 12 years and was the first supplier to provide Generators for continuous rotation in a production system. This expertise has made it possible to develop and produce a highly reliable 60kW Scanner power supply specifically designed to meet the exacting requirements for helical scanning. It has low ripple to make enhanced image quality possible.



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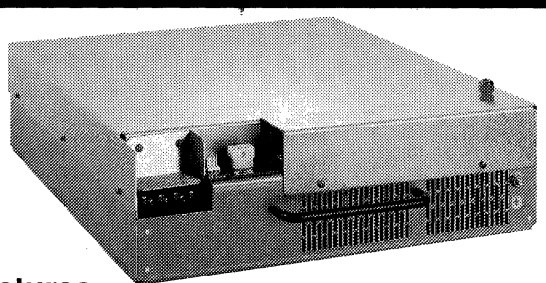
Features

- Output Voltage:
  0 to ± 82.5kV (165kV across the tube).
- Emission Current:
  0 to 400mA.
- Output Power:
  60kW peak.
- Filament:
  15Vdc, 0 to 6A referenced to cathode.
- Dual Focal spot.
- Controls for kV, mA, filament current.

7kV, 2.4kW continuous Power Supply for NICP Spectrometers



This important analytical instrument application required a low cost, highly reliable and compact 2.4kW high voltage power supply to power a vacuum tube RF power source. It provides a variable DC voltage to a maximum value of 7kV capable of a continuous output of 2.4kW.

Features

- 7kV, 460mA, 2.4kW positive polarity.
- Fast dynamic response, <2mSec.
- Full remote control capability.
- Output voltage control:
  0 to 10V from 0 to max voltage.
- Output ripple:
  <2% RMS of output voltage.
- Output Voltage and Current monitoring.
- External Interlock circuitry.
- Compact, low cost.

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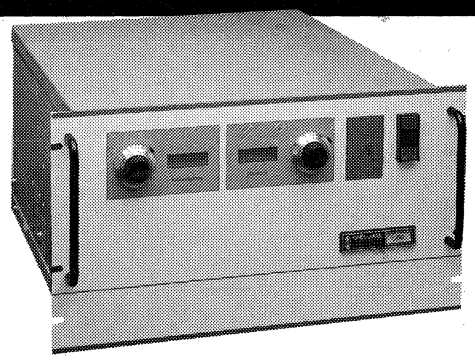
1kV to 120kV
6kW to 18kW

6kW to 18kW SR6 Series HV Power Supplies



The SR6 series incorporates series resonant converter technology with a unique patented control circuit to provide unmatched performance. Special circuitry enables this supply to operate without damage or interruption in rugged environments that frequently pose threats to conventional high voltage power supplies. In addition, the SR6 series protects the load from excessive peak currents by limiting the output current when an arc over condition is sensed.

Features

- Meets CE Low Voltage and EMC directives
- Overvoltage, Overcurrent, Arc and Short Circuit Protection
- Constant Voltage/Constant Current Operation with Automatic Crossover
- Arc Detect, Arc Quench and Arc Count
- Extensive Local and Remote Operation
- 85% efficiency
- System Status Indicators

Specifications

- Input Voltage:
  208Vac ±10%, three phase or
  220Vac ±10%, single phase
  50/60Hz. Specify with order.
- Output controls: Voltage and current are continuously adjustable over entire range via 10-turn potentiometers with lockable counting dials.
- Voltage Regulation:
  Load: 0.005% of full voltage for full load change.
  Line: ±0.005% of full voltage over specified input range.
- Current Regulation:
  Load: 0.05% of full current ±100µA for any voltage change.
  Line: ±0.05% of full current over specified input range.
- Ripple:
  0.1% p-p for 3 phase models only.
  0.1% rms for single phase models.
- Temperature Coefficient: 100ppm/°C.
  50ppm/°C available on special order.
- Stability: 0.01%/hr. after 1/2hr. warm up; 0.02%/8 hrs (typical).
- Metering: Digital voltage and current meters.
- Output cable: 10 ft (3.05m) shielded high voltage cable.
- Physical:
  10 1/2" H x 19" W x 19" D
  (26.6 x 48.3 x 48.3cm)
  for units 1 to 70kV.
  10 1/2" H x 19" W x 24" D
  (26.6 x 48.3 x 61cm)
  for units 80 to 120kV.
- Weight: 75 lbs (34kg) (typical).

Parallel Operation

Parallel Operation options to increase the power and current output capability of the SR6 Series HV Power Supplies are available. Each system is comprised of two, three (or more) separate rack mount chassis consisting of the Master and the Slave(s). Signal Cables are connected from the Master to the Slave supplies via 15 pin mini D connectors located on the rear panels and the appropriate HV interconnect and ground cables are connected to provide the paralleled outputs.

These models can be customized to fit your OEM applications and special requirements.

Maximum Rating (kV)	Maximum Rating (mA)	Model Number
1	6000	SR 1*6
2	3000	SR 2*6
3	2000	SR 3*6
6	1000	SR 6*6
10	600	SR 10*6
15	400	SR 15*6
20	300	SR 20*6
30	200	SR 30*6
40	150	SR 40*6
50	120	SR 50*6
60	100	SR 60*6
70	86	SR 70*6
80	75	SR 80*6
100	60	SR 100*6
120	50	SR 120*6

* Specify "P" for positive, "N" for negative, or "PN" for reverse polarity.

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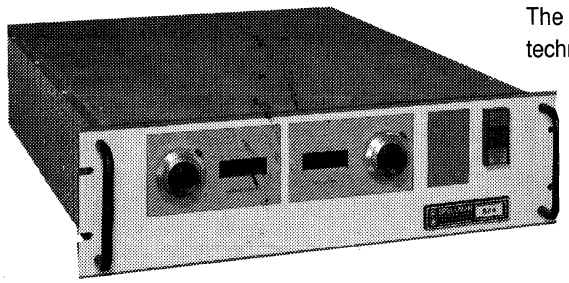
1kV to 70kV
4kW to 12kW

4kW to 12kW SA4 Series HV Power Supplies



The SA4 series incorporates series resonant converter technology with a unique patented control circuit to provide unmatched performance. Special circuitry enables this supply to operate without damage or interruption in rugged environments that frequently pose threats to conventional high voltage power supplies. In addition, the SA4 series protects the load from excessive peak currents by limiting the output current when an arc over condition is sensed.

Features

- Meets CE Low Voltage and EMC directives
- Overvoltage, Overcurrent, Arc and Short Circuit Protection
- Constant Voltage/Constant Current Operation with Automatic Crossover
- Arc Detect, Arc Quench and Arc Count
- Extensive Local and Remote Operation
- 85% efficiency
- System Status Indicators

Specifications

- Input Voltage:
  208Vac ±10%, three phase or
  220Vac ±10%, single phase
  50/60Hz. Specify with order.
- Output controls: Voltage and current are continuously adjustable over entire range via 10-turn potentiometers with lockable counting dials.
- Voltage Regulation:
  Load: 0.005% of full voltage for full load change.
  Line: ±0.005% of full voltage over specified input range.
- Current Regulation:
  Load: 0.05% of full current ±100µA for any voltage change.
  Line: ±0.05% of full current over specified input range.
- Ripple:
  0.1% rms for 3 phase models only.
  0.3% rms for single phase models.
- Temperature Coefficient: 100ppm/°C.
  50ppm/°C available on special order.
- Stability: 0.01%/hr. after 1/2hr. warm up; 0.02% per 8hrs. (typical).
- Metering: Digital voltage and current meters.
- Output cable: 10 ft (3.05m) shielded high voltage cable.
- Physical:
  5 1/4" H x 19" W x 22" D
  (13.3 x 48.3 x 55.9cm).
- Weight: 40lbs to 85lbs (18 to 38.6kg) depending on model.

Parallel Operation

Parallel Operation options to increase the power and current output capability of the SA4 Series HV Power Supplies are available. Each system is comprised of two, three (or more) separate rack mount chassis consisting of the Master and the Slave(s). Signal Cables are connected from the Master to the Slave supplies via 15 pin mini D connectors located on the rear panels and the appropriate HV interconnect and ground cables are connected to provide the paralleled outputs.

These models can be customized to fit your OEM applications and special requirements.

Maximum Rating (kV)	Maximum Rating (mA)	Model Number
1	4000	SA 1*4
2	2000	SA 2*4
3	1330	SA 3*4
6	667	SA 6*4
10	400	SA 10*4
15	267	SA 15*4
20	200	SA 20*4
30	133	SA 30*4
40	100	SA 40*4
50	80	SA 50*4
60	67	SA 60*4
70	57	SA 70*4

* Specify "P" for positive, "N" for negative, or "PN" for reverse polarity.

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Spellman
High Voltage Electronics Corporation

1kV to 130kV
10W to 1200W

10W-1200W Compact SL Series HV Power Supplies

The Spellman SL series high voltage power supplies are designed to meet uncompromising performance standards in a minimum of space. These are full featured supplies available in a wide range of outputs with many available options. This makes the SL series ideally suited for satisfying the requirements of applications such as:

- Analytical X-ray
- CPT/CRT Testing
- Electrostatics
- E-Beam Systems
- Capacitor Charging
- Hipot Testing
- CW Lasers
- General Laboratory

A resonant high frequency inverter with proprietary control provides fault free operation in extreme transient and arcing environments together with greater than 85% efficiency.

Features

- Meets CE Low Voltage and EMC directives
- Voltage Range from 1kV to 130kV
- High Stability
- Constant Voltage/Constant Current Operation with Automatic Crossover
- Overvoltage, Overcurrent, Arc and Short Circuit Protection
- System Status Indicators
- Extensive Analog and Digital Interface
- Designed to meet UL®/CSA/IEC950 Standards
- 10 second slow start
- Voltage and Current Regulation
- Arc Quench
- Arc Count/Arc Trip

Specifications

- Input Voltage: 115Vac ±10%, or 220Vac ±10%, or 100Vac ±10%, or 200Vac ±10%, 50/60Hz. Specify with order. **1200W:** 220Vac ±10%, only 50/60Hz, single phase.
- Output: Models available from 1kV to 130kV. Each model is available in positive, negative or reversible polarity output.
- Output Controls: Voltage and current are continuously adjustable by ten turn potentiometers with lockable counting dials, ON/OFF circuit breaker/lamp, high voltage ON switch/indicator and high voltage OFF switch/indicator.
- Voltage Regulation: Load: 0.005% of maximum voltage for full load change. Line: ±0.005% of maximum voltage for a ±10% input line change.
- Current Regulation: Load: 0.01% of maximum current ±100uA for full voltage change. Line: ±0.005% of maximum current for a ±10% input line change.
- Ripple: 0.1% p-p of maximum output.
- Temperature Coefficient: 100ppm/°C. Higher stability is available on special order.
- Ambient Temperature: Operating: 0°C to 50°C. Storage: -40°C to 85°C .
- Stability: 100ppm/hour after a 1/2hr warm up.
- Metering: Digital voltage and current meters, 3 1/2 digit ±1 least significant digit.

	10 Watt		30 Watt		60 Watt	
kV	**mA**	**Model**	**mA**	**Model**	**mA**	**Model**
1	10.0	SL1PN10	30.0	SL1PN30	60.0	SL1PN60
2	5.0	SL2PN10	15.0	SL2PN30	30.0	SL2PN60
3	3.3	SL3PN10	10.0	SL3PN30	20.0	SL3PN60
6	1.7	SL6PN10	5.0	SL6PN30	10.0	SL6PN60
8	1.25	SL8PN10	3.75	SL8PN30	7.5	SL8PN60
10	1.0	SL 10*10	3.0	SL 10*30	6.0	SL 10*60
15	0.67	SL 15*10	2.0	SL 15*30	4.0	SL 15*60
20	0.50	SL 20*10	1.5	SL 20*30	3.0	SL 20*60
30	0.33	SL 30*10	1.0	SL 30*30	2.0	SL 30*60
40	0.25	SL 40*10	0.75	SL 40*30	1.5	SL 40*60
50	0.20	SL 50*10	0.60	SL 50*30	1.2	SL 50*60
60	0.17	SL 60*10	0.50	SL 60*30	1.0	SL 60*60
70	0.14	SL 70*10	0.43	SL 70*30	0.85	SL 70*60
80	0.13	SL 80*10	0.38	SL 80*30	0.75	SL 80*60
100	0.10	SL100*10	0.30	SL100*30	0.60	SL100*60
120	0.10	SL120*10	0.25	SL120*30	0.50	SL120*60
130	0.10	SL130*10	0.25	SL130*30	0.46	SL130*60

* Specify "P" for positive, "N" for negative, or "PN" for reverse polarity.

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89/336/EEC
73/23/EEC

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1kV to 130kV
10W to 1200W

10W-1200W Compact SL Series HV Power Supplies

Specifications (cont.)

- Front Panel Status Indicators
- HV Output Cable: 10 feet (3.05m) of shielded high voltage cable.
- AC Line Input cable:
  10 to 300W:
  IEC320 Cord Set, 6ft (1.83m)
  600 to 1200W:
  3-conductor, 12AWG, 6ft (1.83m) cable permanently attached to unit.
- Physical:
  10W & 300W:
  13/4" H x 19" W x 19" D** rack mnt. (445 x 483 x 483mm).
  600W & 1200W:
  31/2" H x 19" W x 19" D** rack mnt. (89 x 483 x 484mm).
  **Depth becomes 24" (610mm) for 80 to 130kV ranges
- Weight: 17 to 30 lbs (7.7 to 14kg) depending on model.

Options

- AOL Adjustable Overload Trip
- FG Floating Ground (15V Standard)
- FGLL Low Leakage Floating Ground, 10nA
- LR Low Ripple, 0.05% p-p
- NSS No Slow Start
- SS(X) Non-Standard Slow Start
- APT Adjustable Power Trip
- CPC Constant Power Control
- SL Mounting Slides
- FPS Filament Power Supply (see XLF & XLG Series)
- RMI Remote Mode Indicator
- MS Bipolar Master/Slave Operation
- IO Instant ON
- EFR External Fault Relay
- NAD No Arc Detect
- CFC Coarse Fine Control
- EAR External Alarm Relay
- DPM4 4.5 Digit digital Panel Meter
- IDR Improved Dynamic Response

These models can be customized to fit your OEM applications and special requirements.

	150 Watt		300 Watt		600 Watt		1200 Watt	
kV	**mA**	**Model**	**mA**	**Model**	**mA**	**Model**	**mA**	**Model**
1	150.0	SL1PN150	300.0	SL1PN300	600.0	SL1PN600	1200.0	SL1PN1200
2	75.0	SL2PN150	150.0	SL2PN300	300.0	SL2PN600	600.0	SL2PN1200
3	50.0	SL3PN150	100.0	SL3PN300	200.0	SL3PN600	400.0	SL3PN1200
6	25.0	SL6PN150	50.0	SL6PN300	100.0	SL6PN600	200.0	SL6PN1200
8	18.75	SL8PN150	37.5	SL8PN300	75.0	SL8PN600	150.0	SL8PN1200
10	15.0	SL 10*150	30.0	SL 10*300	60.0	SL 10*600	120.0	SL 10*1200
15	10.0	SL 15*150	20.0	SL 15*300	40.0	SL 15*600	80.0	SL 15*1200
20	7.5	SL 20*150	15.0	SL 20*300	30.0	SL 20*600	60.0	SL 20*1200
30	5.0	SL 30*150	10.0	SL 30*300	20.0	SL 30*600	40.0	SL 30*1200
40	3.75	SL 40*150	7.5	SL 40*300	15.0	SL 40*600	30.0	SL 40*1200
50	3.0	SL 50*150	6.0	SL 50*300	12.0	SL 50*600	24.0	SL 50*1200
60	2.5	SL 60*150	5.0	SL 60*300	10.0	SL 60*600	20.0	SL 60*1200
70	2.1	SL 70*150	4.28	SL 70*300	8.6	SL 70*600	17.0	SL 70*1200
80	1.90	SL 80*150	3.75	SL 80*300	7.5	SL 80*600	15.0	SL 80*1200
100	1.50	SL100*150	3.0	SL100*300	6.0	SL100*600	12.0	SL100*1200
120	1.25	SL120*150	2.5	SL120*300	5.0	SL120*600	10.0	SL120*1200
130	1.15	SL130*150	2.3	SL130*300	4.6	SL130*600	9.2	SL130*1200

* Specify "P" for positive, "N" for negative, or "PN" for reverse polarity. Higher Voltage models available on special order.

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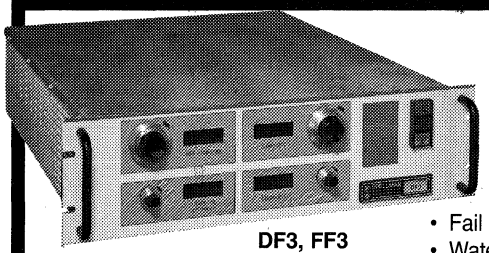
10kV to 60kV
3kW, 4kW

3kW DF3 Series XRD X-Ray Generator



DF3, FF3
3kW Supply

The Spellman DF3 is an XRD X-Ray generator which uses a sine wave current source produced by a series resonant circuit to generate dc high voltage at switching frequencies greater than 20kHz. The high efficiency of this unit allows for air cooling in a 5 1/4" high chassis.

Features

- Ideal for use with most common XRD X-ray tubes
- Compact Size, 5 1/4" high chassis
- Greater than 85% efficiency
- High Stability through precision feedback control circuits
- System fault diagnostics and displays including filament errors, overvoltage, overcurrent and tube water flow interlock
- Automatic ramp of the high voltage and emission current topreset values
- Continuous adjustment for both high voltage and emission current
- Fail Safe Interlock
- Fail Safe X-ray ON Lamp Circuit
- Water Flow Control
- Extensive Remote Interface capabilities
- Meets CE Low Voltage and EMC directives

Specifications

- Input Voltage: 220Vac ±10%, 50 or 60Hz, single phase (three phase optional).
- Output Voltage: 10 to 60kV negative polarity.
- Output Current: 0 to 80mA.
- Maximum Output Power: 3kW (4kW optional).
- Voltage Regulation:
  Load: 0.005% of rated output for a full load change.
  Line: 0.005% of rated output over specified input range.
- Emission Current Regulation:
  Load: 0.01% of rated output for a 10 to 60kV change.
  Line: 0.005% of rated output over specified input range.
- Ripple: 0.03% rms below 1kHz.
  0.75% rms above 1kHz.
- Temperature Coefficient: 50ppm/°C.
- Stability: 0.01%/8hrs.
- Filament Voltage:
  12Vac (dc filament optional).
- Filament Current:
  5A (up to 12A max available).
- Physical:
  5 1/4" H x 19" W x 22" D
  (13.26 x 48.26 x 55.9cm).
- Weight: 75lbs (34kg).

These models can be customized to fit your OEM applications and special requirements.

3kW, 4kW FF Series XRF X-Ray Generator

The FF3 and FF4 are designed for use with most common end window XRF X-ray tubes.

Features

- Ideal for use with most common XRF X-ray tubes
- Compact Size
- Greater than 85% efficiency
- High Stability through precision feedback control circuits
- System fault diagnostics and displays including filament errors, overvoltage, overcurrent and tube water flow interlock
- Automatic ramp of the high voltage and emission current to preset values
- Continuous adjustment for both high voltage and emission current
- Fail Safe Interlock
- Fail Safe X-ray ON Lamp Circuit
- Water Flow Control
- Extensive Remote Interface capabilities
- Meets CE Low Voltage and EMC directives

Specifications

- Input Voltage: 220Vac ±10%, 50 or 60Hz, single phase (three phase optional).
- Output Voltage: 10 to 60kV positive polarity.
- Output Current and Power:
  FF3: 0 to 100mA, 3kW.
  FF4: 0 to 150mA, 4kW.
- Voltage Regulation:
  Load: 0.005% of rated output for a full load change.
  Line: 0.005% of rated output over specified input range.
- Emission Current Regulation:
  Load: 0.01% of rated output for a 10 to 60kV change.
  Line: 0.005% of rated output over specified input range.
- Ripple: 0.03% rms below 1kHz.
  0.75% rms above 1kHz.
- Temperature Coefficient: 50ppm/°C.
- Stability: 0.01%/8hrs.
- Filament Voltage:
  12Vac (dc filament optional).
- Filament Current: 12Aac.
- Metering: Digital meters for kV, mA, filament current and tube power.
- Physical:
  FF3: 5 1/4" H x 19" W x 22" D
  (13.26 x 48.26 x 55.9cm).
  FF4: 10 1/2" H x 19" W x 22" D
  (26.52 x 48.26 x 55.9cm).
- Weight: FF3: 75lbs (34kg).
  FF4: 85lbs (38.6kg).

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10kV to 60kV; 75kV 18kW; 24kW

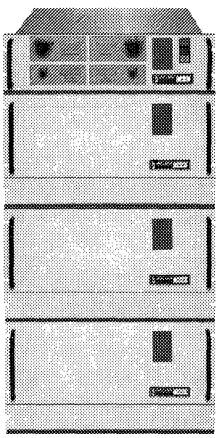
18kW XR18 HV Generator for X-ray

Features

- Low stored energy
- 0.1% p-p ripple
- Meets CE Low Voltage and EMC directives
- Overvoltage, Arc, and Short Circuit Protection
- Extensive Local/Remote Operation
- 85% efficiency
- Extensive tube protection features
- Fail Safe X-ray ON indicator

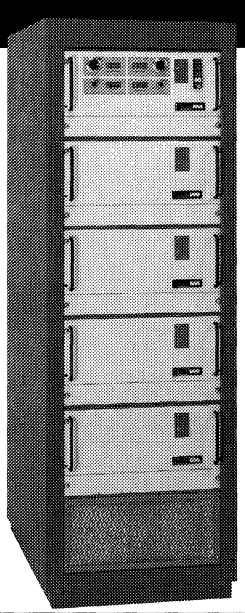
Specifications

- Input: 208Vac ±10%, 50 or 60Hz, three phase.
- Output Voltage: 10 to 60kV continuously adjustable, negative polarity.
- Voltage Regulation:
  Load Regulation: 0.005% of full voltage for 0 to 100% load change.
  Line Regulation: ±0.005% of full voltage over specified input range.
- Ripple: 0.1% p-p (≤360Hz).
- Stability: 0.01%/hr. after 1/2 hour warm up; 0.02% per 8 hrs. (typical).
- Temperature Coefficient: 100ppm/°C. Higher Stability (50ppm/°C) available on special order.
- Emission Current: 0 to 300mA, continuously adjustable.
- Emission Current Stability: 0.01% per 8 hours after 1/2 hour warm-up.
- Emission Current Regulation: 0.01% ±50μA for a 50% voltage change.
- Filament Compliance Voltage: 0 to 20Vac
- Filament Current: 0 to 15Aac.
- Bias Output Voltage: 0 to 1kVdc.
- Bias Current: 1mA max.
- Bias Ripple: 0.1% rms.
- Temperature Range:
  Operating: 0°C to 40°C.
  Storage: -20°C to 65°C.
- Metering: Digital meters for kV, mA, filament current, and bias voltage.
- Controls: AC ON/OFF, Output Voltage, Emission Current, X-ray ON, X-ray OFF, Bias Voltage, Filament Limit.
- Output Connector: Federal Standard 75kV X-ray connector.



- Interface Connector: 50 pin female mini-D.
- Physical:
  Three chassis,each 10 1/2" H x 19" W x 19" D (26.52 x 48.3 x 48.3cm).
  One chassis 5 1/4" H x 19" W x 19" D (13.26 x 48.3 x 48.3cm).
- Weight: 474 lbs (215 kg) total.

± 75kV, 24kW continuous, 30kW peak, XTS Series for X-ray Tube Test and Aging



The Spellman 24kW X-ray Tube Test System is designed specifically to meet the rugged demands of X-ray tube testing. The integrated package provides anode and cathode voltage, filament power and extensive local and remote controls for integration into automatic Tube Test and Aging Systems.

Features

- Output Voltage: 0 to ± 75kV (150kV across the tube).
- Emission Current: 0 to 200mA.
- Output Power: 24kW continuous, 30kW peak. 1 minute ON with a 25% duty cycle.
- Slew Up: 0% to 75% in ≤10mS.
- Slew down: 100% to 25% in ≤50mS.
- Filament: 5Vdc, 0 to 8A referenced to cathode.
- Dual Focal spot.
- Controls for kV, mA, Filament current limit and Power limit.
- Digital metering for kV, mA, Filament current and Power.
- Federal Standard 75kV X-ray connectors for anode and cathode.
- Physical: 52.5" H x 19" W x 36" D (133.4 x 48.3 x 91.4cm).

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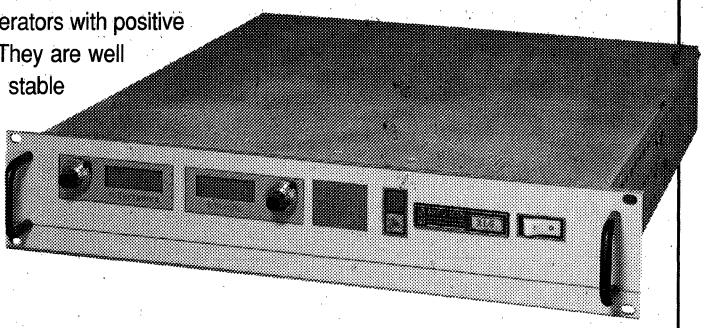
30kV to 130kV
3W to 260W

XLG X-ray Generator with Filament Supply

The Spellman XLG Series are "Hot Anode" X-ray generators with positive output polarity and a regulated DC filament supply. They are well regulated high voltage power supplies. Extremely stable voltage and emission current outputs result in significant performance improvements over previously available technology. The series provide control and support functions required for X-ray applications. They incorporate local and remote programming, monitoring, safety interlock, short circuit and overload protection.



Specifications

- Input Voltage:
  115Vac ±10%, or 220Vac ±10%, 50/60Hz single phase.
- Voltage and Current Control:
  Local: continuously adjustable from 0 to maximum rating via a ten-turn potentiometer.
  Remote: 0 to +10Vdc proportional from 0 to full output.
- Filament:
  Preheat 0.45A
  Specify at time of order.
  FH: 9A, 3V.
  FL: 3A, 3V.
- Voltage Regulation:
  Load: 0.005% of full output voltage no load to full load.
  Line: 0.005% for input voltage range change.
- Current Regulation:
  Load: 0.05% of full current ±100µA from 0 to full voltage.
  Line: 0.05% of rated current over specified input range.
- Ripple:
  0.03% rms below 1kHz.
  0.75% rms above 1kHz.
- Temperature Coefficient: 100ppm/°C.
- Stability:
  0.01%/8 hrs after 1/2hr warm up
  0.02%/8 hours (typical).
- Cooling: Free air convection.
- Metering:
  Digital voltage and current meters.
- Voltage and Current Monitors:
  0 to +10Vdc proportional to rated output.
- HV Output:
  10 feet (3.3m) of shielded HV cable removable at rear.
- Physical:
  30kV to 60kV:
  3.5" H x 19" W x 19" D
  (88.1 x 482.6 x 482.6mm).
  80kV to 130kV:
  3.5" H x 19" W x 24" D
  (88.1 x 482.6 x 609.6mm).
- Weight: 17 to 41 lbs (7.7 to19 kg) depending on model.

kV	0.1mA	0.2mA	0.5mA	1.0mA	2.0mA	3.0mA
30	XLG30P3*	XLG30P6*	XLG30P15*	XLG30P30*	XLG30P60*	XLG30P90*
35	XLG35P3.5*	XLG35P7*	XLG35P17.5*	XLG35P35*	XLG35P70*	XLG35P105*
40	XLG40P4*	XLG40P8*	XLG40P20*	XLG40P40*	XLG40P80*	XLG40P120*
50	XLG50P5*	XLG50P10*	XLG50P25*	XLG50P50*	XLG50P100*	XLG50P150*
60	XLG60P6*	XLG60P12*	XLG60P30*	XLG60P60*	XLG60P120*	XLG60P180*
80	XLG80P8*	XLG80P16*	XLG80P40*	XLG80P80*	XLG80P160*	-------
100	XLG100P10*	XLG100P20*	XLG100P50*	XLG100P100*	XLG100P200*	-------
120	XLG120P12*	XLG120P24*	XLG120P60*	XLG120P120*	XLG120P240*	-------
130	XLG130P13*	XLG130P26*	XLG130P65*	XLG130P130*	XLG130P260*	-------

* Specify FH for High power filament, FL for Low power filament.
These models can be customized to fit your OEM applications and special requirements.

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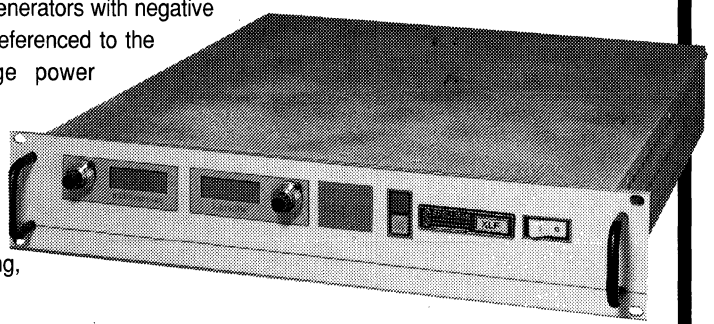
30kV to 60kV 600W, 1200W

XLF X-ray Generator with Floating Filament

The Spellman XLF Series are "Hot Cathode" X-ray generators with negative output polarity and a regulated AC filament supply referenced to the cathode. They are well regulated high voltage power supplies. Extremely stable voltage and emission current outputs result in significant performance improvements over previously available technology. The series provide control and support functions required for X-ray applications. They incorporate local and remote programming, monitoring, safety interlock, short circuit and overload protection.



Specifications

- Input Voltage:
  115Vac ±10%, or 220Vac ±10%, 50/60Hz single phase.
  1200W: 220Vac ±10% only, 50/60Hz single phase.
- Voltage and Current Control:
  Local: continuously adjustable from 0 to maximum rating via a ten-turn potentiometer.
  Remote: 0 to +10Vdc proportional from 0 to full output.
- Filament:
  Preheat 0.45A
  5A,12V.
- Voltage Regulation:
  Load: 0.005% of full output voltage no load to full load.
  Line: 0.005% for input voltage range change.
- Current Regulation:
  Load: 0.05% of full current ±100µA from 0 to full voltage.
  Line: 0.05% of rated current over specified input range.
- Ripple:
  0.03% rms below 1kHz.
  0.75% rms above 1kHz.
- Temperature Coefficient: 100ppm/°C.
- Stability:
  0.01%/8 hrs after 1/2hr warm up
  0.02%/8 hrs (typical).
- Cooling: Fan cooled.
- Metering:
  Digital voltage and current meters.
- Voltage and Current Monitors:
  0 to +10Vdc proportional to rated output.
- HV Output:
  75kV, 3 conductor Federal Standard X-ray connector.
- Physical:
  3.5" H x 19" W x 19" D
  (88.1 x 482.6 x 482.6mm).
- Weight: 17 to 41 lbs (7.7 to19 kg) depending on model.

600 Watt			1200 Watt	
kV	**mA**	**Model**	**mA**	**Model**
30	20	XLF30N600	40	XLF30N1200
40	15	XLF40N600	30	XLF40N1200
50	12	XLF50N600	24	XLF50N1200
60	10	XLF60N600	20	XLF60N1200

These models can be customized to fit your OEM applications and special requirements.

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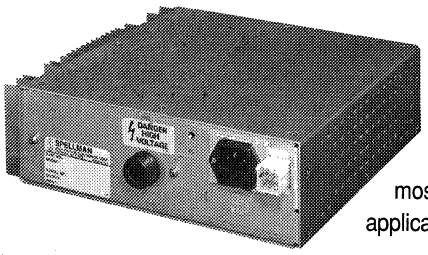
1kV to 70kV 200W, 350W

200W and 350W PTV Modular HV Power Supplies



The Spellman PTV Series modular high voltage power supplies now deliver up to 350 Watts of continuous power. A quasi-resonant inverter design provides over 80% efficiency with very fast dynamic response and very high peak current capability. The PTVs incorporate extensive standard features in two power output ranges of 200W and 350W in a wide range of output voltages operating to the most exacting specifications. An optional 600 Watt pulse capability is available for applications requiring fast response and high peak power.

Features

- Output voltages from 1kV to 70kV at 200 Watts and 350 Watts
- Voltage and current programming
- 1 second slow start
- Output Inhibit control via TTL signal.
- Test points for output voltage and current
- Designed to meet UL®/CSA/IEC950 Standards
- Meets CE Low Voltage and EMC directives
- Overvoltage and Short Circuit Protection
- Low stored energy
- Internal 10.24V reference

Specifications

- Input Voltage:
  115Vac ±10%, 50/60Hz
  220Vac ±10%, 50/60Hz
  Specify at time of ordering.
- Output: Models from 1kV to 70kV, 200W or 350W. Each model is available in positive or negative polarity outputs.
- Voltage Regulation:
  Load: 0.01% of output voltage no load to full load.
  Line: ±0.01% for a ±10% change in input voltage.
- Current Regulation:
  Load: 0.01% of output current from 0 to rated voltage.
  Line: 0.01% of rated current over specified input range.
- Efficiency: 80% typical.
- Ripple:
  PTV200: 0.1% p-p of output voltage.
  PTV350: 0.2% p-p of output voltage.
- Temperature:
  Operating: -20°C to +40°C.
  Storage: -40°C to +85°C.
- Temperature Coefficient: 0.01%/°C
- Stability:
  0.01%/hr after 1/2 hour warm up.
  0.02%/8 hrs.
- Cooling:
  200 Watt: convection cooled.
  350 Watt: fan cooled, rear air intake.
- Physical:
  1-40kV:
  3 3/16"H x 10 3/4"W x 10"D
  (8.1 x 27.3 x 25.4cm).
  50-70kV:
  4 3/16"H x 10 7/8"W x 11 13/16"D
  (10.65 x 27.6 x 35.1cm).
- HV Output Cable: 18" ± 1" (45.7cm) UL® listed high voltage cable.
- Power Input Connector: IEC320.
- AC Line Voltage Input Cable:
  Length: 8 ft (2.4m).

Output Voltage	200 Watt Model PTV200		350 Watt Model PTV350	
kV	mA	Model Number	mA	Model Number
1	200.0	PTV1*200	350.0	PTV1*350
3	70.0	PTV3*200	117.0	PTV3*350
5	40.0	PTV5*200	70.0	PTV5*350
10	20.0	PTV10*200	35.0	PTV10*350
15	14.0	PTV15*200	23.0	PTV15*350
20	10.0	PTV20*200	18.0	PTV20*350
25	8.0	PTV25*200	14.0	PTV25*350
30	7.0	PTV30*200	12.0	PTV30*350
40	5.0	PTV40*200	9.0	PTV40*350
50	4.0	PTV50*200	7.0	PTV50*350
60	3.3	PTV60*200	5.8	PTV60*350
70	2.85	PTV70*200	5.0	PTV70*350

* Specify "P" for positive, "N" for negative. These models can be customized to fit your OEM applications and special requirements.

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Spellman
High Voltage Electronics Corporation

1kV to 70kV 120W, 60W

120W PCM Series Modular HV Power Supplies

The Spellman 120W PCM series provides over 80% efficiency and high pulse current capability. This supply is ideal for applications requiring well regulated high voltage from a power supply that operates from most AC input voltages. The PCM has universal input and power factor correction.

Features

- Outputs from 1kV to 70kV at 120W
- Pulsed power up to 400W
- Universal AC input & Power Factor Correction
- Voltage & Current programming
- Inhibit control of output via TTL signal
- Safety Interlock
- Test points for Output Current & Voltage
- Power ON, Interlock closed and Fault indicators
- Overvoltage & Short circuit protection
- Designed to meet UL®/CSA/IEC950 Standards
- Meets CE Low Voltage and EMC directives

Specifications

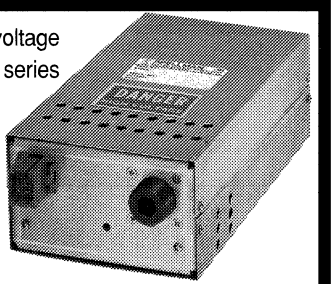
- Input Voltage: 85-265Vac, 45-63Hz, power factor corrected. UL® rated for 85-250Vac input for 1kV to 5kV models.
- Power Factor: FL: 0.99; NL: 0.98.
- Output: 11 models from 1kV to 70kV. Positive or negative polarity outputs.
- Voltage Regulation:
  Load: 0.01% of output voltage no load to full load.
  Line: ±0.01% for ±10% change in input voltage.
- Current Regulation:
  Load: 0.01% of output current from 0 to rated voltage.
  Line: 0.01% of rated current over specified input range.
- Ripple: 0.1% p-p of output voltage.
- Temperature Coefficient: 0.01%/°C,
- Stability: 0.02%/8 hrs.
- Physical:
  1kV to 50kV: 3.65"H x 5"W x 9"L (9.27 x 12.7 x 22.9cm).
  60, 70kV: 3.65"H x 5"W x 11"L (9.27 x 12.7 x 27.9cm).
- Connectors:
  AC Input: IEC320 with mating cable.
  Signal: 15 pin D connector.
- HV Output Cable: 36" (91.4cm) UL® listed high voltage cable.

Maximum Rating (kV)	(mA)	Model Number
1	120.0	PCM 1*120
3	40.0	PCM 3*120
5	24.0	PCM 5*120
10	12.0	PCM 10*120
15	8.0	PCM 15*120
20	6.0	PCM 20*120
30	4.0	PCM 30*120
40	3.0	PCM 40*120
50	2.4	PCM 50*120
60	2.0	PCM 60*120
70	1.7	PCM 70*120

* Specify "P" for positive, "N" for negative.

60W SMS Series Modular HV Power Supplies

The SMS series provides over 75% efficiency. It is ideal for applications requiring regulated high voltage from a supply that operates from a low voltage DC input. With additional optional circuitry, the SMS series has capability of delivering constant power down to 25% of the rated output voltage.



Features

- Output voltages from 1kV to 60kV at 60 W
- Voltage and Current programming
- Inhibit control of output via TTL signal
- Test points for Output Current and voltage
- Mode indicators for current and voltage control
- Overvoltage protection and latch reset
- Designed to meet UL®/CSA/IEC950 Standards

Specifications

- Input Voltage: +28Vdc ±10%.
- Output: 10 models from 1kV to 60kV. Positive or negative polarity outputs. See Table.
- Voltage Regulation:
  Load: 0.01% of output voltage no load to full load.
  Line: ±0.01% for ±10% change in input voltage.
- Current Regulation:
  Load: 0.1% of output current from 0 to rated voltage.
  Line: 0.05% of rated current over specified input range.
- Ripple: 0.1% p-p of output voltage.
- Temperature Coefficient: 0.01%/°C
- Stability: 0.02%/8 hrs.
- Physical: 5" x 9" x 3" (12.7 x 23.0 x 7.6cm).
- Input Connector: 12 pin AMP Metri-Mate
- HV Output Cable: 18" ± 1" (45.7cm) of UL® listed high voltage cable.

Maximum Rating (kV)	(mA)	Model Number
1	60.0	SMS 1*60
3	20.0	SMS 3*60
5	12.0	SMS 5*60
10	6.0	SMS 10*60
15	4.0	SMS 15*60
20	3.0	SMS 20*60
30	2.0	SMS 30*60
40	1.5	SMS 40*60
50	1.2	SMS 50*60
60	1.0	SMS 60*60

* Specify "P" for positive, "N" for negative.

These models can be customized to fit your OEM applications and special requirements.

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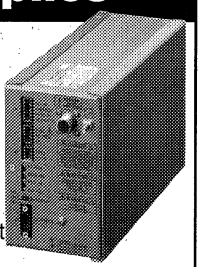
1kV to 65kV 50W, 30W

50W XRM Series Modular X-Ray Power Supplies

The 50 Watt XRM series is a well regulated power supply with output voltages to 65kV. It incorporates a filament supply which provides regulated DC current adjustable from 0.3A to 3.5A at 5.5V. The modules are designed to power grounded cathode X-ray tubes from Kevex, Oxford, RTW, Superior and Trufocus.



Features

- Output voltages 0 to 65kV
- Adjustable integrated Filament Supply
- Voltage & Current programming
- Local and remote emission control
- Inhibit control of output via TTL signal
- Safety Interlock
- Overvoltage & Short Circuit protection
- Designed to meet UL®/CSA/IEC950 Standards
- Meets CE Low Voltage and EMC directives

Specifications

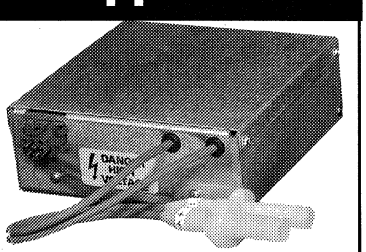
- Input Voltage: +24Vdc ± 10%, 4.25A max.
- Output: 4 models with positive output polarity and adjustable voltages.
- Voltage Control:
  Local: Internal multi-turn potentiometer to set voltage from 0 to full output.
  Remote: 0 to +10Vdc proportional from 0 to full output voltage.
- Emission Current Control:
  Local: Internal potentiometer to set current between 0 and full output.
  Remote: 0 to +10Vdc proportional from 0 to full output current.
- Filament Supply:
  Current: 3.5Adc, adjustable
  Voltage: 5.5V.
- Voltage Regulation:
  Load: 0.01% of output voltage no load to full load.
  Line: ±0.01% for ±10% change in input voltage.
- Current Regulation:
  Load: 0.01% of output current from 0 to rated voltage.
  Line: 0.01% of rated current over specified input range.
- Ripple: 0.25% p-p of output voltage.
- Temperature Range: 0°C to +50°C.
- Temperature Coefficient: 0.01%/°C.
- Stability: 0.05%/8 hrs after 1/2 hr warm up.
- Voltage and Current Monitors: 0 to +10Vdc proportional to rated output.
- Physical: 6.3"H x 3.937"W x 10"L (160 x 100 x 254mm).
- HV Output Cable: 39.4" (1m) of

Maximum Rating (kV)	(mA)	Model Number
25	2.00	XRM25P50
30	1.67	XRM30P50
50	1.00	XRM50P50
65	0.77	XRM65P50

These models can be customized to fit your OEM applications and special requirements.

30W EPM Series Modular HV Power Supplies

The EPM series utilizes proprietary circuitry enabling these power supplies to yield full output current from near zero to maximum output voltage.



Features

- Output voltages from 1kV to 30kV at 30 Watts
- Voltage and current programming
- Inhibit control of output via TTL signal
- Test points for output current and voltage
- Overvoltage protection
- Designed to meet UL®/CSA/IEC950 Standards
- Low stored energy
- Meets CE Low Voltage and EMC directives

Specifications

- Input Voltage: +24Vdc ±10%.
- Output: 8 models from 1kV to 30kV. Each model is available in positive or negative polarity outputs.
- Voltage Regulation:
  Load: 0.01% of output voltage no load to full load.
  Line: ±0.01% for ±10% change in input voltage.
- Current Regulation:
  Load: 0.01% of output current from 0 to rated voltage.
  Line: 0.01% of rated current over specified input range.
- Ripple: 0.1% p-p of output voltage.
- Temperature Coefficient: 0.01%/°C.
- Stability: 0.01%/8 hrs.
- Physical: 5.7" x 5.7" x 2" (145 x 145 x 51mm).
- Input Connector: 9 pin AMP Metri-Mate.
- HV Output Cable: 18" ± 1" (45.7cm) of UL® listed high voltage cable.

Maximum Rating (kV)	(mA)	Model Number
1	30.0	EPM 1*30
3	10.0	EPM 3*30
5	6.0	EPM 5*30
10	3.0	EPM 10*30
15	2.0	EPM 15*30
20	1.5	EPM 20*30
25	1.2	EPM 25*30
30	1.0	EPM 30*30

* Specify "P" for positive, "N" for negative.

These models can be customized to fit your OEM applications and special requirements.

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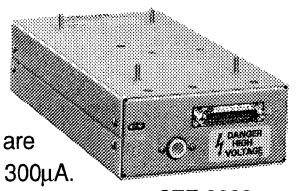
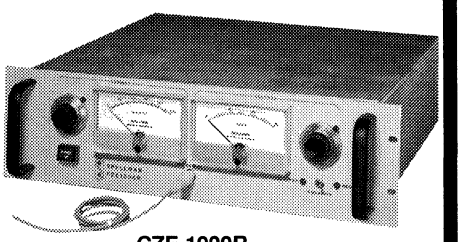
1kV TO 40kV 10W, 8W

10W CZE Capillary Electrophoresis HV Power Supplies

The Spellman CZE Series power supplies meet the requirements of the Capillary Zone Electrophoresis application and other applications requiring a hot switched reversible output voltage. The DC output voltage and current are continuously adjustable from 0 to 30kV and 0 to 300μA. Output polarity is reversible on command.



CZE 2000


CZE 1000R

Features

- 30kV output voltage, programmable
- 0-300μA load current, programmable
- Auto polarity reversing upon digital command in <1 sec at no load
- Low stored energy
- Digital ON/OFF control
- Meets CE Low Voltage and EMC directives

Specifications

- Input Voltage:
  CZE1000R: 115Vac ±10%.
  CZE2000: 24Vdc ±10%.
- Input Current: 1.25A max.
- Output Voltage:
  0 to 30kV programmable.
- Output Current:
  300μA max from 1 to 30kV.
- Line regulation:
  0.01% for a 10% V input change.
- Load Regulation:
  0.01% for a no load to full load change.
- Ripple: 0.1% p-p
- Voltage and Current Monitors:
  0 to +10Vdc proportional to rated output.
- Remote Enable: 3.4V=ON; <1V=OFF
- Output Time Constant with no load: 0.1 sec.
- Stored energy: 0.2 Joules at 30kV.
- Physical:
  CZE1000R:
  5.25"H x 19"W x 17"D
  (133 x 483 x 432mm).
  CZE2000:
  3.5"H x 5" W x 10"L
  (89 x 127 x 254mm).

10W and 8W MP High Stability HV Power Supplies

Designed as high performance DC to DC converters with output voltages to 40kV, the MP Series combine linear and switched mode techniques minimizing internal dissipation and generated RFI. The high frequency oscillator may be synchronized to other MP modules or to an external source.

Features

- High stability: 0.001% line and load regulation
- Low output ripple: 0.001% p-p
- Remote Voltage Programming
- 10V Reference for external control
- Output Current and Voltage Monitor
- Arc and Short Circuit Protection
- Internal oscillator may be synchronized

Specifications

- Input Voltage: +24Vdc ±2V. Other input voltages available as option.
- Input Current: <1A at full output.
- Output Voltage: Continuously adjustable over entire output range. Positive or negative output polarity.
- Line Regulation: 0.001% for input change of 1V.
- Load Regulation: 0.001% for 100μA to full load change at maximum voltage.
- Temperature Coefficient: < 0.025%/°C.
- Stability: < 0.007%/hr at constant operating conditions after 1 hour.
- Output Control:
  Internal 10-turn potentiometer
  External potentiometer
  Remote Voltage Programming
- Voltage and Current Monitors:
  0 to +10Vdc proportional to rated output.
- Temperature: Operating: 0°C to +50°C.
  Storage: -35°C to +85°C.
- Input: 10 pin connector (mate supplied).
- HV Output Cable: 20" (50.8cm) shielded cable with flying leads.
- Physical:
  1-5kV: 5.83"L x 3.86"W x 1.65"H.
  10-15kV: 7.48"L x 3.86"W x 1.65"H.
  20-30kV: 9.45"L x 3.86"W x 1.65"H.
  40kV: 13.00"L x 3.86"W x 1.81"H.
  (Flange Case only).

Output Voltage	Max. Current	Ripple (full load)	Model Number
kV	mA	mV	
1.0	10.0	10mV p-p	MP1.0*
1.5	6.0	10mV p-p	MP1.5*
2.0	5.0	10mV p-p	MP2.0*
2.5	4.0	10mV p-p	MP2.5*
3.0	3.0	10mV p-p	MP3.0*
5.0	2.0	20mV p-p	MP5.0*
10.0	1.0	100mV p-p	MP10.0*
15.0	0.60	150mV p-p	MP15.0*
20.0	0.50	200mV p-p	MP20.0*
30.0	0.33	300mV p-p	MP30.0*
40.0	0.2	400mV p-p	MP40.0*

* Specify "P" for positive, "N" for negative, or "PN" for reverse polarity.

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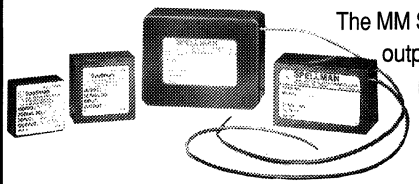
300V to 15kV 2.5W, 3W

2.5W MM Series PCB Mount HV Power Supplies



The MM Series high voltage power supplies are low cost, general purpose DC to DC converters, with output voltages up to 15kV. They are intended for customer designed products for direct PCB mounting at power levels up to 2.5 Watts. The MM Series can be used with an external resistor feedback loop to provide regulated outputs. Application Notes are available from Spellman showing a range of voltage regulated circuits using these power supplies.

Applications

- Photomultiplier Tubes
- Solid State Detectors
- Flow Sensors
- Analytical Instruments
- Spectral Source Lamps
- Ink Jet Printers
- Gas Chromatography

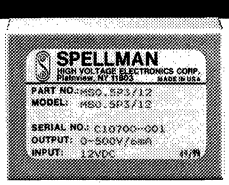
Features

- Outputs up to 15kV at 1.5W or 2.5W
- Compact size
- Arc and Short Circuit Protection
- Positive, Negative or Reversible Outputs
- Output Voltage proportional to Input

Specifications

- Input Voltage: 9Vdc, 12Vdc, or 24Vdc. Other input voltages available.
- Input Current: <1A at full output
- Output Voltages: Any preset maximum voltage between 500V and 15kV is available. Output voltage is proportional to the input voltage over the range 10% to 100%.
- Output Power: 1.5W or 2.5W continuous; higher peak power available.
- Output Ripple: Less than 0.1% rms.
- Load Regulation: 10% maximum.
- Module Efficiency: 55% to 70% typical.
- Isolated Outputs available.
- Modules are fully encapsulated in an ABS Box and may be wave soldered.
- Terminations: 4PC pins: 0.040" (1mm) diameter.
- PCB plated through holes: 0.055" (1.4mm); 4 required.
- Physical:
  Up to 3kV:
  1.57"L x 1.57"W x 0.79"H
  (39.88 x 39.88 x 20mm).
  Over 3kV to 5kV:
  1.97"L x 1.97"W x 1.18"H
  (48.3 x48.3 x 30mm).
  Over 5kV to 10kV:
  2.95"L x 1.97"W x 1.38"H
  (74.93 x 48.3 x 35.1mm).
  Over 10kV to 15kV:
  3.74"L x 2.80"W x 1.38"H
  (95 x 71.1 x 35.1mm).

3W MS Series High Stability Modular HV Power Supplies



The MS Modules have been designed for printed circuit board mounting. Each module provides 3 Watts of output power to 3kV with well regulated, low ripple and stable high voltage in a versatile compact cost effective design. The modules incorporate remote control and arc and short circuit protection. Radiation problems are eliminated by sealing each module in an aluminum enclosure. Custom designs are available for special applications. The MS Series is ideal for photomultiplier tubes, precision lenses and image intensifiers.

Features

- PCB Mounting
- Positive or Negative Output
- Fully Regulated
- Output Current Limited
- Separate Output Control or Fixed Output
- High Efficiency
- Internal 5V Reference Available

Specifications

- Input Voltage: +12Vdc ±1V. Other input voltages are available upon special order.
- Input Current: less than 0.5A at full output.
- Output Power: 3 Watts continuous.
- Output Voltages: Continuously adjustable over each entire range.
- Voltage Regulation:
  Line:0.005% for input change of 1 Volt.
  Load:0.005% for 100mA to full load change at maximum voltage.
- Ripple: < 0.01% p-p of full output Volts.
- Efficiency: > 65%.
- Temperature:
  Operating: 0°C to +50°C.
  Storage: -35°C to +85°C .
- Temperature Coefficient: 100ppm/°C.
- Stability: < 0.05%/8 hrs at constant operating conditions after one hour.
- Humidity: 0 to 90% non-condensing.
- Local Control: Internal adjustment.
- Remote Control: by external 5kOhm potentiometer or by voltage programming: 0 to 5V = 0 to full output.
- Terminations:
  4PC pins: 0.040" (1mm) diameter;
- PCB plated through holes;
  0.043" (1.1mm) 4 required.
- Physical:
  Up to 1000V: 3.1"L x 2.1"W x .87"H
  (78 x 53 x 22 mm).
  Over 1000V: 4.2"L x 2.36"W x 1.1"H
  (106 x 60 x 28 mm).
- Weight: Up to 1000V: 2.82oz (80gm).
  Over 1000V: 5.64oz (160gm).

Output Voltage (V)	Output Current (mA)	Ripple V (p-p)	Model
300	10.0	0.06	MSO.3*
500	6.0	0.1	MSO.5*
750	4.0	0.15	MSO.75*
1000	3.0	0.2	MS1*
1500	2.0	0.3	MS1.5*
2000	1.5	0.4	MS2*
2500	1.2	0.5	MS2.5*
3000	1.0	0.6	MS3*

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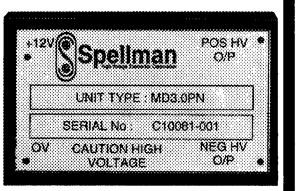
50V to 3kV
1.5W, 120mW

1.5W MD Series PCB Mount HV Power Supplies

The MD Series high voltage power supply modules are low cost, general purpose DC to DC converters with output voltages to 3kV. They are intended for customer designed products for direct PCB mounting at power levels up to 1.5 Watts. The modules are short circuit and reverse polarity protected. Input to output isolation permits positive or negative grounding for either positive or negative high voltage output. The modules are fully encapsulated.



Applications

- Photomultiplier Tubes
- Precision Lenses
- Image Intensifiers
- Ionization Chambers
- Geiger Counters
- Ink Jet Printers
- Gas Chromatography

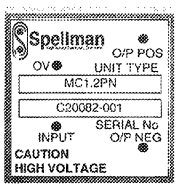
Specifications

- Input Voltages:
  Model MD: 1.75V to 12Vdc
  Model MDA: 5V to 12Vdc
- Input Current: <400mA at full output.
- Output Voltages:
  Voltage ranges between 50V and 3kV are available in two models.
  Output voltage is proportional to the input voltage over the range 10% to 100%.
- Output Power: 1.5 Watt maximum.
- Ripple: Less than 0.5% p-p of full output voltage.
- Module Efficiency: 55% to 70% typ.
- Temperature:
  Operating: 0°C to + 65°C.
  Storage: -35°C to + 85°C.
- Humidity: 0 to 90%, non-condensing.
- Insulation Strength: 3kV Input/Output.
- MTBF: 105,000 Hours
- Terminations:
  4PC pins: 0.040" (1mm) diameter.
- PCB plated through holes:
  0.043" (1.1mm); 4 required.
- Physical: 1.5"L x 2.5"W x 0.75"H (38.8 x 63.5 x 19mm).
- Weight: 3oz (85gm).

Output Voltage Range (V)	Output Current (mA) max	Model Number
50 to 500	3.0	MD 0.5PN
150 to 1500	1.0	MD 1.5PN
300 to 3000	0.5	MD 3.0PN
170 to 500	3.0	MDA0.5PN
500 to 1500	1.0	MDA1.5PN
1000 to 3000	0.5	MDA3.0PN

120mW MC Series PCB Mount Low Power Converters

The MC Series high voltage DC to DC converters are ideally suited for low power applications. They are designed for direct PCB mounting with output voltages to 2400 Volts. All units are short circuit protected. Input to output isolation permits positive or negative grounding for either positive or negative high voltage output. Lower output ripple can be achieved by adding an external filter capacitor. The MC Series is ideal for photo detector biasing and other low power printed circuit board mounting applications.



Features

- PCB Mounting
- Positive or Negative Output
- Fully Regulated
- Output Current Limited
- Separate Output Control or Fixed Output
- High Efficiency
- Internal 5V Reference Available

Specifications

- Input Voltage: 10Vdc.
  Other input voltages are available
- Input Current: <0.3A at full output.
- Output Power: 120 milliWatts continuous.
  1W versions are available.
- Output Voltages & Currents:
  Other preset voltages between 250V and 2400V are available.
  See Table.
- Voltage Regulation:
  Line: Output proportional to Input.
  Load: 5%, half load to full load.
- Ripple: <0.2% p-p of full output V.
- Efficiency: >70% typical.
- Switching Frequency: 100kHz (typ).
- Insulation Strength: 3kV Input/Output.
- Temperature:
  Operating: 0°C to +70°C.
  Storage: -45°C to +85°C.
- Humidity: 0 to 90%, non-condensing.
- Terminations:
  4PC pins: 0.040" (1mm) diameter;
- PCB plated through holes;
  0.043" (1.1mm) 4 required.
- Physical:
  1.5"L x 1.5"W x 0.63"H (38.1 x 38.1 x 16mm).
- Weight: 1.35oz (38gm).

Output Voltage (V)	Output Current (mA)	Model Number
250	250	MC0.25PN
500	200	MC0.50PN
1200	100	MC1.20PN
2400	50	MC 2.4PN

These models can be customized to fit your OEM applications and special requirements.

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89/336/EEC 73/23/EEC
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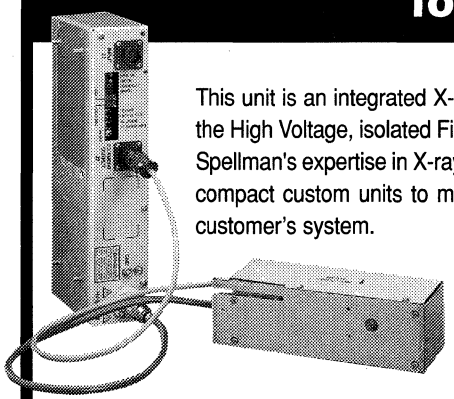
Custom Models

40kV, 200µA X-ray Source for Medical Applications



This unit is an integrated X-ray Generator system which includes the High Voltage, isolated Filament, X-ray tube and Tube housing. Spellman's expertise in X-ray power supplies enables us to design compact custom units to meet the exacting requirements of the customer's system.

Features

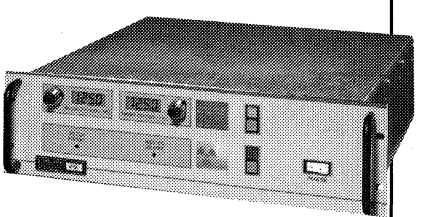
- Includes Power Supply and X-ray tube housing as an integrated subsystem.
- Full remote control of kV and Emission Current.
- 0.02% stability over 8 hours.
- Linear ramp of kV and mA.
- Low profile for system installation:
  HV module:
  11.65" x 4.6" x 2.5"
  (29.6 x 11.7 x 6.35cm).
  X-ray Tube housing:
  8.25" x 2.77" x 2.65"
  (21 x 7.04 x 6.73cm).

125kV, 70W Multiple Output Power Supply for Microfocus X-Ray Tubes

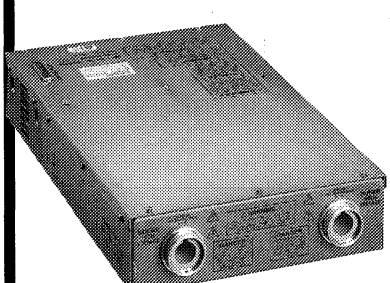
The MF Series incorporates four independent power supplies to drive Microfocus X-ray tubes in a compact 5 1/4" high rack mount chassis. Remote programming, monitoring and interlock controls with overload trip are featured.

Features

- 125kV, 1mA, 70W Anode supply.
- Adjustable Focus, Bias & Heater supplies are provided.
- Optional dual Focal spot selection is available.
- Low peak discharge current to protect X-ray tube.
- Constant Power control option is available.



±67.5kV, 675 Watt High Voltage Power Supply for Low Power C-Arm X-ray Systems



This compact module is designed to specifically mount in the base of a C-Arm, for medical diagnostic X-Ray systems. Incorporates an adjustable filament supply referenced to the cathode voltage. High voltage and filament current ramp up linearly for fast start. Constant beam current is adjustable from 0 to 5mA for precise emission control.

Features

- 0.05% Emission Current regulation.
- Adjustable filament supply 0 to 15V, 4.0A.
- Overcurrent and overvoltage circuitry with fault status indication.
- Remote analog voltage and current reference control.
- Voltage and current test points.
- 385Vdc input.
- Compact size: 19" x 12" x 3.44"
  (48.3 x 30.5 x 8.74cm).
- IEC/UL/VDE/TUV approved.

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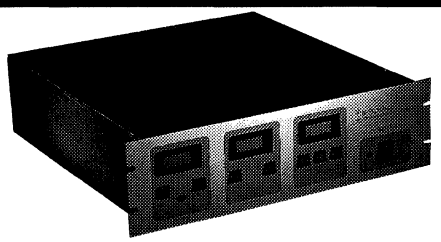
Custom Models

-50kV @ 300µA Precision Electron Gun Power Supply System



This new E-beam Gun Power Supply has been designed to achieve the highest stability and lowest ripple for demanding applications such as E-beam Lithography, Semiconductor Inspection and Microscope Systems.

Features

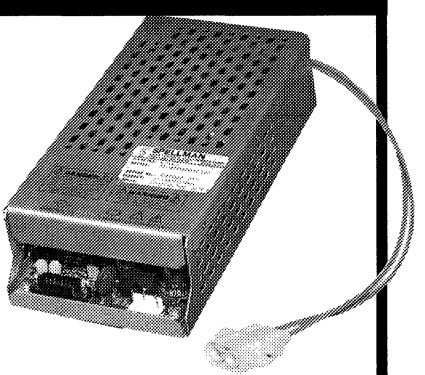
- Floating Filament Supply.
- RS-232 Interface.
- Low Ripple and Noise: <2.5ppm.
- Line and Load Stability: <10ppm.
- Active Bias System.
- Local or Remote Control of Beam Energy, Filament Power and Emission Current.
- Safe, ground level controls via 16-bit serial fiber optic link.

Ballastless 200W CO_2 LASER Power Supply

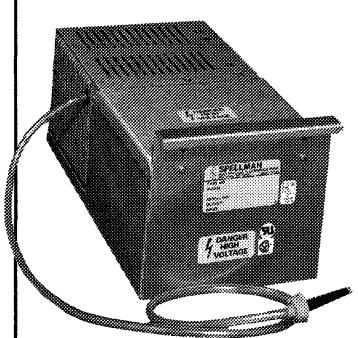
The Spellman high performance low cost Laser supply powers a CO_2 Laser discharge tube. The Laser supply has an average output power of 200W and provides 260W of peak power for discharge ignition with a typical efficiency of 90%. Overload protection for voltage and current are featured. The unit has a remote programming capability for current and voltage.

Features

- Up to 15kV, 20mA, 200W average.
- Pulse mode: up to 20Hz.
- High stability: 0.03% per hour.
- Light weight: 8lbs. (3.6kg).
- Small footprint: 10"L x 5"W x 3.2"H (254 x 127 x 81.3mm).
- Open frame design available.
- IEC/UL/VDE/TUV approved.
- No ballast required.



40kV at 600W peak with 2.5mS dynamic response for Projection Television Applications



This high performance high voltage power supply provides Projection Television cathode ray tubes with a 40kV anode voltage and three separate G2 Supplies of 200 to 1000 Volts with excellent regulation and ripple. The module has continuous short circuit protection and is capable of withstanding air arcing of the anode supply to ground.

Features

- Ultra-low ripple <8V P-P.
- Ultra-fast dynamic response <2.5mS.
- >600 Watt Pulse capability.
- Up to 40kV output to 15mA.
- Three independently controllable grid outputs 0 to 1200V.

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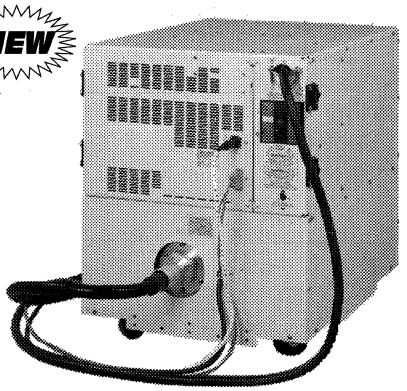
Custom Models

160kV, 85kW Ultrafast CT Power Supply

Spellman's high frequency resonant inverter technology enabled the development of this single ended power supply for an electron gun in an ultra-high speed CT scanner. This unit is housed in a ten cubic ft. package and features programmable high voltage from 0 - 160kV and a floating filament supply programmable from 0 - 10Vrms.

NEW



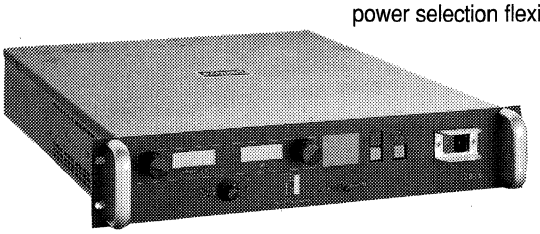
Features

- Output Voltage: 0 to 160kv.
- Emission Current: 0 to 650mA.
- Output Power: 85kW peak output.
- Extremely Low Ripple.
- Filament: 0 to 10Vrms, programmable.
- Controls for kV, mA, and filament current limit.
- Small volume: 30" x 24" x 27" (76.2 x 61 x 68.6cm).

375V, 750V, 1kV, 1.5kW Multiple Output Power Supply for Wireline Data Logging

NEW

This 1.5kW power supply is designed to meet the rugged outdoor demands of Wireline Data Logging. Reliable operation over wide temperature/humidity extremes and rough terrain is insured by stringent testing. A true floating output section provides power selection flexibility, and this supply features an RS 485 interface.



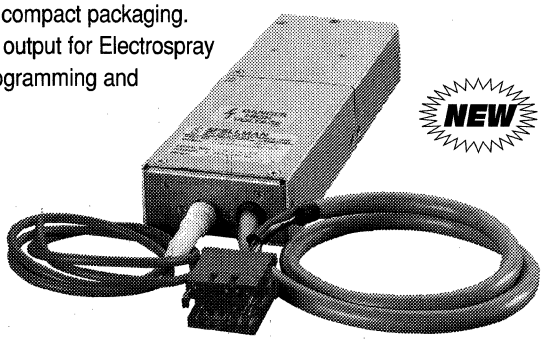
Features

- Output Voltage Ranges: 0 to 375V, 0 to 750V and 0 to 1kV. Front panel and remotely adjustable.
- Current: 0 to 2A, 0 to 1.5A or 0 to 4A.
- Low output Ripple, <150mV p-p
- Size: 3.5"H x 19"W x 21"D (7.62 x 48.3 x 53.3cm)

±8kV, 0.8W Reversible Power Supply for Mass Spectrometry

The features of this power supply include reversible polarity and compact packaging. This high voltage supply is designed to provide a very low ripple output for Electrospray Mass Spectrometry applications. The unit also allows remote programming and current and voltage monitoring.

NEW



Features

- Reversible polarity.
- ±0 to 8kV externally programmable.
- Low Ripple: 0.1% p-p.
- Low stored energy.
- Mode indicator and voltage and current monitors.
- DC Input: 24Vdc ±10%
- Small Size: 1.50"H x 3.25"W x 9.50"L (3.8 x 8.3 x 24.1cm)

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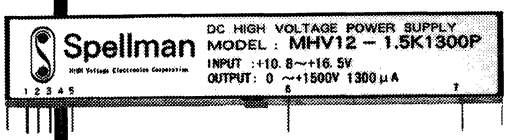
180V to 2kV, 2W HVD Dividers

2W MHV Regulated Modular HV Power Supplies



The MHV Series are well regulated high voltage power supplies using surface mount technology. A major reduction in size and volume to one fifth of previously available models has been achieved through hybrid integration. Electromagnetic shielding is provided through the use of a sealed metal case.

Applications

- Photomultiplier Tubes
- Solid State Detectors
- Flow Sensors
- Spectral Source Lamps
- Gas Chromatography
- Analytical Instruments
- Ink Jet Printers

Features

- Integrated compact package for PCB & chassis mounting; only 4.33" x 0.47" required
- Surface mount technology
- 16 models available to 2000V output; positive or negative polarity
- Low Ripple: 0.007%
- Adjustable from zero to rated voltage
- RFI/EMI shielded
- 300,000 Hour MTBF at 25°C

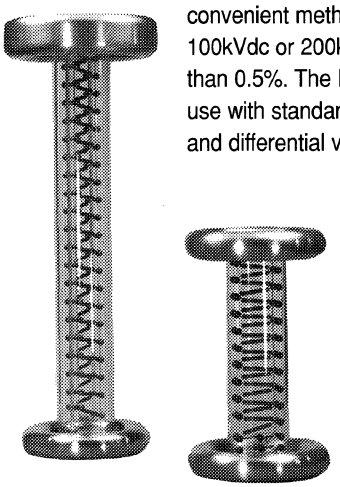
Specifications

- Input Voltage: 12Vdc, +38% -10%.
- Input Current: 280mA max. at all input voltages.
- Output Voltages & Currents: See Table.
- Output Power: 2W maximum.
- Remote Voltage Control: 0 to +4V from 0 to rated output, or 5kOhm potentiometer adjustment.
- Voltage Regulation:
  Load: 0.03% at full load with12Vdc in.
  Line: 0.03% at full current over specified input range.
- Ripple: 100mV p-p max (0.007%).
- Efficiency: 60% typical at 12Vdc input.
- Temperature Coefficient: 70ppm/°C.
- Stability: 0.05%/8hrs after 1/2hr warm up, over constant operating conditions.
- Humidity: 0 to 90% noncondensing.
- Physical:
  MHV 180 to 350V:
  3.15"L x 0.78"H x 0.47"W
  (80 x 19.75 x 12mm).
  MHV 470V to 2kV:
  4.33"L x 0.78"H x 0.47"W
  (110 x 19.75 x 12mm).
  SHV 1.5 and 2kV:
  5.16"L x 0.55"H x 0.83"W
  (131 x 14 x 21mm).
- Weight: 2.5oz (71gm) avg.

Vmax	mA	Model
0 - 180	15.0	MHV12-180S15*
0 - 300	10.0	MHV12-300S10*
0 - 350	7.0	MHV12-350S7*
0 - 470	6.0	MHV12-470S06*
0 - 1500	1.3	MHV12-1.5K1300*
0 - 2000	1.0	MHV12-2.0K1000*
0 - 1500	1.3	SHV12-1.5K1300*
0 - 2000	1.0	SHV12-2.0K1000*

* Specify "P" for positive, "N" for negative polarity.
* Specify "MHV" for PCB mount.

HVD Series Resistive Dividers



Spellman's resistive voltage dividers provide laboratory or production facilities with a convenient method of measuring up to 100kVdc or 200kVdc with accuracy better than 0.5%. The Dividers are designed for use with standard high impedance digital and differential voltmeters.

Features

- High Input Impedance
- 25ppm Temperature Coefficient
- High Accuracy
- Corona-Free Operation

	HVD100	HVD200
Input Voltage	0-100kVdc	0-200kVdc
Input Impedance	1000 Mohms	2000 Mohms
Output Impedance	1M; 100kohms	10kohms
Output Taps	100V,10V	2V
Accuracy	0.5%: (0.1% opt)[1]	0.5%: (0.25% opt)[2]
Temp.Coefficient	0.01%/8hrs	0.025%/8hrs
Height	17 1/2" (44.5cm)	33 1/2" (84.5cm)
Max. Diameter	10" (25.4cm)	12" (30.5cm)
Weight	6.75 lbs (3.1kg)	12 lbs (5.5kg)
Output Connector	BNC type	BNC type

(1) For accuracy for 0.1%, specify HVD100-1
(2) For accuracy of 0.25%, specify HV200-1

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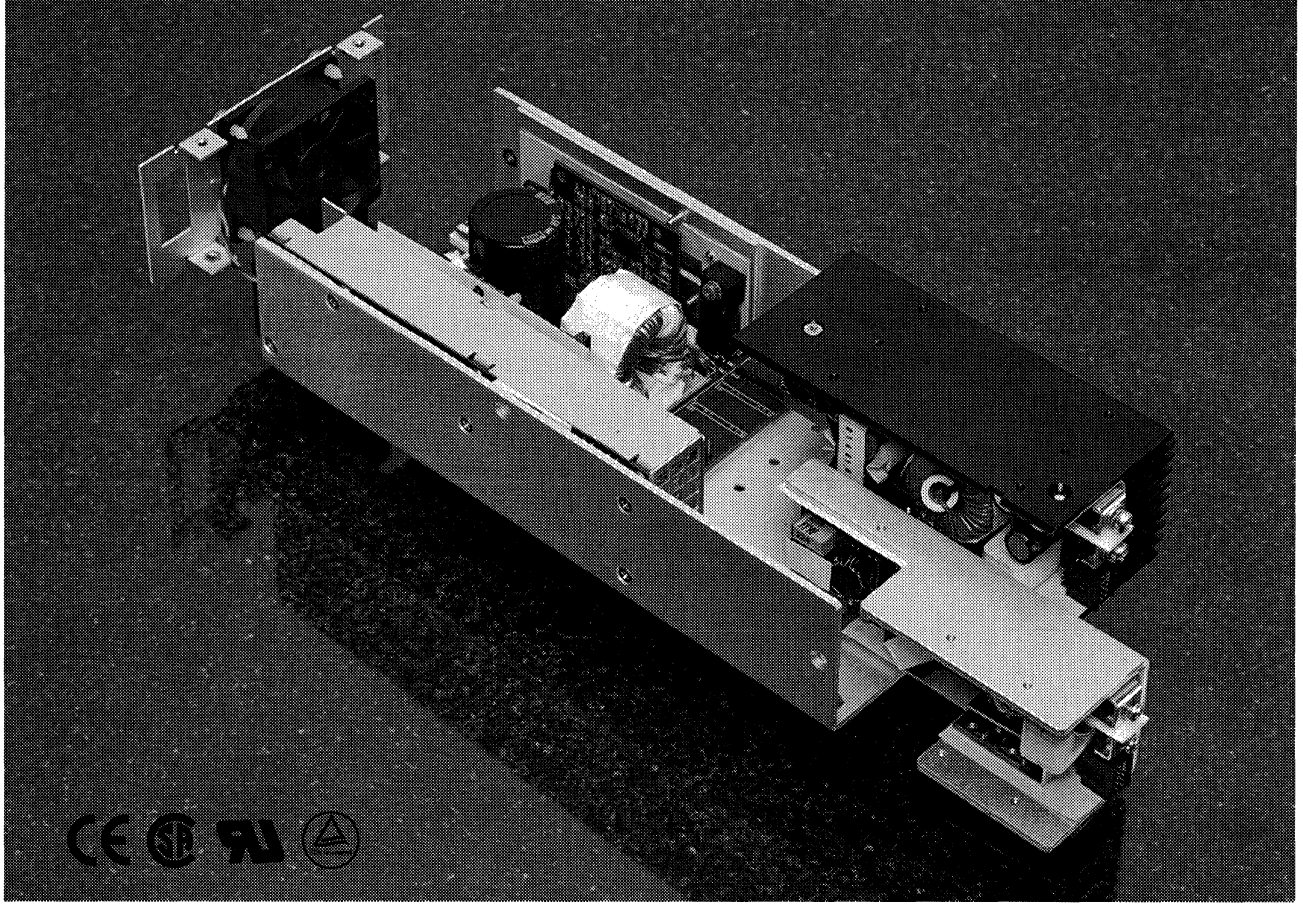

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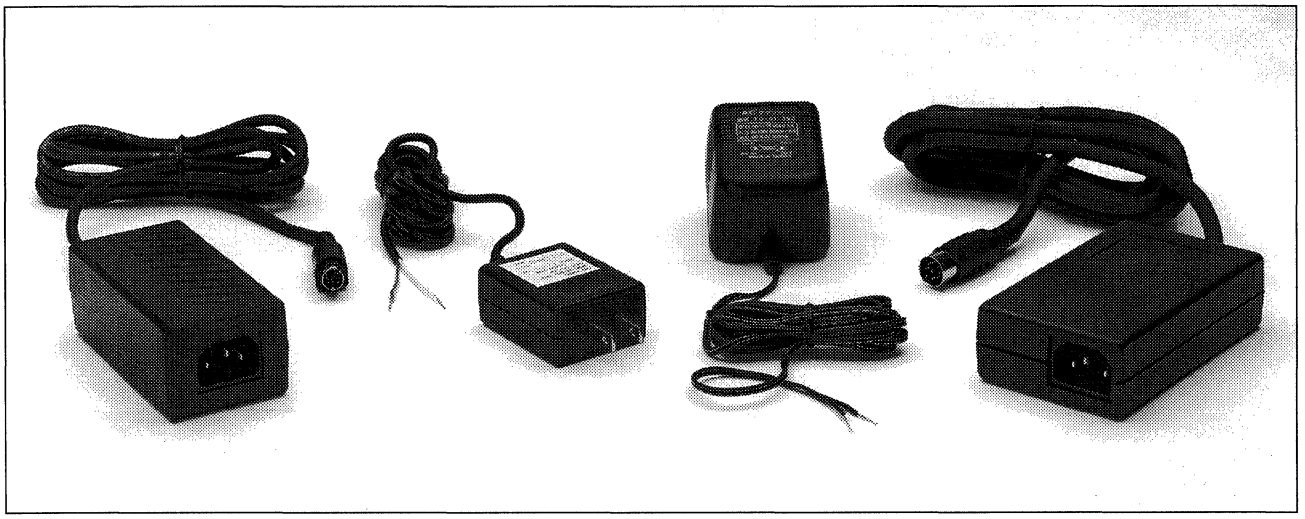

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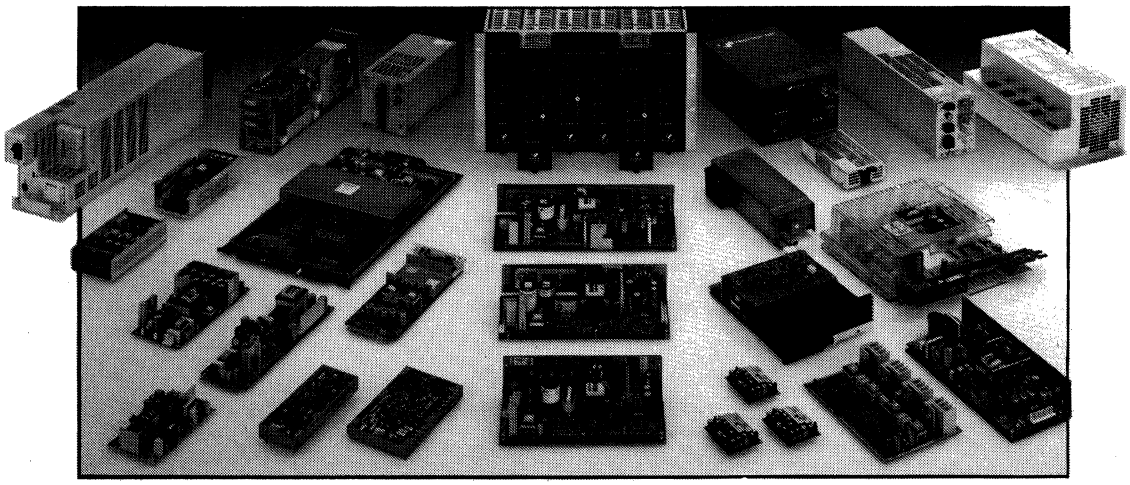
SWITCH MODE POWER SUPPLIES & DC - DC CONVERTERS



TECTROL has over twenty years of switching power supply and DC-DC converter experience. With hundreds of proven designs in service, Tectrol offers a wide variety of products to satisfy the most exacting customer needs.

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* **CUSTOM DESIGNS**
* **MILITARY PRODUCTS**

PRODUCT

Switching Power Supplies and DC-DC Converters covering a power range from 1 to 3500 Watts are available in various topologies, configurations and packages. All Tectrol products are designed to meet International Safety requirements such as UL, CSA, VDE, BSI, and conform to FCC and/or VDE Class A and B emission standards.

* **1 to 3500 WATTS**
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* **MODULAR & SEMI-MODULAR DESIGNS**
* **REDUNDANT (N+1) SYSTEMS**
* **1 MHZ RESONANT CONVERTERS**
* **HOT PLUG SYSTEMS**
* **POWER FACTOR CORRECTION**

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(OTHER REDUNDANT SYSTEMS AVAILABLE INCLUDING TM-600)

FEATURES		MODEL	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5	DIMENSION
SP0840 SERIES - 115/230 VAC OPERATION SWITCH SELECTABLE, MULTI-OUTPUT SWITCHING POWER SUPPLY								
- FULLY REGULATED OUTPUT, ADJUSTABLE, FLOATING - EFFICIENCY ABOVE 75% - FORCED CURRENT SHARING (FCS) CIRCUIT OUTPUTS 1-4 - ACTIVE PRE-LOAD ON MAIN OUTPUT- NO MIN. LOAD - AC POWER FAIL WARNING AND DC - OK SIGNALS	300W	SP0840/10 SP0840/15 SP0840/16 SP0840/17 SP0840/18 SP0840/19	5V 40A 5V 40A 5V 40A 5V 40A 5V 40A 5V 40A	12V 7A 12V 7A 12V 7A 12V 7A 12V 7A 15V 7A	12V 7A 12V 7A 12V 7A 12V 7A 12V 7A 15V 7A	5V 10A 5V 10A 12V 7A 12V 7A 12V 7A 15V 7A	12V 7A 24V 5A 12V 7A 5V 10A 24V 5A 24V 5A	5.0x13.75x2.8 127x350x71

NOTE: DIMENSIONS ARE IN INCHES AND MILLIMETER

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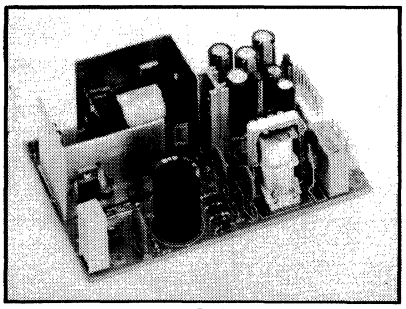

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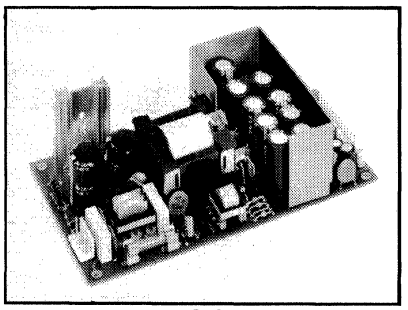
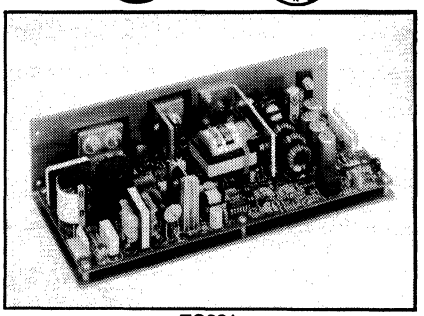


TO70



TO221

STANDARD FEATURES:

- EFFICIENCY ABOVE 70%
- SHORT CIRCUIT PROTECTED
- MEETS FCC, VDE EMI STANDARDS
- LOW RIPPLE & NOISE
- UL, CSA (TUV) VDE APPROVED (OR IN PROCESS OF APPROVAL)
- OVER VOLTAGE PROTECTION
- CURRENT & POWER LIMITED
- INRUSH CURRENT LIMITED & SOFT START

FEATURES		MODEL	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5	DIMENSION
TO-31, TO-41, TO-51 SERIES -UNIVERSAL INPUT, SINGLE/MULTI-OUTPUT								
-VERY LOW CROSS-REGULATION BETWEEN MAIN AND AUXILIARY RAILS	30W	TO-31/10 TO-31/11 TO-31/12	5V 3A 5V 3A 5V 3A	+12V 1.5A +24V 0.8A +15V 1.5A	−12V .35A −12V .35A −15V .35A			3.0x5.0x1.45 76x127x37
	40W	TO-39/10A TO-39/10B	5V 4A 5V 4.5A	+12V 2A +12V 2A	−12V .35A			3.0x5.0x1.45 76x127x37
	50W	TO-51/10 TO-51/12 TO-51/11	5V 6A 5V 6A 12V 3A	+12V 2A +15V 1.5A +24V 1A	−12V 0.5A −15V 0.5A −12V 0.5A	−5V 0.1A −5V 0.1A −5V 0.1A		3.75x5.7x1.7 95x145x43
	65W	TO-65/10 TO65/11 TO65/12 TO65/13 TO65/17	5V 6A 5V 6A 5V 6A 5V 3.5A 5V 6A	+12V 3A +12V 3A +15V 3A +12V 4A +15V 3A	−12V 1.5A 24V 1A −15V 1.5A 24V 1A	−5V 0.5A −12V 1.5A −5V 0.5A −15V 1.5A		3.5 x6x1.54 90 x153x39
TO-70 SERIES - 115/230 VAC SELECTABLE, MULTI-OUTPUT								
-POWER TRADING BETWEEN SECONDARIES -UL, CSA & VDE 0806/IEC380(TUV) & IEC950 -MEETS FCC & VDE EMI STANDARDS -UP TO 5 REGULATED OUTPUTS	70W	TO-70/10 TO-70/11 TO-70/12 TO-70/13 TO-70/14	5V 8A 5V 8A 5V 10A 5V 6A 5V 8A	+12V 3.5A +15V 3A +12V 2A +12V 4A +15V 3A	+24V 1A +24V 1A +24V 1A +24V 1A +24V 1A	−12V 1.5A −12V 1.5A −12V 1.5A −12V 1.5A −15V 1.5A	−5V 1A −5V 1A −5V 1A −5V 1A −12V 1A	4.25x7.75x1.9 108x197x48
TO-81, TO-101, TO-131, TO151, TO161, TO221 SERIES - UNIVERSAL INPUT, MULTI-OUTPUT								
-VERY LOW CROSS-REGULATION BETWEEN MAIN AND AUXILIARY RAILS -POWER GOOD SIGNAL	80W	TO-81/10 TO-81/11 TO-81/17 TO-81/19	5V 10A 5V 10A 5V 10A 5V 10A	+12V 3A +12V 3A +15V 1.5A +15V 3A	−12V 1.25A −12V 1.25A −15V 1.5A −15V 1.5A	+12V 1A +24V 1A +24V 1A +12V 1A		4.0x6.5x1.6 102x165x41
	100W	TO-101/10 TO-101/11 TO-101/12 TO-101/14 TO-101/13	5V 12A 5V 12A 5V 12A 5V 10A 12V 5A	+12V 3.5A +12V 3.5A +15V 3.5A +24V 3.5A +24V 4A	−12V 1.5A −12V 1.5A −15V 1.5A −12V 1A −12V 1.5A	−5V 0.3A +24V 1.5A −5V 0.3A +12V 1.5A −5V 0.3A		4.25x7.75x1.9 108x197x48
	130W	TO-131/10 TO-131/11 TO-131/12 TO-131/14 TO-131/13	5V 15A 5V 15A 5V 15A 5V 12A 12V 6A	+12V 4A +12V 4A +15V 4A +24V 4A +24V 4A	−12V 1.5A −12V 1.5A −15V 1.5A −12V 1A −12V 1.5A	−5V 0.3A +24V 1.5A −5V 0.3A +12V 1.5A −5V 0.3A		4.5x7.75x2.12 114x197x58
*NOTE: TO149 HAS 115/230V SELECTABLE INPUT RANGE.	150W*	TO-149/10 TO-149/12	5V 25A 5V 25A	+12V 3A +15V 3A	−12V 3A −15V 3A			4.45x7.5x2 113x191x51
	150W	TO-151/10 TO-151/12	5V 25A 5V 25A	+12V 4A +15V 4A	−12V 3A −15V 3A			4.45x7.5x2 113x191x51
	160W	TO-161/10 TO-161/11 TO-161/12 TO-161/13	5V 25A 5V 25A 5V 25A 5V 15A	+12V 4A +24V 3A +15V 1.5A +12V 8A	−12V 1.5A −12V 1.5A −15V 1.5A −12V 1.5A	−5V 0.8A +12V 1A −5V 0.8A −5V 0.8A		5.0x9.0x2.5 127x229x63.5
	220W	TO-221/10 TO-221/11 TO-221/12 TO-221/13 TO-221/14	5V 30A 5V 25A 5V 30A 5V 15A 5V 35A	+12V 6A +24V 4A +15V 6A +12V 10A +12V 2A	−12V 1.5A −12V 1.5A −15V 1.5A −12V 2.5A −12V 2A	−5V 1A +12V 1.5A −5V 1A −5V 1A		5.0x9.0x2.5 127x229x63.5
TO-351 SERIES - UNIVERSAL INPUT, MULTI-OUTPUT								
-POWER GOOD SIGNAL -OPTIONAL FAN COVER ASSEMBLY	350W	TO-351/10 TO-351/11 TO-351/12	5V 50A 5V 50A 5V 50A	+12V 7A +24V 4A +15V 6A	−12V 6A −12V 6A −15A 6A	−5V 1A −5V 1A −5V 1A		5"x9"x2.5" (127x229x63.5)

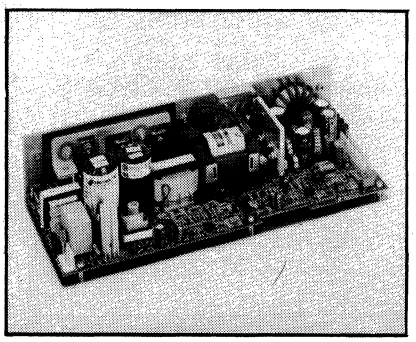
FOR FURTHER INFORMATION ON STANDARD, CUSTOM, SEMI-CUSTOM AND MILITARY POWER PRODUCTS, PLEASE CONTACT TECTROL

TECTROL INC
SWITCHING POWER PRODUCTS

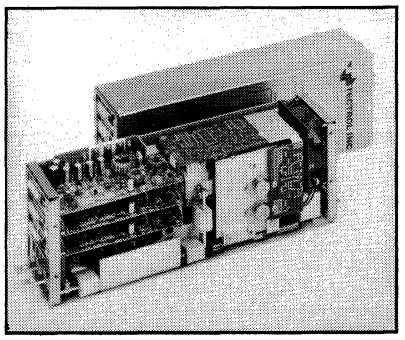
39 KODIAK CRESCENT
DOWNSVIEW, ONT. M3J 3E5
TEL: (416) 630-8108
FAX: (416) 638-0553

SEMI-MODULAR & MODULAR POWER SUPPLIES

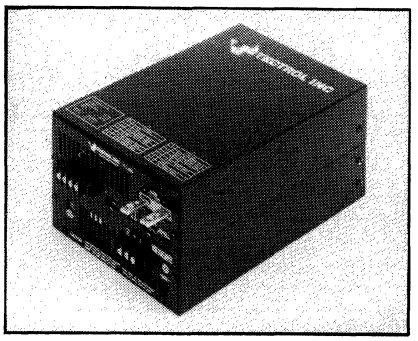
ISO 9001 REGISTERED



TO204 / TO304



TM600



TO825

STANDARD FEATURES:
- 77-86% EFFICIENCY
- INHIBIT - ACTIVE LOW
- CURRENT LIMITED OUTPUTS
- POWER TRADING BETWEEN SECONDARIES
- OVER TEMPERATURE PROTECTION
- OVER VOLTAGE PROTECTION
- UL,CSA & (TUV)VDE APPROVED (OR IN PROCESS OF APPROVAL)
- MEETS FCC & VDE EMI STANDARDS

FEATURES		MODEL	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5	DIMENSION
TO-204, TO-304, TO-404 SERIES - SEMI-MODULAR POWER SUPPLY								
- SHORT CIRCUIT PROTECTED - INRUSH CURRENT LIMITED & SOFT START - NO CROSS REG. BETWEEN MAIN & AUX. - HIGH SURGE LOAD CAPABILITY - REMOTE SENSING ON MAIN OUTPUT	200W 250W	TO-204/11 TO-204/10 TO-204/17 TO-204/12 TO-204/13 TO-204/14 TO-204/15 TO-204/16	5V 40A 5V 30A 5V 30A 12V 21A 15V 17A 24V 11A 28V 9A 48V 5.5A	12V 8A 15V 8A	12V 8A 15V 8A		SEE NOTE **	5.0x10.5x2.6 127x267x66
	350W	TO-304/10 TO-304/17 TO-304/18 TO-304/19 TO-304/12 TO-304/13 TO-304/14 TO-304/15 TO-304/16	5V 30A 5V 30A 5V 40A 5V 40A 12V 25A 15V 20A 24V 13A 28V 11A 48V 7A	12V 12A 15V 12A 12V 12A 15V 10A	12V 6A 15V 6A 12V 6A 15V 6A	24V 12A 24V 12A 24V 12A 24V 12A	SEE NOTE **	5.0x12.0x2.6 127x305x66
	450W	TO-404/10 TO-404/17 TO-404/11 TO-404/12 TO-404/13 TO-404/14 TO-404/15 TO-404/16	5V 50A 5V 50A 5V 80A 12V 38A 15V 30A 24V 19A 28V 16A 48V 10A	12V 10A 15V 10A	12V 10A 15V 10A	+24V 12A +24V 12A	SEE NOTE **	5.0x14.0x2.6 127x356x66
TM-600 SERIES - MODULAR SWITCHING POWER SUPPLY								
- FULLY REGULATED & ADJUSTABLE OUTPUTS - OVER VOLTAGE SHUTDOWN ON ALL OUTPUTS - REMOTE SENSING ON ALL OUTPUTS - REDUNDANT (N+1), PARALLELABLE - MASTER & AUX. OUTPUT INHIBIT - UP TO 7 INDEPENDENTLY CONFIGURABLE OUTPUTS - FORCED CURRENT SHARING ON ALL SINGLE REGULATORS - UPS SYSTEM CAPABILITY	600W	TM-600/10 TM-600/21 TM-600/22 TM-600/23 TM-600/24 TM-600/25 TM-600/11 TM-600/12 TM-600/13 TM-600/14 TM-600/15 TM-600/16	5V 80A 5V 80A 5V 80A 5V 80A 5V 80A 5V 80A 5V 100A 12V 50A 15V 40A 24V 25A 28V 22A 48V 13A	12V 10A 12V 10A 15V 7A 15V 7A +/-12V 5A +/-15V 4A	12V 10A 12V 10A 15V 7A 15V 7A 5V 5A 5V 4A	24V 4A 5V 15A 24V 4A 5V 15A 2.2V 15A 2.2V 15A		5.0x14.25x3.5 127x362x89
TO-825 SERIES - HIGH POWER SINGLE/MULTIPLE OUTPUT								
- UP TO 5 FULLY REGULATED OUTPUTS - FORCED CURRENT SHARING FOR PARALLEL REDUNDANT OPERATION - POWER FAIL WARNING - FRONT PANEL AC SELECT	825W	TO-825/10 TO-825/18 TO-825/19 TO-825/20 TO-825/25 TO-825/12 TO-825/14 TO-825/10B	5V 150A 5V 100A 5V 100A 5V 100A 5V 100A 12V 70A 24V 35A 5V 150A	24V 10A 24V 10A 24V 10A 12V 12A 12V 20A	12V 12A 12V 12A 15V 10A 12-15V 10A 12V 10A 12V 20A	12V 8A 12V 8A 15V 6A 12-15V 6A	5V 15A 5V 15A 5V 15A 5V 15A 2.2V 15A	8.0x5.0x11.75 203x127x298
TRM-1000 SERIES - MODULAR SWITCHING POWER SUPPLY								
- POWER FACTOR CORRECTED	1000W	TRM-1000/10 TRM-1000/18 TRM-1000/19	5V 150A 5V 150A 5V 150A	12V 15A 12V 10A 15V 10A	12V 10A 12V 10A 15V 10A	5V 15A 24V 10A 24V 5A		8.0x15.0x3.2 203x381x81

** NOTE:
MODULAR ADD-IN REGULATORS AVAILABLE FOR TO-204, TO-304, TO-404 (OUTPUT 4, 5 AND/OR 6)

SINGLE	DUAL
2.2V 15A	+/-15V 8A
5V 15A	+/-12V 8A
12V 12A	+/-15V 8A
15V 10A	
24V 8A	

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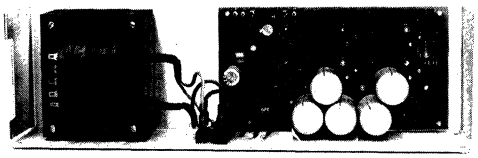
DOWNSVIEW, ONT. M3J 3E5
TEL: (416) 630-8108
FAX: (416) 638-0553

DC LINEAR POWER SUPPLIES

IEC 380.435

ISO9001 Registered

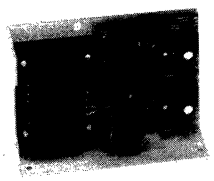


GHOF 5 SERIES

CAT. NO.	VOLTS	AMPS
GHOF 5-5	5	25.0
GHOF 5-12	12	16.0
GHOF 5-15	15	15.0
GHOF 5-24	24	12.0
GHOF 5-28	28	10.0

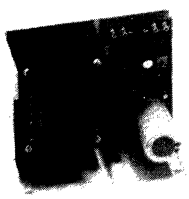
GHOF 1 SERIES

CAT. NO.	VOLTS	AMPS
GHOF 1-5	5	3.0
GHOF 1-12	12	1.7
GHOF 1-15	15	1.5
GHOF 1-24	24	1.2
GHOF 1-28	28	1.0



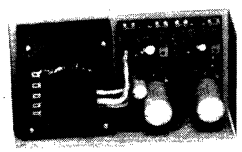
GHOF 1D SERIES

CAT. NO.	VOLTS	AMPS	VOLTS	AMPS
GHOF 1DA	12-15	1.5	12-15	1.5
GHOF 1DB	5	3.0	5	3.0
GHOF 1DC	5	3.0	12-15	1.5
GHOF 1DD	5	3.0	24	.4



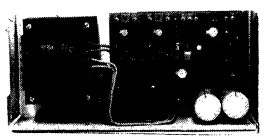
GHOF 2 SERIES

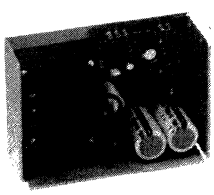
CAT. NO.	VOLTS	AMPS
GHOF 2-5	5	6.0
GHOF 2-12	12	3.4
GHOF 2-15	15	3.0
GHOF 2-24	24	2.4
GHOF 2-28	28	2.0



GHOF 2D SERIES

CAT. NO.	VOLTS	AMPS	VOLTS	AMPS
GHOF 2DA	12-15	3.0	12-15	3.0
GHOF 2DB	5	6.0	5	6.0
GHOF 2DC	5	6.0	12-15	3.0
GHOF 2DD	5	6.0	24	2.3



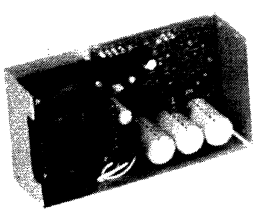


GHOF N SERIES

CAT. NO.	VOLTS	AMPS
GHOF N-5	5	9.0
GHOF N-12	12	5.1
GHOF N-15	15	4.5
GHOF N-24	24	3.6
GHOF N-28	28	3.0

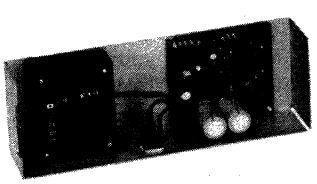
GHDD / GHOF 2TA SERIES

CAT. NO.	VOLTS	AMPS	VOLTS	AMPS	VOLTS	AMPS
GHDD 100	24	2.0	5	1.5	5	0.5
GHDD 101	12-15	1.0	5	3.0	12-15	1.0
GHDD 102	24	2.0	5	1.0	12-15	0.7
GHOF 2TA	5	8.0	12-15	1.5	12-15	1.5



GHOF 3 SERIES

CAT. NO.	VOLTS	AMPS
GHOF 3-5	5	12.0
GHOF 3-12	12	7.0
GHOF 3-15	15	6.2
GHOF 3-24	24	4.8
GHOF 3-28	28	4.0



GHOF 4 SERIES

CAT. NO.	VOLTS	AMPS
GHOF 4-5	5	18.0
GHOF 4-12	12	10.2
GHOF 4-15	15	9.0
GHOF 4-24	24	6.0
GHOF 4-28	28	5.0

SPECIFICATIONS

AC Input
100/120/220/240 VAC + 10% −13% 47-63 Hz

Line Regulation
±.005% maximum over full range.

Load Regulation
±.015% from zero to full load.

Output Ripple
<1mV pk-pk (DC to 100kHZ)

Transient Response
Maximum deviation less than ±1%.
Recovers within 0.5% in less than 20μ sec.

Overvoltage Protection
SCR crowbar type standard on +5V outputs set to 6.2V ±200mV. Optional on other outputs.

Temperature
Operating 0-70° derated linearly above 50°C to 50% load at 70°C
Storage −40°C to +85°C

Short Circuit and Overload Protection
Automatic, self recovering controlled profile foldback and delayed re-entrant foldback type.

Remote Inhibit
Standard on series N,3,4,5,2TA output 1.

Remote Sense
Standard on all models.

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SWITCHING POWER PRODUCTS

39 KODIAK CRESCENT
DOWNSVIEW, ONT. M3J 3E5
TEL: (416) 630-8108
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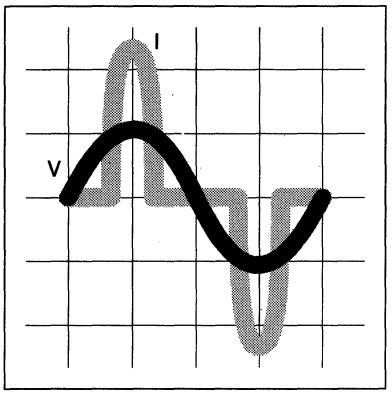
POWER FACTOR CORRECTED SWITCHING POWER SUPPLIES

Tectrol designs and manufactures Power Factor Corrected Power Supplies for medium to high power applications.



Some Advantages are:

a) **Maximum power is made available for end system use for any given branch circuit current rating.**

b) **Compliance with pending regulatory requirements (eg. IEC-555) for line current harmonic content limits.**

c) **Elimination of Neutral conductor current overload in 3-phase systems due to the additive nature of the harmonic current content generated by switching power supplies with no power factor correction.**

d) **Elimination of the unnecessary stress on the power distribution system caused by the "Wattless" component of the line current in an uncorrected power supply.**

On a 15 ampere setrvice, UL limits current draw to 80% of the branch circuit rating, i.e. 12A.

Output power is defined as Vin (rms) x Iin (rms) x Power Factor x Efficiency.

The typical Power Factor x Efficiency (PFE) product for an uncorrected supply is about (0.65 x 0.75) = 0.48. This results in a maximum output power available for system use of about 670W from a 115VAC/15A line.

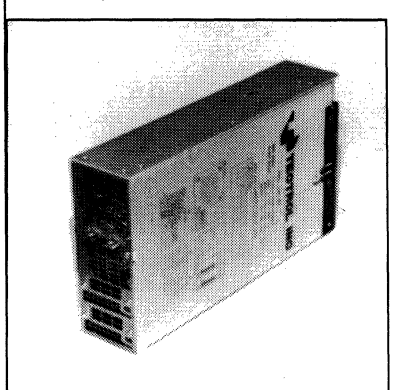
If the power factor is improved to 0.99 the available power is increased to 1024W, an increase of 53%.

Power Factor Corrected Unit - 1000W model

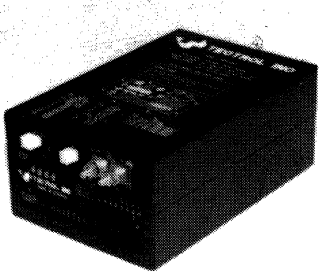
Input Ratings
Voltage: 85 - 265VAC / 47 - 63Hz
Current: Less than 12A rms
Power Factor: 0.99 typical.
Hold Up Time: 20msec minimum at 90VAC
Efficiency: 75% minimum
Surge withstand capability: To IEEE-587, Category A/B

Output Ratings
Single output models: 1000W; 5VDC / 200A to 48VDC / 21A
Multiple output models: Output 1: up to 750W, votages from 2.2VDC - 48VDC
Outputs 2 - 5: 150W or 250W per output, 2.2VDC - 48VDC

All outputs have low ripple and noise characteristics (<1%), and are fully regulated and adjustable.



Features
- Built in PFC circuity
- UL, CSA, & TUV approved
- FCC 20780 A & VDE 0871, level A
- Forced current sharing on main & single output modules
- Master remote ON / OFF
- Master remote latching shut down
- Advance thermal warning output
- AC power fail output
- Overload / Short circuit protected, all outputs
- Over voltage protected, all outputs
- Built in Forced-Air fan cooling



Tectrol is a leader in standard or custom packaged Power Factor Corrected multiple output power supplies for single unit stand alone applications or for parallel-redundant system applications with hot-plug-in capability.

Standard units are offered for 1000 - 1500W, in an 8" x 5" x 11 to 13" package.

Contact Tectrol for your PFC Power Supply solutions.

ISO 9001 REGISTERED

FOR FURTHER INFORMATION ON POWER FACTOR CORRECTED SWITCHING POWER SUPPLIES, PLEASE CONTACT TECTROL

TODD POWER SUPPLIES

Todd Products Corp. is committed to meeting or exceeding customers' requirements at the lowest possible cost, while providing the highest grade of technical support.

TODD PRODUCTS CORP.
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BRENTWOOD, NY 11717 USA
TEL: 800 223-TODD
(8633)
516 231-3366
FAX: 516 231-3473
http://www.toddpower.com

TODD ACQUIRES ORYX POWER PRODUCTS CORPORATION

This acquisition accelerates the double-digit growth Todd Products Corp. has achieved over the last three fiscal years. It broadens our product line, enhances its mix, and provides additional resources for sales, engineering and manufacturing.

As a result of this acquisition, Todd has the capability for high-volume manufacturing offshore, in addition to the manufacturing done at its ISO 9001 certified headquarters facility in Brentwood, New York.

Todd's product line of AC/DC switching power supplies includes over 260 standard models between 150 and 1500 watts in addition to a virtually unlimited number of modified standard and custom power solutions. The acquisition of Oryx Power Products Corp. expands the Todd product line so that the company provides one of the industry's **most complete lines of AC/DC switching power supplies from 30 to 1500 watts, and DC/DC converters from 1 to 500 watts.**

See EEM pages D•1825 to D•1846; D•2127 to D2130; and www.toddpower.com

Overseas TODD offices are located in Australia, Canada, Denmark, France, Germany, Hong Kong, Israel, Italy, Korea, Netherlands, Norway, South Africa, Spain, Sweden, Switzerland, and United Kingdom.

Since 1968, TODD has been a leading designer and manufacturer of a broad range of standard, modified standard and custom switching regulated power supplies for a wide variety of OEM applications.

TODD's 65,000-square-foot headquarters in Brentwood, NY, combines executive offices, engineering, and manufacturing.

TOTAL QUALITY MANAGEMENT

Our continuous improvement process includes implementation of corrective action and computerized tracking systems. All processes conform to both USA and International safety and quality standards. We were one of the first power supply manufacturers to have an ISO registered quality system and now maintain registration to ISO 9001.

We are factory certified to BABT 340, TUV Rheinland PSQA, CSA Category Program and UL Compass Programs, and we meet the applicable low voltage and EMC directive as required for the CE mark.

TODD power supplies are designed to meet your most demanding criteria for:

- Reliability
- Performance
- Dependable Dock-to-Stock Assurance
- Conservative Derating
- Manufacturability - Testability
- International Safety Approvals
- Serviceability

MEETING OEM REQUIREMENTS WITH SUPERIOR TECHNOLOGY

All of our departments – engineering, quality, manufacturing, and sales – work together to become an integral part of your product development. Experts from each department provide innovative, cost-effective solutions by applying both conventional and new, but proven technologies.

We achieve low parts counts which help insure simplicity, high MTBF and exceptional reliability. Our power supply design employs the very latest high-efficiency technology. Single-board construction, extensive use of surface mount devices (SMD), and unique board layouts allow maximum air flow for optimum thermal performance. This reduces both the number of through-hole connections and component temperature, and greatly increases overall reliability.

WORLD-CLASS MANUFACTURING FOR THE GLOBAL MARKET

JIT – Just In Time Manufacturing – supported by a computerized MRP system, common materials, and "single-piece-flow" manufacturing provide maximum manufacturing efficiency.

Our dock-to-stock system for incoming parts requires that three departments – purchasing, quality and engineering – must approve and continuously audit vendors, to insure that they provide consistent quality and on-time delivery.

Training of over 400 TODD employees is also continuous, to insure that the highest levels of effectiveness are maintained.

AUTOMATION AND ENVIRONMENTAL CONTROL

We utilize systems and equipment which help insure that quality, repeatability and verification are consistent.

Among these are:

Automatic Test Equipment (ATE) – After mechanical assembly, all units are burned-in. All finished products are calibrated, tested and checked against specifications and customer requirements.

Surface Mount Devices (SMD) – All PC boards are double sided with plated through-holes. Installation of surface mount devices and axial leaded components is automated.This keeps costs down, manufacturing repeatability high, and adds to superior reliability. Already known for our exceptional surface mount capabilities, in 1996 we added another state-of-the-art Siemens high-speed, automatic surface mount system which can place up to 10,500 components an hour with amazing accuracy.

ESD and Contamination Control – To insure that all TODD power supplies are protected from undetected damage, we use no contaminating cleaning solvents or chemicals, and have systems in place which prevent the problems associated with electrostatic discharge.

Magnetic Device Manufacturing – Magnetic devices are critical in the performance and safety of power supplies. To be certain we have total control over all aspects of magnetics, we design them ourselves.

Ozone Protection – TODD strongly supports efforts to alleviate the depletion of the earth's ozone layer caused by chloroflurocarbons (CFCs), hydrochloroflurocarbons (HCFCs), methylchloroform, carbon tetrochloride, and halons (collectively known as "Ozone Depleting Chemicals" or ODCs). These chemicals are NEVER used to manufacture Todd products.

3-YEAR WARRANTY AND CUSTOMER SERVICE

Our promise of quality and service is backed by a 3-year warranty. Our goal is to become your primary power supply vendor, and we know that this can be achieved only when both product quality and customer service are outstanding.

POWER SUPPLY LOCATOR

How to Use This Power Supply Locator.

Todd Products Corp. has a wide range of switching power supplies. Available models range from 150 to 1500 watts; single and multiple output; ac or dc input. This Locator makes selection of the best power supply for your application simple. Here's how it works:

1. Determine your Input Voltage requirements: ac or dc.
2. Decide on your output needs. Single, Dual, Triple, or Quad output.
3. Calculate the maximum power the power supply must deliver.
4. Locate the appropriate section meeting these criteria.
5. Review the output current ratings of the products available within your needs.
6. Find detailed specifications for the model selected.

Custom Power Solutions

If you cannot locate a standard product meeting your needs, please contact the factory.

To Order

Orders can be placed through your local representative or directly through the factory by calling 800 223-TODD, or 516 231-3366.

Technical Support

You can talk to an engineer regarding applications, technical concerns, etc., simply by calling our Toll Free Hot Line 800 223-TODD.

3.3V
MAIN OUTPUT AVAILABLE
CONSULT FACTORY FOR DETAILS
See our SC3.3-30 and SC 3.3-50.

AC INPUT – SINGLE OUTPUT

OUTPUT		PWR	SIZE	MODEL
3.3V	3.3V @ 30A	100	9" x 5" x 2.5"	SC3.3-30
	3.3V @ 50A	165	9" x 5" x 2.5"	SC3.3-50
5-VOLT	5V @ 30A	150	9" x 5" x 2.5"	SC5-30
	5V @ 50A	250	9" x 5" x 2.5"	SC5-50
	5V @ 70A	350	11.5" x 5" x 2.5"	SC5-70
	5V @ 100A	500	11.5" x 5" x 2.5"	SC5-100
	5V @ 120A	600	12.92" x 5" x 2.5"	SPF-600-05
	5V @ 200A	1000	12" x 8" x 3.38"	SPF-1000-05
	5V @ 300A	1500	12" x 8" x 3.38"	SPF-1500-05
12-VOLT	12V @ 15A	180	9" x 5" x 2.5"	SC12-15
	12V @ 21A	250	9" x 5" x 2.5"	SC12-21
	12V @ 30A	360	11.5" x 5" x 2.5"	SC12-30
	12V @ 42A	500	11.5" x 5" x 2.5"	SC12-42
	12V @ 62A	750	12.92" x 5" x 2.5"	SPF-750-12
	12V @ 84A	1000	12" x 8" x 3.38"	SPF-1000-12
	12V @ 125A	1500	12" x 8" x 3.38"	SPF-1500-12
15-VOLT	15V @ 12A	180	9" x 5" x 2.5"	SC15-12
	15V @ 17A	250	9" x 5" x 2.5"	SC15-17
	15V @ 24A	360	11.5" x 5" x 2.5"	SC15-24
	15V @ 34A	500	11.5" x 5" x 2.5"	SC15-34
	15V @ 50A	750	12.92" x 5" x 2.5"	SPF-750-15
	15V @ 67A	1000	12" x 8" x 3.38"	SPF-1000-15
	15V @ 100A	1500	12" x 8" x 3.38"	SPF-1500-15
24-VOLT	24V @ 7.5A	180	9" x 5" x 2.5"	SC24-7.5
	24V @ 11A	250	9" x 5" x 2.5"	SC24-11
	24V @ 15A	360	11.5" x 5" x 2.5"	SC24-15
	24V @ 21A	500	11.5" x 5" x 2.5"	SC24-21
	24V @ 31A	750	12.92" x 5" x 2.5"	SPF-750-24
	24V @ 42A	1000	12" x 8" x 3.38"	SPF-1000-24
	24V @ 41.6A	1000	13.93"x5"x2.5"	TCM-1000-24
	24V @ 50A	1200	13.44" x 5" x 4.03""	SPH-1200-24
	24V @ 63A	1500	12" x 8" x 3.38"	SPF-1500-24
28-VOLT	28V @ 6.5A	180	9" x 5" x 2.5"	SC28-6.5
	28V @ 9A	250	9" x 5" x 2.5"	SC28-9
	28V @ 13A	360	11.5" x 5" x 2.5"	SC28-13
	28V @ 18A	500	11.5" x 5" x 2.5"	SC28-18
	28V @ 27A	750	12.92" x 5" x 2.5"	SPF-750-28
	28V @ 36A	1000	12" x 8" x 3.38"	SPF-1000-28
	28V @ 35.7A	1000	13.93"x5"x2.5"	TCM-1000-28
	28V @ 42A	1200	13.44" x 5" x 4.03"	SPH-1200-28
	28V @ 54A	1500	12" x 8" x 3.38"	SPF-1500-28
48-VOLT	48V @ 3.7A	180	9" x 5" x 2.5"	SC48-3.7
	48V @ 5.5A	250	9" x 5" x 2.5"	SC48-5.5
	48V @ 8A	360	11.5" x 5" x 2.5"	SC48-8
	48V @ 11A	520	11.5" x 5" x 2.5"	SC48-11
	48V @ 16A	750	12.92" x 5" x 2.5"	SPF-750-48
	48V @ 21A	1000	12" x 8" x 3.38"	SPF-1000-48
	24V @ 20.8A	1000	13.93"x5"x2.5"	TCM-1000-48
	48V @ 25A	1200	13.44" x 5" x 4.03"	SPH-1200-48
	48V @ 32A	1500	12" x 8" x 3.38"	SPF-1500-48

DC INPUT – SINGLE OUTPUT

INPUT	OUTPUT	PWR	SIZE	MODEL
24/28 VDC	5V @ 50A	250	9" x 5" x 2.5"	DB5-50
	12V @ 21A	250	9" x 5" x 2.5"	DB12-21
	15V @ 17A	250	9" x 5" x 2.5"	DB15-17
	24V @ 11A	250	9" x 5" x 2.5"	DB24-11
	28V @ 9A	250	9" x 5" x 2.5"	DB28-9
	48V @ 5.5A	250	9" x 5" x 2.5"	DB48-5.5
48 VDC	5V @ 50A	250	9" x 5" x 2.5"	DC5-50
	12V @ 21A	250	9" x 5" x 2.5"	DC12-21
	15V @ 17A	250	9" x 5" x 2.5"	DC15-17
	24V @ 11A	250	9" x 5" x 2.5"	DC24-11
	28V @ 9A	250	9" x 5" x 2.5"	DC28-9
	48V @ 5.5A	250	9" x 5" x 2.5"	DC48-5.5

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TODD POWER SUPPLIES

POWER SUPPLY LOCATOR

DC INPUT – MULTIPLE OUTPUT

INPUT	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	SIZE	MODEL
24/28 VDC	275	+5V @ 45A	+12V @ 6A	-12V @ 6A		9" x 5" x 2.5"	DBT-273-0512
	275	+5V @ 45A	+15V @ 5A	-15V @ 5A		9" x 5" x 2.5"	DBT-273-0515
	275	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A		9" x 5" x 2.5"	DBX-273-0512
	275	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	5.2V @ 2A	9" x 5" x 2.5"	DBX-274-1205
	275	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	24V @ 1.5A	9" x 5" x 2.5"	DBX-274-1224
	250	+5V @ 30A	+12V @ 5A	-12V @ 5A		9" x 5" x 2.5"	DCT-253-0512
	250	+5V @ 30A	+15V @ 4A	-15V @ 4A		9" x 5" x 2.5"	DCT-253-0515
	350	+5V @ 45A	+12V @ 6A	-12V @ 6A		9" x 5" x 2.5"	DCT-353-0512
	350	+5V @ 45A	+15V @ 5A	-15V @ 5A		9" x 5" x 2.5"	DCT-353-0515
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A		9" x 5" x 2.5"	DCX-353-0512
	500	+5V @ 75A	+12V @ 8/12Apk	-12V @ 4A		9.65" x 5" x 2.05"	DMX-503-0512
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A		10.75" x 4.8" x 2.5"	TMX-353-0512
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	5.2V @ 5A	10.75" x 4.8" x 2.5"	TMX-354-1205
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	12V @ 5A	10.75" x 4.8" x 2.5"	TMX-354-1212
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	24V @ 3A	10.75" x 4.8" x 2.5"	TMX-354-1224
48 VDC	350	+5V @ 50A	+15V @ 4A	-15V @ 4A	12V @ 5A	10.75" x 4.8" x 2.5"	TMX-354-1512
	350	+5V @ 50A	+15V @ 4A	-15V @ 4A	24V @ 3A	10.75" x 4.8" x 2.5"	TMX-354-1524
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	5.2V @ 2A	9" x 5" x 2.5"	DCX-354-1205
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	24V @ 1.5A	9" x 5" x 2.5"	DCX-354-1224
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	5.2V @ 2A	9" x 5" x 2.5"	DPS-354-1205
	500	+5V @ 75A	+12V @ 8/12Apk	-12V @ 4A	5.2V @ 5A	9.65" x 5" x 2.10"	DMX-504-1205
	500	+5V @ 75A	+12V @ 8/12Apk	-12V @ 4A	12V @ 5A	9.65" x 5" x 2.10"	DMX-504-1212
	500	+5V @ 75A	+12V @ 8/12Apk	-12V @ 4A	24V @ 3A	9.65" x 5" x 2.10"	DMX-504-1224
	500	+5V @ 75A	+15V @ 4A	-15V @ 4A	12V @ 5A	9.65" x 5" x 2.10"	DMX-504-1512
	500	+5V @ 75A	+15V @ 4A	-15V @ 4A	24V @ 3A	9.65" x 5" x 2.10"	DMX-504-1524

AC INPUT – MULTIPLE OUTPUT

OUTPUT	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	SIZE	MODEL
DUAL	400	+5V @ 20A	+12V @ 25/36Apk			11.5" x 5" 2.5"	MSC-402-0512
	500	+5V @ 30A	+12V @ 30/40Apk			9.65" x 5" x 2.5"	NMX-502-0512V
TRIPLE	160	+5V @ 25A	+12V @ 4/9Apk	12V @ 1.5A		9" x 5" x 2.5"	MDT-163-0512R
	160	+5V @ 30A	+12V @ 1.5A	-12V @ 1.5A		9" x 5" x 2.5"	MTC-163-0512
	160	+5V @ 30A	+15V @ 1.5A	-12V @ 1.5A		9" x 5" x 2.5"	MTC-163-0515
	220	+5V @ 30A	+12V @ 6/10Apk	12V @ 2.5A		9" x 5" x 2.5"	MDT-223-0512R
	220	+5V @ 10A	+12V @ 10/16Apk	-12V @ 1A		9" x 5" x 2.5"	MDT-223-1212R
	250	+5V @ 30A	+12V @ 5A	-12V @ 5A		9" x 5" x 2.5"	MTC-253-0512
	250	+5V @ 30A	+15V @ 4A	-15V @ 4A		9" x 5" x 2.5"	MTC-253-0515
	250	+5V @ 35A	+12V @ 8/12Apk	-12V @ 2A		9" x 5" x 2.5"	MTX-253-0512
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A		9" x 5" x 2.5"	MAX-353-0512
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A		9" x 5" x 2.5"	MPS-353-0512
	350	+5V @ 30A	+12V @ 20/26Apk	-12V @ 4A		9" x 5" x 2.5"	MSC-353-0512
	350	+12V @ 30/36Apk	+5V @ 20A	-12V @ 4A		9" x 5" x 2.5"	MSC-353-1205
	350	+5V @ 45A	+12V @ 6A	-12V @ 6A		9" x 5" x 2.5"	MTC-353-0512
	350	+5V @ 45A	+15V @ 5A	-15V @ 5A		9" x 5" x 2.5"	MTC-353-0515
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A		8.05" x 4.82" x 1.85"	NMX-353-0512
	350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A		10.75" x 4.8" x 2.5"	RMX-353-0512
	400	+5V @ 70A	+12V @ 10/16Apk	-12V @ 6A		11.5" x 5" x 2.5"	MAX-403-0512
	400	+5V @ 30A	+12V @ 20/26Apk	-12V @ 4A		9" x 5.5" x 3.8"	MSC-353-0512F
	400	+12V @ 30/36Apk	+5V @ 20A	-12V @ 4A		9" x 5.5" x 3.8"	MSC-353-1205F
	400	+5V @ 50A	+15V @ 6.5A	-15V @ 6.5A		11.5" x 5" x 2.5"	MTC-403-0515
	500	+5V @ 80A	+12V @ 10/16Apk	-12V @ 10A		11.5" x 5" x 2.5"	MAX-503-0512
	500	+5V @ 70A	+12V @ 10A	-12V @ 10A		11.5" x 5" x 2.5"	MTC-503-0512
	500	+5V @ 70A	+15V @ 8A	-15V @ 8A		11.5" x 5" x 2.5"	MTC-503-0515
	500	+5V @ 75A	+12V @ 8/12Apk	12V @ 4A		9.65" x 5" x 2.05"	NMX-503-0512
	700	+5V @ 100A	+12V @ 12/20Apk	-12V @ 10A		13.5" x 5" x 2.6"	MAX-703-0512
	750	+5V @ 120A	+12V @ 12/20Apk	-12V @ 10A		13.5" x 5" x 3.83"	MAX-753-0512
	750	+5V @ 120A	+12V @ 20/27Apk	-12V @ 6A		13.5" x 5" x 3.83"	MSC-753-0512
	750	+5V @ 120A	+12V @ 12/20Apk	-12V @ 10A		12.92" x 5" x 2.5"	NMX-753-0512
	1000	+5V @ 150A	+12V @ 20/30Apk	-12V @ 10A		12" x 8" x 3.38"	MAX-1003-0512
	1000	+5V @ 150A	+12V @ 20/30Akp	-12V @ 10A		12" x 8" x 3.38"	NMX-1003-0512
QUAD	160	+5V @ 25A	+12V @ 4/9Apk	+12V @ 1A	-12V @ 1A	9" x 5" x 2.5"	MDT-164-1212R
	160	+5V @ 20A	+24V @ 3/6Apk	+12V @ 1A	-12V @ 1A	9" x 5" x 2.5"	MDT-164-2412R
	200	+5V @ 30A	+3.3V @ 20A	+12 @ 5A	-12V @ 5A	8.09" x 5" x 2"	PCI-204-1203
	220	+5V @ 30A	+12V @ 6/10Apk	+12V @ 1.5A	-12V @ 1.5A	9" x 5" x 2.5"	MDT-224-1212R
	220	+5V @ 25A	+24V @ 4/8Apk	+12V @ 1.5A	-12V @ 1.5A	9" x 5" x 2.5"	MDT-224-2412R
	250	+5V @ 35A	+12V @ 8/12Apk	-12V @ 4A	5.2V @ 2A	9" x 5" x 2.5"	MAX-254-1205
	250	+5V @ 35A	+12V @ 8/12Apk	-12V @ 2A	5V @ 1.5A	9" x 5" x 2.5"	MTX-254-1205
	250	+5V @ 35A	+12V @ 8/12Apk	-12V @ 2A	12V @ 2A	9" x 5" x 2.5"	MTX-254-1212
	250	+5V @ 35A	+12V @ 8/12Apk	-15V @ 1.5A	15V @ 1.5A	9" x 5" x 2.5"	MTX-254-1215

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TODD POWER SUPPLIES

POWER SUPPLY LOCATOR

AC INPUT – MULTIPLE OUTPUT

OUTPUT QUAD

PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	SIZE	MODEL
250	+5V @ 35A	+12V @ 8/12Apk	-12V @ 2A	24V @ 1.5A	9" x 5" x 2.5"	MTX-254-1224
300	+5V @ 30A	+12V @ 8A	-12V @ 4A	+3.3 @ 15A	10.23" X 5.5" X 2.19"	PCI 304-1203F
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	-5.2V @ 2A	9" x 5" x 2.5"	MAX-354-1205
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	12V @ 2A	9" x 5" x 2.5"	MAX-354-1212
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	+24V @ 1.5A	9" x 5" x 2.5"	MAX-354-1224
350	+5V @ 50A	+12V @ 8/12Apk	-5.2V @ 10A	-12V @ 2A	9" x 5" x 2.5"	MAX-354-1252
350	+5V @ 40A	+15V @ 4A	-15V @ 4A	12V @ 2A	9" x 5" x 2.5"	MAX-354-1512
350	+5V @ 50A	+24V @ 5/6Apk	-12V @ 4A	+12V @ 2A	9" x 5" x 2.5"	MAX-354-2412
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	-5.2V @ 2A	9" x 5" x 2.5"	MPS-354-1205
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	12V @ 2A	9" x 5" x 2.5"	MPS-354-1212
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	+24V @ 1.5A	9" x 5" x 2.5"	MPS-354-1224
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	5.2V @ 5A	8.05" x 4.82" x 1.85"	NMX-354-1205
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	12V @ 5A	8.05" x 4.82" x 1.85"	NMX-354-1212
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	24V @ 3A	8.05" x 4.82" x 1.85"	NMX-354-1224
350	+5V @ 50A	+15V @ 4A	-15V @ 4A	12V @ 5A	8.05" x 4.82" x 1.85"	NMX-354-1512
350	+5V @ 50A	+15V @ 4A	-15V @ 4A	24V @ 3A	8.05" x 4.82" x 1.85"	NMX-354-1524
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	5.2V @ 5A	10.75" x 4.8" x 2.5"	RMX-354-1205
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	12V @ 5A	10.75" x 4.8" x 2.5"	RMX-354-1212
350	+5V @ 50A	+12V @ 8/12Apk	-12V @ 4A	24V @ 3A	10.75" x 4.8" x 2.5"	RMX-354-1224
350	+5V @ 50A	+15V @ 4A	-15V @ 4A	12V @ 5A	10.75" x 4.8" x 2.5"	RMX-354-1512
350	+5V @ 50A	+15V @ 4A	-15V @ 4A	24V @ 3A	10.75" x 4.8" x 2.5"	RMX-354-1524
400	+5V @ 70A	+12V @ 10/16Apk	-12V @ 5A	12V @ 2A	11.5" x 5" x 2.5"	MAX-404-1212
400	+5V @ 70A	+12V @ 10/16Apk	-5.2V @ 6A	12V @ 2A	11.5" x 5" x 2.5"	MAX-404-1252
500	+5V @ 80A	+12V @ 10/16Apk	-12V @ 10A	5.2V @ 2A	11.5" x 5" x 2.5"	MAX-504-1205
500	+5V @ 80A	+12V @ 10/16Apk	-12V @ 10A	12V @ 2A	11.5" x 5" x 2.5"	MAX-504-1212
500	+5V @ 80A	+12V @ 10/16Apk	-12V @ 10A	+24V @ 2A	11.5" x 5" x 2.5"	MAX-504-1224
500	+5V @ 80A	+12V @ 10/16Apk	-5.2V @ 10A	12V @ 2A	11.5" x 5" x 2.5"	MAX-504-1252
500	+5V @ 80A	+15V @ 10/16Apk	-5V @ 10A	15V @ 2A	11.5" x 5" x 2.5"	MAX-504-1552
500	+5V @ 80A	+24V @ 5/10Apk	-12V @ 10A	12V @ 2A	11.5" x 5" x 2.5"	MAX-504-2412
500	+5V @ 75A	+12V @ 8/12Apk	-12V @ 4A	5.2V @ 5A	9.65" x 5" x 2.05"	NMX-504-1205
500	+5V @ 75A	+12V @ 8/12Apk	-12V @ 4A	12V @ 5A	9.65" x 5" x 2.05"	NMX-504-1212
500	+5V @ 75A	+12V @ 8/12Apk	-12V @ 4A	24V @ 3A	9.65" x 5" x 2.05"	NMX-504-1224
500	+5V @ 75A	+15V @ 4A	-15V @ 4A	12V @ 5A	9.65" x 5" x 2.05"	NMX-504-1512
500	+5V @ 75A	+15V @ 4A	-15V @ 4A	24V @ 3A	9.65" x 5" x 2.05"	NMX-504-1524
700	+5V @ 100A	+12V @ 12/20Apk	-12V @ 10A	5.2V @ 2A	13.5" x 5" x 2.6"	MAX-704-1205
700	+5V @ 100A	+12V @ 12/20Apk	-12V @ 10A	12V @ 2A	13.5" x 5" x 2.6"	MAX-704-1212
700	+5V @ 100A	+12V @ 12/20Apk	-12V @ 10A	+24V @ 2A	13.5" x 5" x 2.6"	MAX-704-1224
700	+5V @ 100A	+12V @ 12/20Apk	-12V @ 10A	12V @ 2A	13.5" x 5" x 2.6"	MAX-704-1252
700	+5V @ 100A	+24V @ 6/10Apk	-12V @ 10A	12V @ 2A	13.5" x 5" x 2.6"	MAX-704-2412
750	+5V @ 120A	+12V @ 12/20Apk	-12V @ 10A	5.2V @ 2A	13.5" x 5" x 3.83"	MAX-754-1205
750	+5V @ 120A	+12V @ 12/20Apk	-12V @ 10A	12V @ 2A	13.5" x 5" x 3.83"	MAX-754-1212
750	+5V @ 120A	+12V @ 12/20Apk	-12V @ 10A	+24V @ 2A	13.5" x 5" x 3.83"	MAX-754-1224
750	+5V @ 120A	+12V @ 12/20Apk	-5.2V @ 10A	12V @ 2A	13.5" x 5" x 3.83"	MAX-754-1252
750	+5V @ 120A	+15V @ 12/20Apk	-15V @ 8A	12V @ 2A	13.5" x 5" x 3.83"	MAX-754-1512
750	+5V @ 120A	+24V @ 6/10Apk	-12V @ 10A	12V @ 2A	13.5" x 5" x 3.83"	MAX-754-2412
750	+5V @ 120A	+12V @ 12/20Apk	-12V @ 10A	5.2V @ 5A	12.92" x 5" x 2.5"	NMX-754-1205
750	+5V @ 120A	+12V @ 12/20Apk	-12V @ 10A	12V @ 5A	12.92" x 5" x 2.5"	NMX-754-1212
750	+5V @ 120A	+12V @ 12/20Apk	-12V @ 10A	24V @ 3A	12.92" x 5" x 2.5"	NMX-754-1224
750	+5V @ 120A	+15V @ 10A	-15V @ 10A	12V @ 5A	12.92" x 5" x 2.5"	NMX-754-1512
750	+5V @ 120A	+15V @ 10A	-15V @ 10A	24V @ 3A	12.92" x 5" x 2.5"	NMX-754-1524
1000	+5V @ 150A	+12V @ 20/30Apk	-12V @ 10A	3.3V @ 10A	12" x 8" x 3.38"	MAX-1004-1203
1000	+5V @ 150A	+12V @ 20/30Apk	-12V @ 10A	5V @ 10A	12" x 8" x 3.38"	MAX-1004-1205
1000	+5V @ 150A	+12V @ 20/30Apk	-12V @ 10A	12V @ 10A	12" x 8" x 3.38"	MAX-1004-1212
1000	+5V @ 150A	+12V @ 20/30Apk	-12V @ 10A	24V @ 5A	12" x 8" x 3.38"	MAX-1004-1224
1000	+5V @ 150A	+15V @ 20/30Apk	-15V @ 10A	12V @ 10A	12" x 8" x 3.38"	MAX-1004-1512
1000	+5V @ 150A	+15V @ 20/30Apk	-15V @ 10A	24V @ 5A	12" x 8" x 3.38"	MAX-1004-1524
1000	+5V @ 150A	+12V @ 20/30Apk	-12V @ 10A	3.3V @ 10A	12" x 8" x 3.38"	NMX-1004-1203
1000	+5V @ 150A	+12V @ 20/30Apk	-12V @ 10A	5V @ 10A	12" x 8" x 3.38"	NMX-1004-1205
1000	+5V @ 150A	+12V @ 20/30Apk	-12V @ 10A	12V @ 10A	12" x 8" x 3.38"	NMX-1004-1212
1000	+5V @ 150A	+12V @ 20/30Apk	-12V @ 10A	24V @ 5A	12" x 8" x 3.38"	NMX-1004-1224
1000	+5V @ 150A	+15V @ 20/30Apk	-15V @ 10A	12V @ 10A	12" x 8" x 3.38"	NMX-1004-1512
1000	+5V @ 150A	+15V @ 20/30Apk	-15V @ 10A	24V @ 5A	12" x 8" x 3.38"	NMX-1004-1524

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TODD POWER SUPPLIES

EXECUTIVE MEMBER

PCI-200

200 WATTS
POWER FACTOR CORRECTED
MULTIPLE OUTPUT

NEW

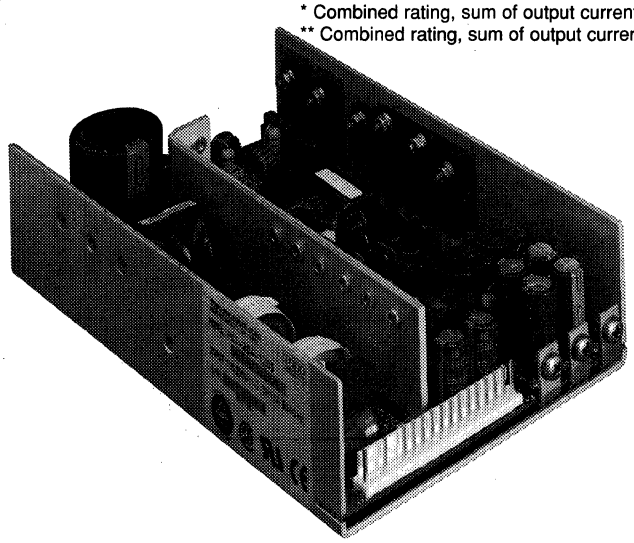
Featuring:

- Dual main outputs
- Flexible ratings
- 5V "Keep Alive" bias output
- Universal AC input
- 0.99 typical power factor
- Remote sense on main outputs
- DC power good and AC power fail
- True remote inhibit
- High current bus bars

STANDARD RATINGS

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
PCI 204-1203	200	+5 @ 30*	+3.3 @ 20*	+12 @ 5**	-12 @ 5**

* Combined rating, sum of output currents of outputs #1 & #2 equals 30 A.
** Combined rating, sum of output currents of outputs #3 & #4 equals 5 A.



The PCI 204 power supply series provides simultaneous high currents on both 5V and 3.3V outputs. The load may be shifted between outputs. For example: the PCI 204-1205 may be loaded at +5V @ 25 A and 3.3V @ 5 A, or 5V @ 10 A and 3.3V @ 20 A, or any other combination of loads within the maximum ratings.

Similarly the ± 12V may be loaded in any combination not exceeding maximum ratings.

The PCI series provides a single solution as system configurations proliferate, reducing cycle time and cost.

PCI-300

300 WATTS
POWER FACTOR CORRECTED
MULTIPLE OUTPUT

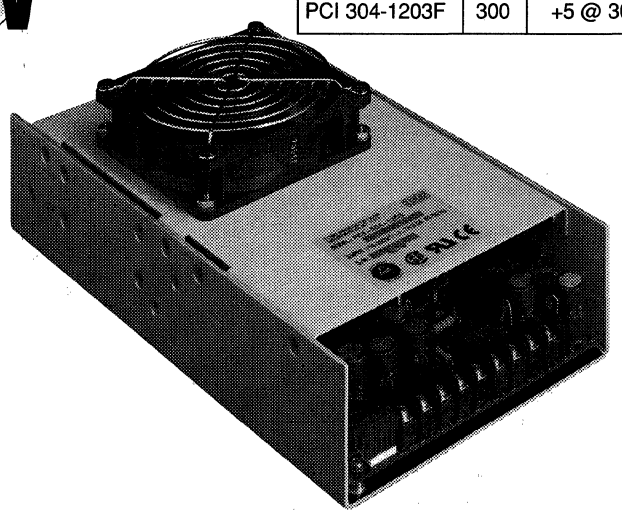
NEW

Featuring:

- Quad output
- Floating wide-range fourth output
- Flexible ratings
- Universal AC input
- 0.99 typical power factor
- Remote sense main
- AC power fail
- Available with or without fan
- Safety agency approved

STANDARD RATINGS

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
PCI 304-1203F	300	+5 @ 30	+12 @ 8.0A	-12 @ 4.0A	+3.3@ 15.0A



The PCI-304 power supply series offers a combination of outputs designed for systems that require both high-current 5V and 3.3V outputs. Outputs #2 and #3 provide ± 12 volts up to 8 amps.

The series is extremely flexible, and it can be cooled using system airflow or by an integral ball-bearing fan.

The fourth output is fully isolated, and is easily configured to your system requirements.

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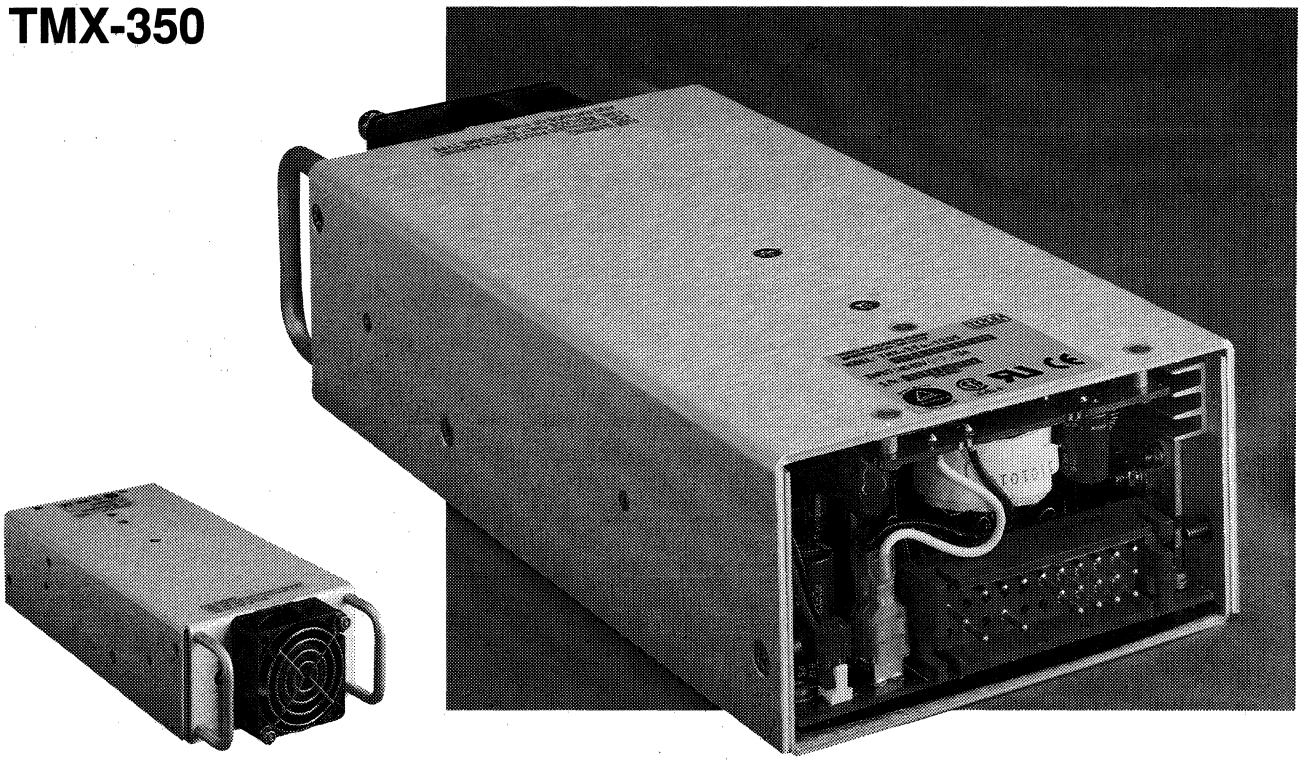
TODD POWER SUPPLIES

350 WATTS MULTIPLE OUTPUT 48 VDC INPUT, HOT SWAP

TMX-350



Featuring:

- Diode isolated outputs for hot swap
- "Zero wire" slope program current sharing
- Self-aligning connector with solid metal machined contacts
- Identical output performance as RMX-350 Series
- Dual converter design eliminates interaction between logic and auxiliary outputs
- Low ripple and noise on all outputs
- DC power good signal
- True remote inhibit
- Monotonic turn-on and turn-off

HOT SWAP TMX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
TMX-353-0512	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	
TMX-354-1205	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	5.2V @ 5A
TMX-354-1212	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	12V @ 5A
TMX-354-1224	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	24V @ 3A
TMX-354-1512	350	+5V @ 50A	+15V @ 4A	-15V @ 4A	12V @ 5A
TMX-354-1524	350	+5V @ 50A	+15V @ 4A	-15V @ 4A	24V @ 3A

Maximum power from outputs #2, #3 and #4 to be less than 170W

TMX Series power supplies are designed to meet applicable Bellcore and NEBS standards, so they are readily operated from Central Office power (48 Vdc). They are DC clones of TODD's RMX Series power supplies. The RMX and TMX power supplies are directly interchangeable. They allow you to operate existing systems from AC or DC power without compromising performance or making any mechanical changes for mounting or cooling. TMX and RMX Series power supplies can also be operated in redundant configurations to achieve AC operation with battery backup capability.

SEE RMX 350 FOR DC INPUT EQUIVALENT

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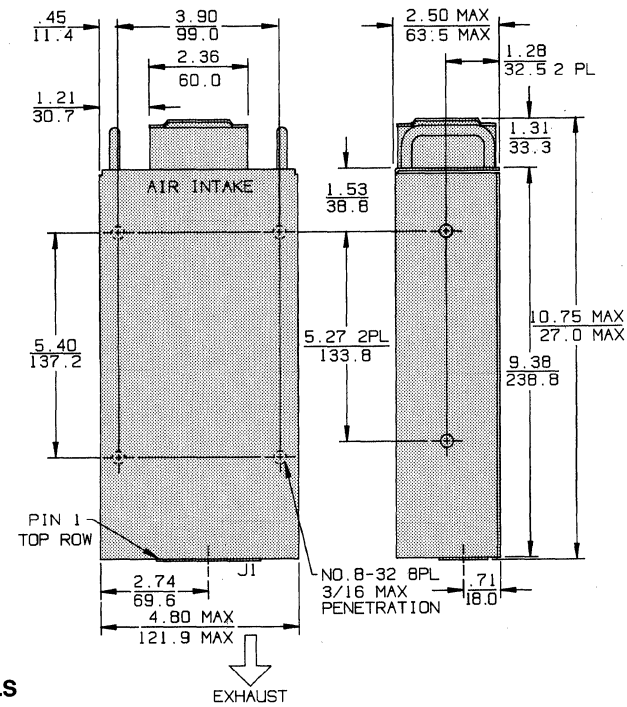
email:info@toddpower.com http://www.toddpower.com

350 WATTS
10.75" X 4.8" X 2.5"
TMX

TMX-350
3.8 lbs - 1.7 kgs



Dimensions: Inches / Millimeters

SPECIFICATIONS: ALL MODELS

DC Input: 40-60 Vdc. Internally fused for 15 A.
Adjustability: Outputs #1 and 2, and 4 factory adjusted to nominal ±0.2%. Output #3 tracks #2; initial accuracy ±3%.
Line & Load Reg: Outputs #1, 2, and 4 hold ±2% (with local sense) over dc input range and 0 to 100% load change (preprogrammed slope). Output #3 requires 20% minimum load on outputs #2 and 3 to hold ±5%.
Ripple & Noise: 1% p-p or 100 mV, whichever is greater.
Remote Sense (Output #1): Compensates for 250 mV total line drop. Preprogrammed slope remains under ±3% worst case. Open sense lead protection.
Temperature Coefficient (Outputs #1, 2, and 4): 0.03% per degree C.
Stability: 0.1% over 8 hours after 30 minutes warm-up.
Transient Response (Outputs #1, 2, and 4): Output voltage returns to within 1% in less than 500 µs for a 50% load change (measured with rise time and fall time of 200 µs). Peak transient does not exceed 5%.
Overload Protection: All outputs are protected against overload and short circuit. Automatic recovery upon removal of fault.
Overvoltage Protection (Outputs #1 and 2): Protects load against power supply induced overvoltage. Trip point is factory set so that output voltage cannot exceed 136% of nominal.
Peak Output Current: Dual current ratings define continuous and peak currents. The peak current shown can be delivered for a maximum period of 30 seconds.
Thermal Protection: Shuts down power supply if overheated. Automatic recovery.
Holdup Time: 20 ms minimum after removal of power at full load.
Temperature Range: 0° to 50°C at full ratings.
Efficiency: 75% typical.
Safety Agencies: Most models are approved to UL1950; CSA 22.2 #234; IEC 950 and TÜV EN60950, Class 1 SELV, CE 72/23/EEC/93/68EEC (low voltage directive).
Conducted RFI: Meets FCC Part 15, Subpart B, Class A; EN55022 Class B and CISPR 22 Class B.
Output Isolation: Isolated from ground 50 Vdc.
Reverse Voltage: Protected against reverse voltage up to supply current rating.
Cooling: Self-cooled by internal ball-bearing fan.
Remote Enable: Contact closure to common turns on DC outputs (recessed pin for "make last, break first" connection).
Remote Inhibit: Contact closure to the negative sense line or a TTL level "0" turns off DC outputs.
Low Battery: Provides TTL "0" when input is below 40 Vdc.
DC Power Good: Provides a TTL "1" open collector when output #1 is above 4.6 V nominal.
Redundancy: Built-in OR-ing diodes, slope program current sharing on all outputs, and self aligning connector provide "hot swap" and "N+1" capabilities. Current sharing remains within 10% of the unit's full output rating while units are in thermal equilibrium.

OPTIONS

Consult factory for available options.

DC INPUT

FUNCTION	48 Vdc	CONNECTOR
J1-22	+48 Vdc	See below
J1-24	-48 Vdc	
J1-11	Safety Ground	

DC OUTPUT

FUNCTION	LOCATION	NOTES	CONNECTOR
Output #1	J1-10, 20, 30	Main Output	Positronics # PLC30M400A1-168.3 Mates with panel mounted PLC30F1000 connector using crimp contacts FC114N2 (14 to 16 AWG)
	J1 - 9, 19, 29	Rtn (Common)	
Output #2	J1-2		
	J1-3	Rtn (Common)	
Output #3	J1-4		
	J1-3	Rtn (Common)	
Output #4	J1-5	(+) Floating Output	
	J1-6	(–) Floating Output	

STATUS AND CONTROL

FUNCTION	LOCATION	NOTES	CONNECTOR
Remote Sense	J1-18	Output #1 Sense	See above
	J1-8	Output #1 Sense Rtn	
DC Power Good	J1-7	Reference to Common when #1 Sense Rtn is terminated	
Enable	J1-16	Reference to Common	
Inhibit	J1-27		
Battery Low	J1-17		

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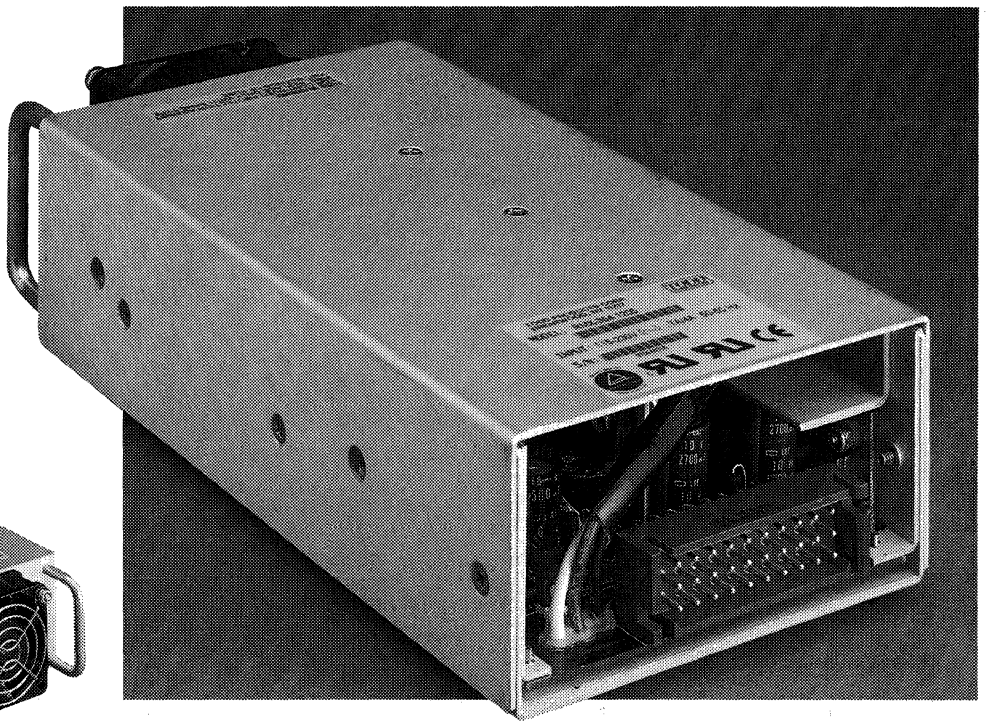
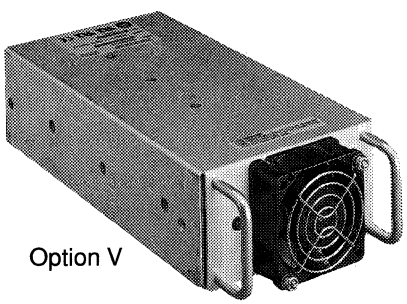
TODD POWER SUPPLIES

350 WATTS POWER FACTOR CORRECTED MULTIPLE OUTPUT, HOT SWAP

RMX-350





Option V

Featuring:

- Diode isolated outputs for hot swap
- "Zero wire" slope program current sharing for redundancy
- Self-aligning connector with solid metal machined contacts
- Universal AC input
- 0.99 typical power factor
- Dual converter design eliminates interaction between logic and auxiliary outputs
- Low ripple and noise on all outputs
- DC power good and AC power fail signals
- True remote inhibit
- Monotonic turn-on and turn-off

HOT SWAP RMX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
RMX-353-0512	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	
RMX-354-1205	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	5.2V @ 5A
RMX-354-1212	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	12V @ 5A
RMX-354-1224	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	24V @ 3A
RMX-354-1512	350	+5V @ 50A	+15V @ 4A	-15V @ 4A	12V @ 5A
RMX-354-1524	350	+5V @ 50A	+15V @ 4A	-15V @ 4A	24V @ 3A

Maximum power from outputs #2, #3 and #4 to be less than 170W

RMX Series 350-watt power supplies provide new and increased flexibility for configuring redundant "hot swappable" power systems using a standard product. The RMX-350 Series eliminates the need for external sheet metal sleds, "OR-ing" diodes, and a high current interface. These switching power supplies are power factor corrected, multiple output units which contain built-in Schottky "OR-ing" diodes and a high current connector interface.

SEE TMX 350 FOR DC INPUT EQUIVALENT

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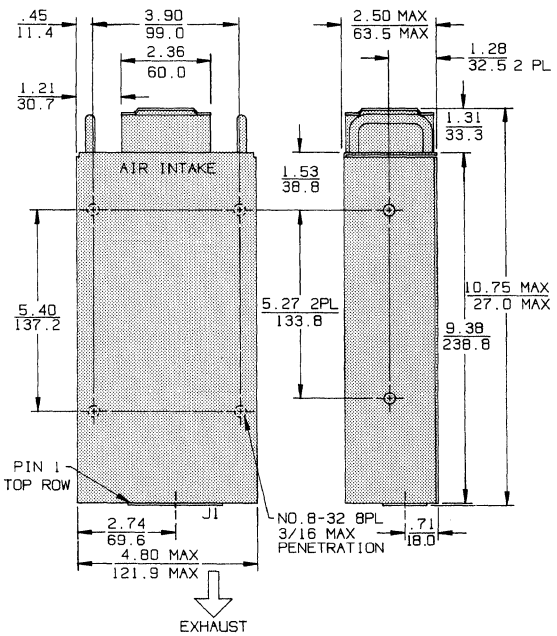
email:info@toddpower.com http://www.toddpower.com

350 WATTS
10.75"x 4.8"x 2.5"
RMX

RMX-350
3.5 lbs - 1.6 kgs



Dimensions: Inches / Millimeters

SPECIFICATIONS: ALL MODELS

AC Input: 90-264 Vac continuous range, 47 to 63 Hz. Internally fused for 7A.
Power Factor: 0.99 typical at full load. Meets EN61000-3-2.
Adjustability: Outputs #1 and 2, and 4 factory adjusted to nominal ±0.2%. Output #3 tracks #2; initial accuracy ±3%.
Line & Load Reg: Outputs #1, 2, and 4 hold ±2% over AC input range and 0 to 100% load change (preprogrammed slope). Output #3 requires 20% minimum load on outputs #2 and 3 to hold ±5%.
Ripple & Noise: 1% p-p or 100 mV, whichever is greater.
Remote Sense (Output #1)**:** Compensates for 250 mV total line drop. Preprogrammed slope remains under ±3 worst case. Open sense lead protection.
Temperature Coefficient (Outputs #1, 2, and 4)**:** 0.03% per degree C.
Stability: 0.1% over 8 hours after 30 minutes warm-up.
Transient Response (Outputs #1, 2, and 4)**:** Output voltage returns to within 1% in less than 500 µs for a 50% load change (measured with rise time and fall time of 200µs). Peak transient does not exceed 5%.
Overload Protection: All outputs are protected against overload and short circuit. Automatic recovery upon removal of fault.
Overvoltage Protection (Outputs #1 and 2)**:** Protects load against power supply induced overvoltage. Trip point is factory set so that output voltage cannot exceed 136% of nominal.
Peak Output Current: Dual current ratings define continuous and peak currents. The peak current shown can be delivered for a maximum period of 30 seconds.
Inrush: Cold start AC current is less than 30 A at 115 Vac and 60 A at 230 Vac. Limited by surgistor.
Brownout Protection: Holds regulation to 85 Vac.
Thermal Protection: Shuts down power supply if overheated. Automatic recovery.
Holdup Time: 20 ms minimum after removal of power at full load.
Temperature Range: 0° to 50°C at full ratings.
Efficiency: 70% typical.
Safety Agencies: Most models are approved to UL1950; CSA 22.2 #234; IEC 950 and TÜV EN60950, Class 1 SELV, CE 72/23/EEC/93/68EEC (low voltage directive).
Conducted RFI: Meets FCC Part 15, Subpart B, Class A; EN55022 Class B; CISPR 22 Class B.
Output Isolation: Isolated from ground 50 Vdc.
Reverse Voltage: Protected against reverse voltage up to supply current rating.
Cooling: Self-cooled by internal ball-bearing fan.
Remote Enable: Contact closure to common turns on DC outputs (recessed pin for "make last, break first" connection).
Remote Inhibit: Contact closure to the negative sense line or a TTL level "0" turns off DC outputs.
AC Power Fail: Provides TTL "0" 5 ms before output voltage goes out of regulation band upon loss of AC power.
DC Power Good: Provides a TTL "1" open collector when output #1 is above 4.6 V nominal.
Redundancy: Built-in OR-ing diodes, slope program current sharing on all outputs, and self aligning connector provide "hot swap" and "N+1" capabilities. Current sharing remains within 10% of the unit's full output rating while units are in thermal equilibrium.

OPTIONS

Consult factory for available options.

AC INPUT (90-264 VAC Continuous Range)

FUNCTION	115 VAC	230 VAC	CONNECTOR
J1-21	Line	Line 1	See below
J1-23	Neutral	Line 2	
J1-25	Safety Ground	Safety Ground	

DC OUTPUT

FUNCTION	LOCATION	NOTES	CONNECTOR
Output #1	J1- 10, 20, 30	Main Output	Positronics # PLC30M400A1-168.3 Mates with panel mounted PLC30F1000 connector using crimp contacts FC114N2 (14 to 16 AWG)
	J1 - 9, 19, 29	Rtn (Common)	
Output #2	J1-2		
	J1-3	Rtn (Common)	
Output #3	J1-4		
	J1-3	Rtn (Common)	
Output #4	J1-5	(+) Floating Output	
	J1-6	(–) Floating Output	

STATUS AND CONTROL

FUNCTION	LOCATION	NOTES	CONNECTOR
Remote Sense	J1-18	Output #1 Sense	See above
	J1-8	Output #1 Sense Rtn	
DC Power Good	J1-7	Reference to Common when #1 Sense Rtn is terminated	
Enable	J1-16	Reference to Common	
Inhibit	J1-27		
AC Power Fail	J1-17		

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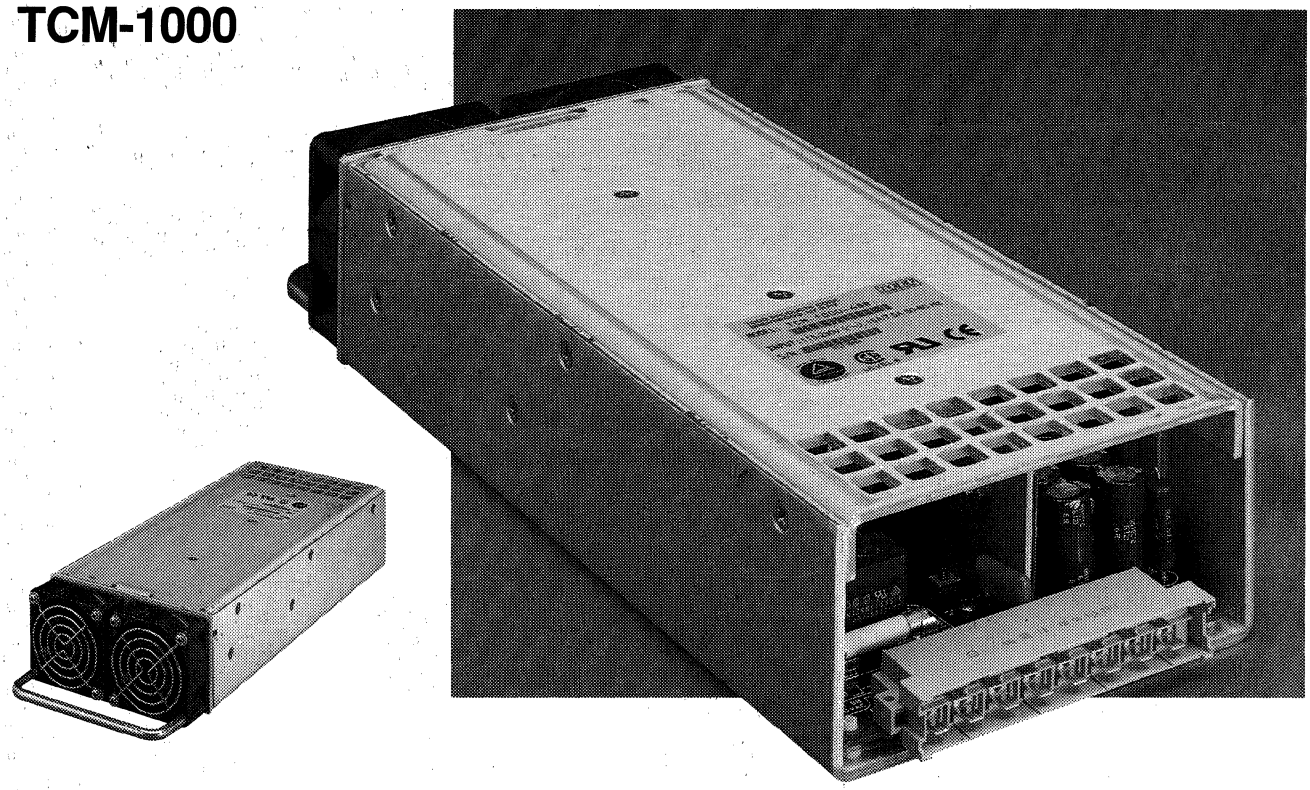
TODD POWER SUPPLIES

1000 WATTS
POWER FACTOR CORRECTED
SINGLE OUTPUT, HOT SWAP

TCM-1000



Featuring:

- Diode isolated output for hot swap
- "Zero wire" slope program current sharing
- High power density **6.5 Watt/cu. in.**
- Industry standard DIN connector
- 0.99 typical power factor
- DC power good and AC power fail signals
- True remote inhibit
- Monotonic turn-on and turn-off
- Extended temperature operation
- High efficiency 87% typical (48 V units)
- Operating temperature range -20ºC to +60ºC

HOTSWAP TCM SERIES

MODEL	OUTPUT RATING	PWR OUT
TCM-1000-24	24V @ 41.6A	1000
TCM-1000-28	28V @ 35.7A	1000
TCM-1000-48	48V @ 20.8A	1000

The 1000-watt TCM Series "hot swappable" power supplies deliver remarkable economy and reliability in applications which require redundancy over extended temperature ranges. These high-density, single-output supplies are available with a front panel and handle for use in sub-system racks or without handles for imbedded applications. Power factor correction, OR-ing diodes, and current sharing make the TCM Series an ideal choice for communications and data processing systems which need distributed power and redundancy.

SEE TRS (TODD RACK SYSTEM)

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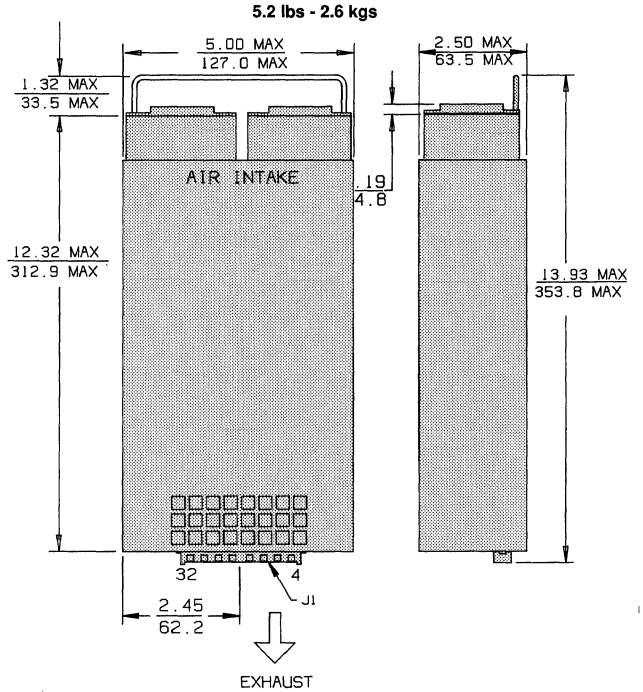
email:info@toddpower.com http://www.toddpower.com

1000 WATTS
13.93"x 5.0"x 2.5"
TCM 1000

TCM-1000
5.2 lbs - 2.6 kgs



Dimensions: Inches / Millimeters

SPECIFICATIONS: ALL MODELS

AC Input: 180-264 Vac, 47-63 Hz internally fused 10 A.
Power Factor: 0.99 typical at full load. Meets EN61000-3.2.
Output: 48 V @ 20.8 Amp. (1000 W max.).
Adjustability: User adjustable ±5% minimum.
Line Regulation: ±0.2%
Load Regulation: ±2% (Slope Program) from 0 to 100% load changes.
Turn On Delay: 1 second typical.
Ripple & Noise: 0.5% p-p, measured at 20 MHz bandwidth.
Temperature Coefficient: 0.02% per degree C.
Stability: 0.1% over 8 hours, under constant line, load and ambient.
Transient Response: Output voltage returns to within 1% in less than 500 µs for a 50% load change. Peak transient does not exceed 3%.
Overload Protection: Electronic current limit, 120% maximum.
Overvoltage Protection: Protects load against power supply induced overvoltage. Trip point is factory set so that output voltage cannot exceed 136% of nominal. Requires AC input to be cycled to reset.
Inrush: Limited by thermistor, 40 Ampere maximum (8mS), cold start.
Thermal Protection: Shuts down power supply if overheated. Automatic recovery.
Hold Up Time: 20 ms minimum after removal of power supply at full load.
Temperature Range: -20 to +60 C, full power, de-rate to 66% maximum power @ 71 C.
Efficiency: 87% typical @ full load
Safety Agencies: Approved to UL1950; CSA 22.2 #950; IEC 950 and TUV EN60950, Class 1 SELV, CE 73/23/EEC//93/68/EEC (low voltage directive).
Conducted RFI: Meets FCC Part 15, Subpart B, Class A; EN55022 Class B; and CISPR 22 Class B.
Cooling: Self-cooled by internal ball-bearing fan.
Remote Inhibit: Contact closure or TTL "0" turns off output.
AC Power Fail: Provides TTL "0" 5 ms before output voltage goes out of regulation band upon loss of AC power.
DC Power Good: Provides a TTL "0" open collector when output is above 90% of nominal Maximum pull-up voltage 30 Vdc; maximum sink current, 10 mA.
Redundancy: Built-in ORing diode, slope program current sharing, and DIN blade connector provide "hot swap" and "N+1" capabilities. Current sharing remains within 10% of the unit's full output rating given 0.2% initial accuracy in the output voltage setting.
Current Sharing: As calibrated at factory, modules will share current within 10% of full rated load.
Reverse Voltage: Protected against reverse voltage up to twice output voltage rating. (internal "ORing" diode.)
Output Isolation: Isolated from ground 100 Vdc.

OPTIONS

Option "R" - Rack Mount Panel: special panel that is required for rack mounting.
Consult factory for other available options.

AC INPUT (180-264 VAC Continuous Range)

LOCATION	230 VAC	CONNECTOR
Z32	Line 1	Eurocard Connector - Male DIN 41 612 Level 1- Type H
D30	Line 2	
Z28	Safety Ground	

DC OUTPUT

FUNCTION	LOCATION	NOTES	CONNECTOR
Output Voltage	Z4D6Z8D10	(+) Polarity	Eurocard Connector - Male DIN 41 612 Level 1- Type H
	Z12D14Z16D18	(-) Polarity	

STATUS AND CONTROL

FUNCTION	LOCATION	NOTES	CONNECTOR
DC Power Good	Z20	Reference to Common	Eurocard Connector - Male DIN 41 612 Level 1- Type H
AC Power Fail	D22		
Inhibit	Z24		

As new products are developed, complete information will be available on the
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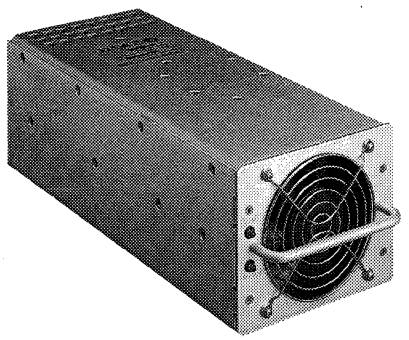
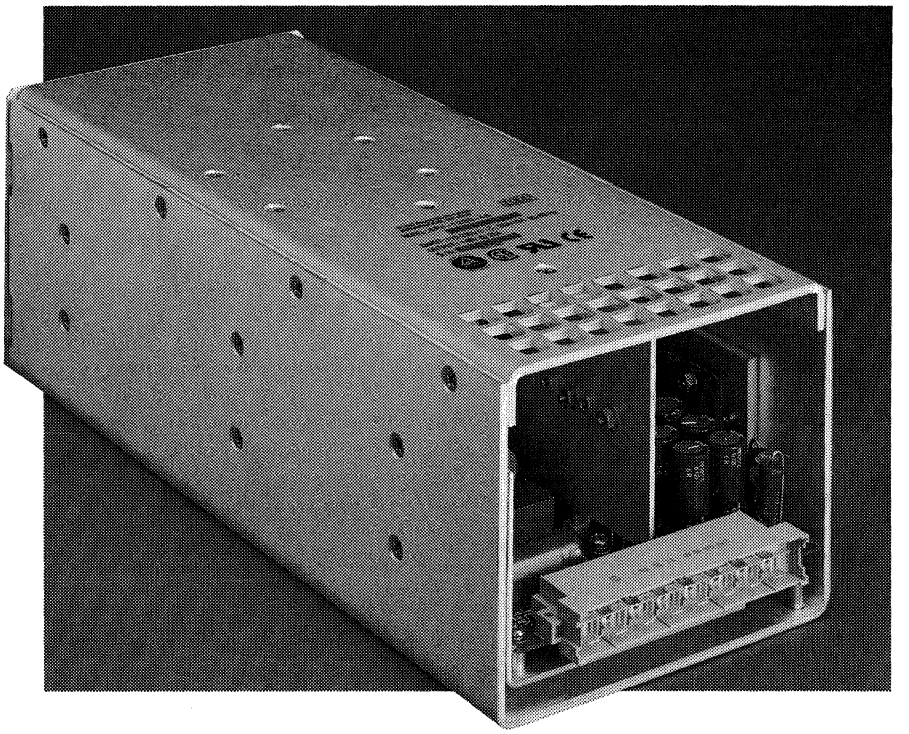
TODD POWER SUPPLIES

1200 WATTS POWER FACTOR CORRECTED SINGLE OUTPUT, HOT SWAP

SPH-1200





Featuring:

- Diode isolated outputs for hot swap
- "Zero wire" slope program current sharing for redundancy
- High power density: **5 W/cu. in.**
- Industry standard DIN connector
- Universal AC input
- 0.99 typical power factor
- DC power good and AC power fail signals
- True remote inhibit
- Monotonic turn-on and turn-off

HOT SWAP SPH SERIES

MODEL	OUTPUT RATING	PWR OUT
SPH-1200-24	24V @ 50A	1200
SPH-1200-28	28V @ 42A	1200
SPH-1200-48	48V @ 25A	1200

No matter what product, equipment or system your company manufacturers, if it needs 1200 watts and a single output, with N+1 redundancy, and the ability to hotswap power supplies, the SPH Series can deliver remarkable economy and reliability, backed by a 3-year warranty.

These single-output power supplies are self-cooled, and very compact. They are available as modules for inclusion within OEM products, or with a front panel and handle for use in power sub-system racks. Power factor correction, OR-ing diodes, high current connector interface, current sharing, redundancy or power boosting, and a status indicator light make this an exceptional choice for many applications.

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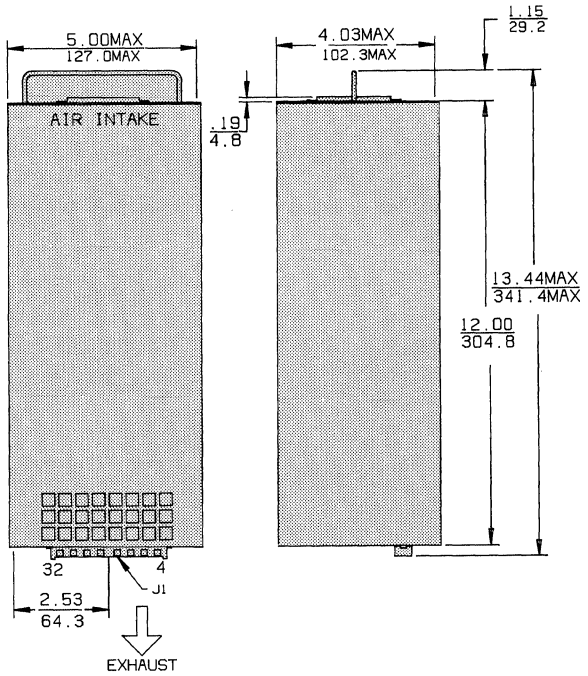
1200 WATTS
13.44"x 5"x 4.03"
SPH 1200

SPH-1200
7.3 lbs - 3.3 kgs



Dimensions: Inches / Millimeters

SPECIFICATIONS: ALL MODELS

AC Input: 105-264 Vac continuous range, 47 to 63 Hz. Internally fused for 20 A.
Power Factor: 0.99 typical at full load. Meets EN60555-2.
Adjustability: User adjustable ±5% minimum.
Line Regulation: ±0.2%
Load Regulation: ±2% (Slope Program) from 0 to 100% load change.
Turn On Delay: 1 second typical
Output Rise Time: (from 10% to 90%) 20 ms typical.
Ripple & Noise: Less than 1% p-p, measured at 20 MHz bandwidth.
Temperature Coefficient: 0.02% per degree C.
Stability: 0.1% over 8 hours after 30 minutes warm-up.
Transient Response: Output voltage returns to within 1% in less than 500 µs for a 50% load change. Peak transient does not exceed 3%.
Overload Protection: Electronic current limit, 120% maximum.
Overvoltage Protection: Protects load against power supply induced overvoltage. Trip point is factory set so that output voltage cannot exceed 136% of nominal. Requires AC input to be cycled to reset.
Inrush: Cold start ac current is less than 75 A at 115 Vac and 150 A at 230 Vac for 8 ms typical. Limited by surgistor.
Brownout Protection: Holds regulation to 85 Vac for 30 seconds maximum.
Thermal Protection: Shuts down power supply if overheated. Automatic recovery.
Holdup Time: 16 ms minimum after removal of power at full load.
Temperature Range: 0° to 50°C at full ratings.
Efficiency: 80% minimum
Safety Agencies: Approved to UL1950; CSA 22.2 #950; IEC 950 and TÜV EN60950, Class 1 SELV, CE 73/23/EEC//93/68/EEC (low voltage directive).
Conducted RFI: Meets FCC Part 15, Subpart B, Class A; EN55022 Class B; and CISPR 22 Class B.
Cooling: Self-cooled by internal ball-bearing fan.
Remote Inhibit: Contact closure or a TTL level "0" turns off DC output.
AC Power Fail: Provides TTL "0" 5 ms before output voltage goes out of regulation band upon loss of AC power.
DC Power Good: Provides a TTL "0" open collector when output is above 90% of nominal. Maximum pull-up voltage 30 Vdc; maximum sink current, 10 mA.
Status Indicators: Green LED on the front panel indicates normal operation (ACPF high and DCPG low)
Redundancy: Built-in OR-ing diode, slope program current sharing, and DIN blade connector provide "hot swap" and "N+1" capabilities. Current sharing remains within 10% of the unit's full output rating given 0.2% initial accuracy in the output voltage setting.

OPTIONS

Consult factory for available options.

AC INPUT (105-264 VAC Continuous Range)

LOCATION	115 VAC	230 VAC	CONNECTOR
Z32	Line	Line 1	See Below
D30	Neutral	Line 2	
Z28	Safety Ground	Safety Ground	

DC OUTPUT

FUNCTION	LOCATION	NOTES	CONNECTOR
Output	Z4 D6 Z8 D10	(+) to Polarity	Eurocard Connector - Male DIN 41 612 Level 1- Type H
Voltage	Z12 D14 Z16 D18	(-) to Polarity	

STATUS AND CONTROL

FUNCTION	LOCATION	NOTES	CONNECTOR
DC Power Good	Z20	Reference to to Common	See above
AC Power Fail	D22		
Inhibit	Z24		

As new products are developed, complete information will be available on the
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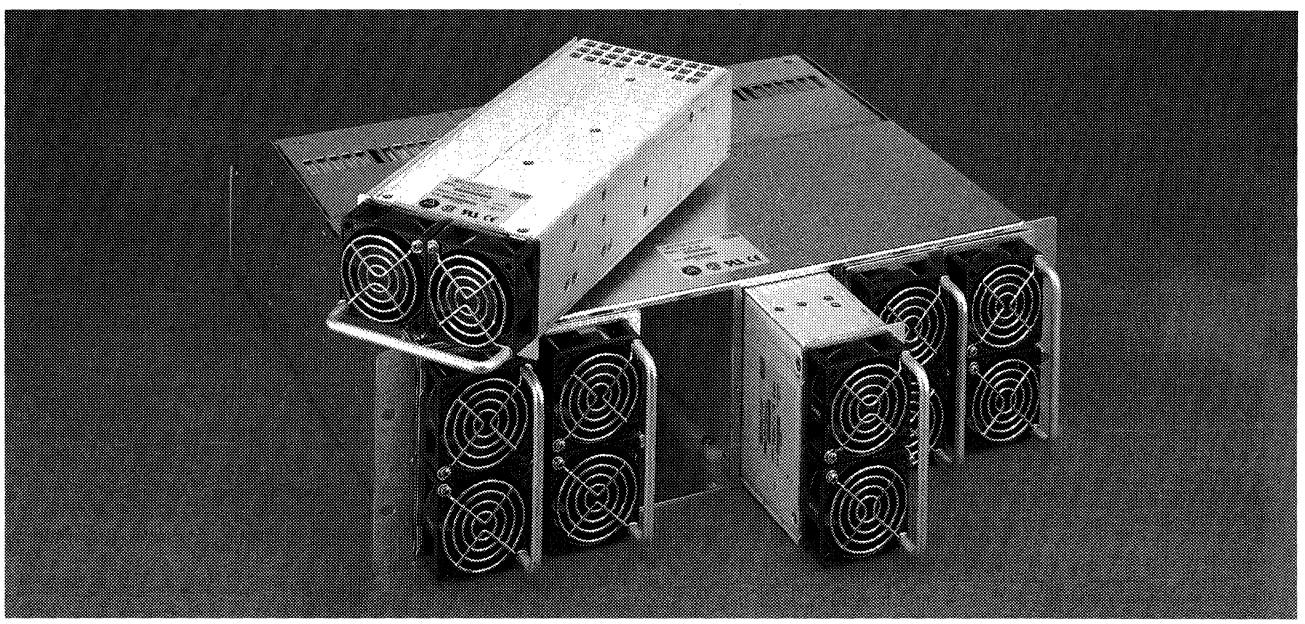
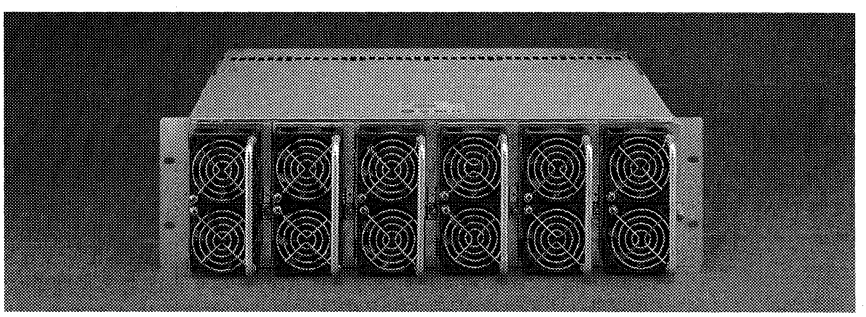
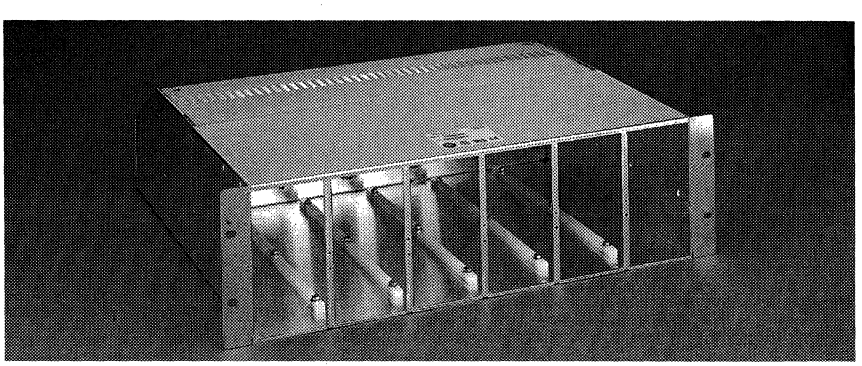
TODD POWER SUPPLIES

N +1 REDUNDANT POWER

TRS (Todd Rack System)







Featuring:

- Low-cost N+1 redundant power system
- Front panel hot pluggability
- Up to 6 KW in one 3U (5¼") rack
- Field configurable inputs may be field wired to accommodate either single phase or 3 phase input voltage
- Blank filler panels available for partially loaded systems or unused slots may be used to install optional metering

Consult factory for Value Added instrumentation and Custom Paint Color options.

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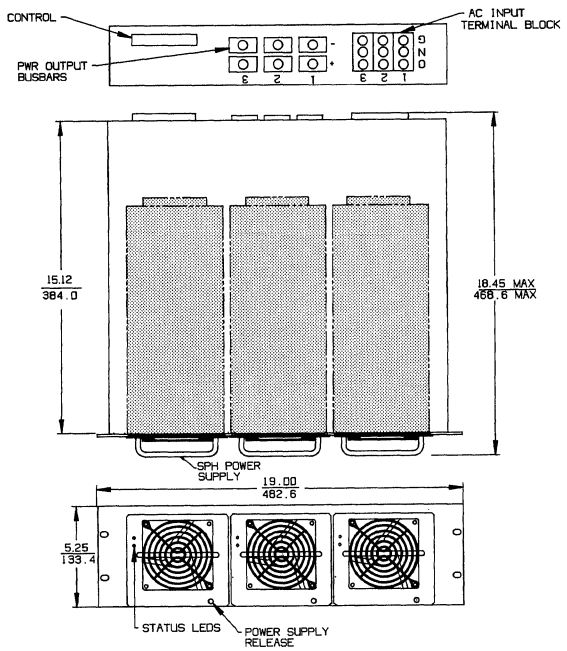
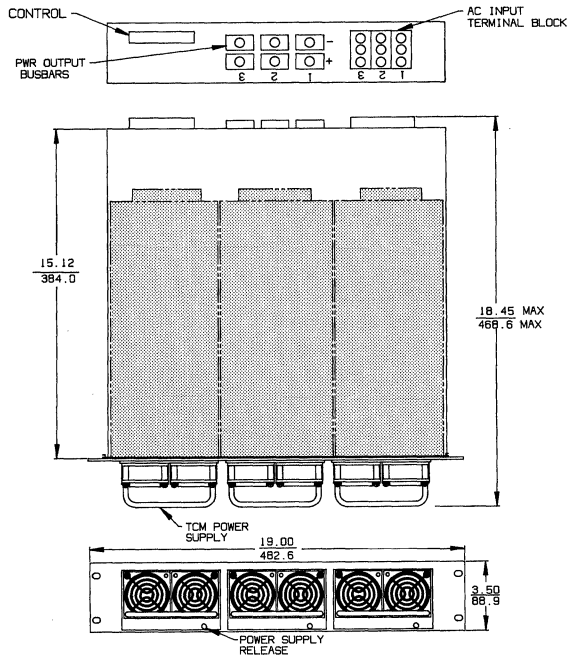
RACK SYSTEMS

TRS - 3 - 3



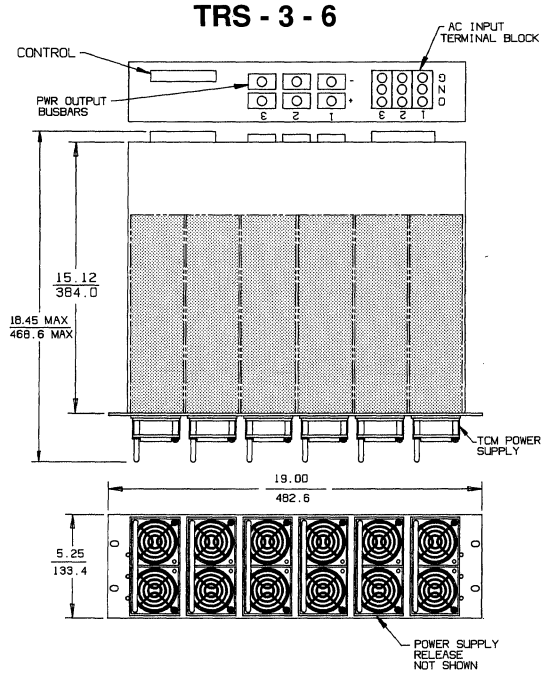
3U (5¼") panel height, mounts from 1 to 3
SPH 1200 Power Modules

TRS - 2 - 3



2U (3½") panel height, mounts from 1 to 3
TCM 1000 Power Modules

TRS - 3 - 6



Dimensions: Inches / Millimeters

3U (5¼") panel height, mounts from 1 to 6
TCM 1000 Power Modules

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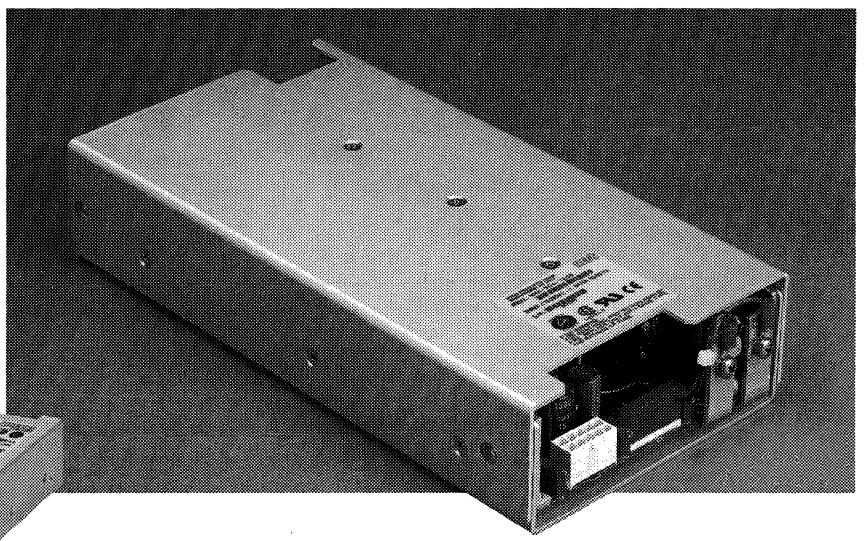
TODD POWER SUPPLIES

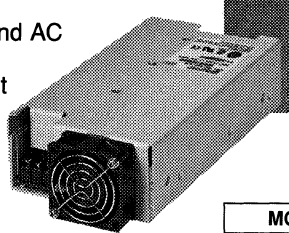
500 WATTS
POWER FACTOR CORRECTED
MULTIPLE OUTPUT, FORCED CURRENT SHARING

NMX-500

Featuring:

- Forced current sharing for N +1 redundancy
- Remote sense on outputs #1 and 2
- Universal AC input
- 0.99 typical power factor
- Dual converter design eliminates interaction between logic and auxiliary outputs
- Low ripple and noise on all outputs
- DC power good and AC power fail signals
- True remote inhibit
- Monotonic turn-on and turn-off





Option V

SEE DMX 500 FOR DC INPUT EQUIVALENT

STANDARD NMX SERIES

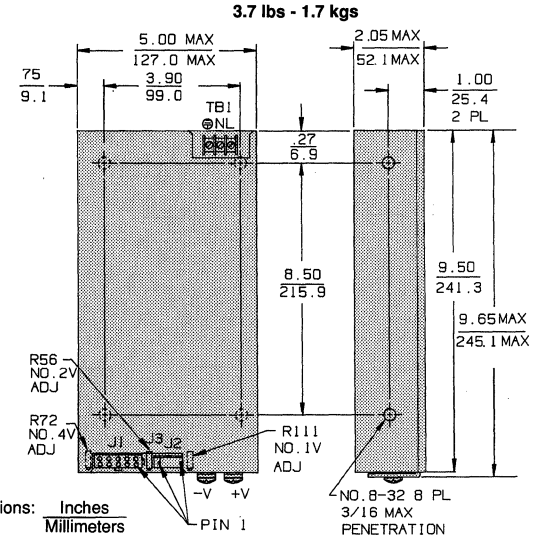
MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
NMX-503-0512	500	+5V @ 75A	+12V @ 8/12 Apk	-12V @ 4A	
NMX-504-1205	500	+5V @ 75A	+12V @ 8/12 Apk	-12V @ 4A	5.2V @ 5A
NMX-504-1212	500	+5V @ 75A	+12V @ 8/12 Apk	-12V @ 4A	12V @ 5A
NMX-504-1224	500	+5V @ 75A	+12V @ 8/12 Apk	-12V @ 4A	24V @ 3A
NMX-504-1512	500	+5V @ 75A	+15V @ 4A	-15V @ 4A	12V @ 5A
NMX-504-1524	500	+5V @ 75A	+15V @ 4A	-15V @ 4A	24V @ 3A

MASS STORAGE NMX-502 SERIES*

MODEL	PWR	OUTPUT #1	OUTPUT #2
NMX-502-0512V	500	+5V @ 30A	+12V @ 30/40Apk

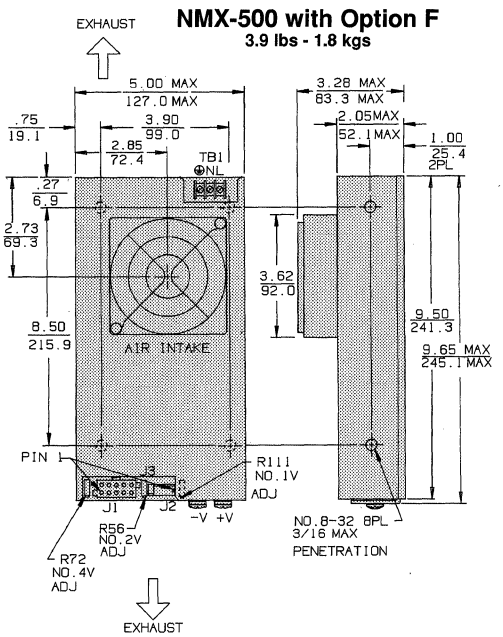
*Contact factory for detailed mechanical and electrical specifications. The drawings below do not represent this NMX product. The NMX-502 features dual bus-bar outputs and integrated "V" option.

NMX-500
3.7 lbs - 1.7 kgs



Dimensions: Inches / Millimeters

NMX-500 with Option F
3.9 lbs - 1.8 kgs



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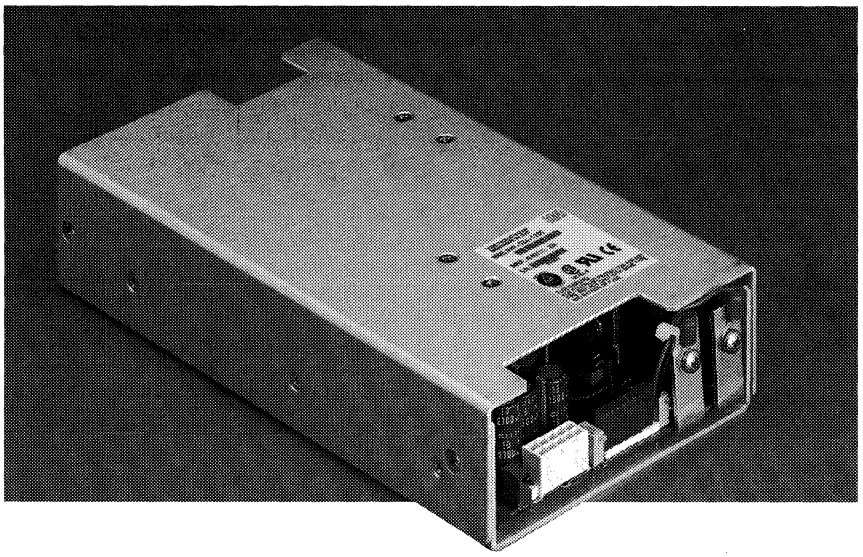
TODD POWER SUPPLIES

500 WATTS MULTIPLE OUTPUT 48 VDC INPUT, FORCED CURRENT SHARING

DMX-500

Featuring:

- Forced current sharing for N +1 redundancy
- Identical output performance as NMX-500 Series with 48 Vdc input
- Remote sense on outputs #1 and 2
- Dual converter design eliminates interaction between logic and auxiliary outputs
- Low ripple and noise on all outputs
- Input transient specification up to 75 V
- DC power good signal
- True remote inhibit
- Monotonic turn-on and turn-off
- Designed for use in telephone network systems

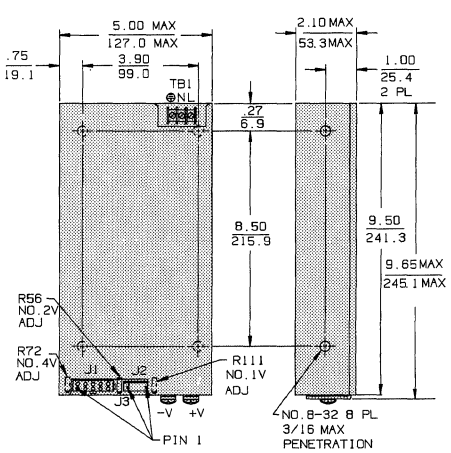


SEE NMX 500 FOR DC INPUT EQUIVALENT

STANDARD DMX SERIES

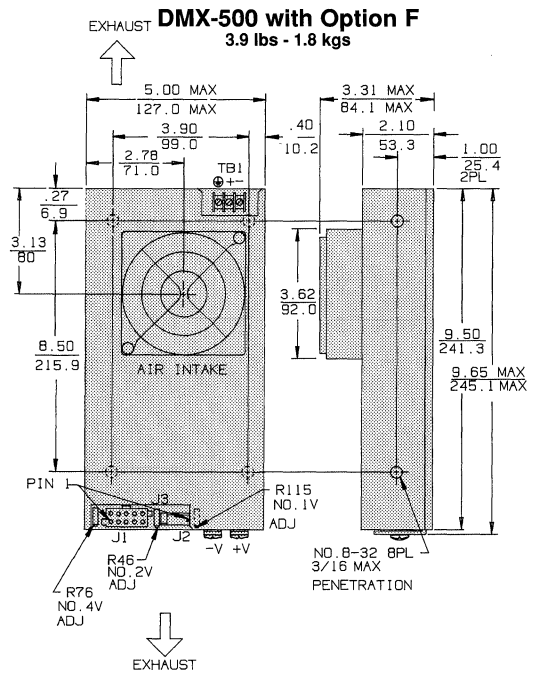
MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
DMX-503-0512	500	+5V @ 75A	+12V @ 8/12 Apk	-12V @ 4A	
DMX-504-1205	500	+5V @ 75A	+12V @ 8/12 Apk	-12V @ 4A	5.2V @ 5A
DMX-504-1212	500	+5V @ 75A	+12V @ 8/12 Apk	-12V @ 4A	12V @ 5A
DMX-504-1224	500	+5V @ 75A	+12V @ 8/12 Apk	-12V @ 4A	24V @ 3A
DMX-504-1512	500	+5V @ 75A	+15V @ 4A	-15V @ 4A	12V @ 5A
DMX-504-1524	500	+5V @ 75A	+15V @ 4A	-15V @ 4A	24V @ 3A

DMX-500
3.7 lbs - 1.7 kgs



Dimensions: Inches / Millimeters

DMX-500 with Option F
3.9 lbs - 1.8 kgs



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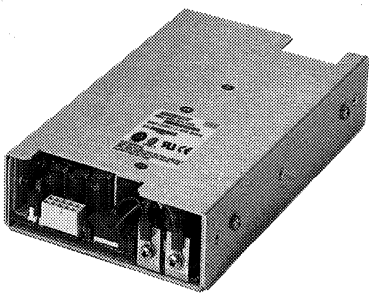
TODD POWER SUPPLIES

NMX-350

**350 WATTS
POWER FACTOR CORRECTED
MULTIPLE OUTPUT,
FORCED CURRENT SHARING**



Featuring:

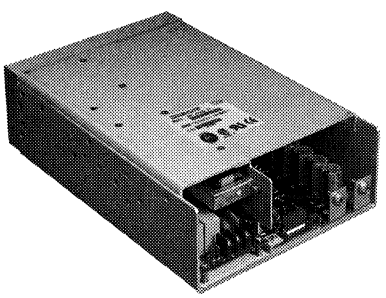
- Forced current sharing for N +1 redundancy
- Universal AC input
- 0.99 typical power factor
- Low ripple and noise on all outputs
- True remote inhibit
- Dual converter design eliminates interaction between logic and auxiliary outputs
- DC power good and AC power fail signals
- Monotonic turn-on and turn-off

STANDARD NMX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
NMX-353-0512	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	
NMX-354-1205	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	5.2V @ 5A
NMX-354-1212	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	12V @ 5A
NMX-354-1224	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	24V @ 3A
NMX-354-1512	350	+5V @ 50A	+15V @ 4A	-15V @ 4A	12V @ 5A
NMX-354-1524	350	+5V @ 50A	+15V @ 4A	-15V @ 4A	24V @ 3A

SPF-600
SPF-750
SPF-1000
SPF-1500

**600-750-1000-1500 WATTS
POWER FACTOR CORRECTED
SINGLE OUTPUT,
FORCED CURRENT SHARING**



Featuring:

- Forced current sharing for N +1 redundancy
- Universal AC input (except SPF-1500)
- 0.99 typical power factor
- Low ripple and noise
- DC power good and AC power fail signals
- True remote inhibit
- Monotonic turn-on and turn-off

600 and 750 WATTS
90-264 VAC INPUT–12.92" x 5" x 2.5"

MODEL	OUTPUT RATING	PWR OUT
SPF-600-05	+5V @ 120A	600
SPF-750-12	+12V @ 62A	750
SPF-750-15	+15V @ 50A	750
SPF-750-24	+24V @ 31A	750
SPF-750-28	+28V @ 27A	750
SPF-750-48	+48V @ 16A	750

1000 WATTS
90-264 VAC INPUT–12" x 8" x 3.38"

MODEL	OUTPUT RATING	PWR OUT
SPF-1000-05	+5V @ 200A	1000
SPF-1000-12	+12V @ 84A	1000
SPF-1000-15	+15V @ 67A	1000
SPF-1000-24	+24V @ 42A	1000
SPF-1000-28	+28V @ 36A	1000
SPF-1000-48	+48V @ 21A	1000

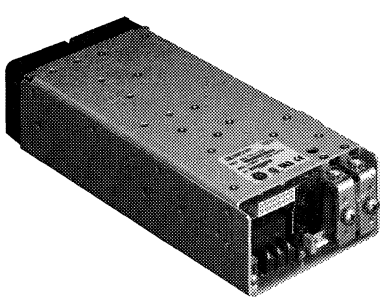
1500 WATTS 180-264 VAC INPUT–12" x 8" x 3.38"

MODEL	OUTPUT RATING	PWR OUT
SPF-1500-05	+5V @ 300A	1500
SPF-1500-12	+12V @ 125A	1500
SPF-1500-15	+15V @ 100A	1500

MODEL	OUTPUT RATING	PWR OUT
SPF-1500-24	+24V @ 63A	1500
SPF-1500-28	+28V @ 54A	1500
SPF-1500-48	+48V @ 32A	1500

NMX-750

**750 WATTS
POWER FACTOR CORRECTED
MULTIPLE OUTPUT,
FORCED CURRENT SHARING**



Featuring:

- Forced current sharing for N +1 redundancy
- Remote sense on outputs #1 and 2
- 0.99 typical power factor
- Dual converter design eliminates interaction between logic and auxiliary outputs
- Low ripple and noise on all outputs
- DC power good and AC power fail signals
- True remote inhibit
- Monotonic turn-on and turn-off
- Universal AC input

STANDARD NMX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
NMX-753-0512	750	+5V @ 120A	+12V @ 12/20 Apk	-12V @ 10A	
NMX-754-1205	750	+5V @ 120A	+12V @ 12/20 Apk	-12V @ 10A	5.2V @ 5A
NMX-754-1212	750	+5V @ 120A	+12V @ 12/20 Apk	-12V @ 10A	12V @ 5A
NMX-754-1224	750	+5V @ 120A	+12V @ 12/20 Apk	-12V @ 10A	24V @ 3A
NMX-754-1512	750	+5V @ 120A	+15V @ 10A	-15V @ 10A	12V @ 5A
NMX-754-1524	750	+5V @ 120A	+15V @ 10A	-15V @ 10A	24V @ 3A

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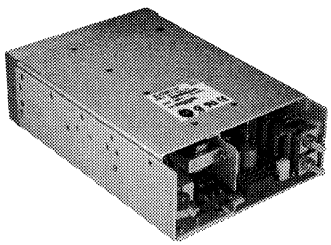
TODD POWER SUPPLIES

NMX-1000

1000 WATTS
POWER FACTOR CORRECTED
MULTIPLE OUTPUT,
FORCED CURRENT SHARING



Featuring:

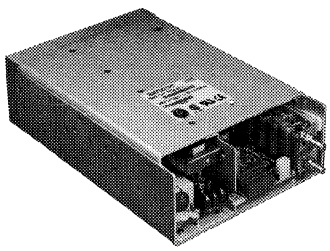
- Forced current sharing for N +1 redundancy
- Remote sense on outputs #1, 2 and 3
- "Zero wire" slope program current sharing on outputs #2 and 3 for redundancy
- Universal AC input
- 0.99 typical power factor
- Mag-Amp regulators eliminate interaction between logic and auxiliary outputs
- Compact, low-profile package, only 12" x 8" x 3.38"
- DC power good and AC power fail signals
- True remote inhibit

STANDARD NMX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
NMX-1003-0512	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	
NMX-1004-1203	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	3.3V @ 10A
NMX-1004-1205	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	5V @ 10A
NMX-1004-1212	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	12V @ 10A
NMX-1004-1224	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	12V @ 10A
NMX-1004-1512	1000	+5V @ 150A	+15V @ 20/30 Apk	-15V @ 10A	12V @ 10A

MAX-1000

1000 WATTS
POWER FACTOR CORRECTED
MULTIPLE OUTPUT



Featuring:

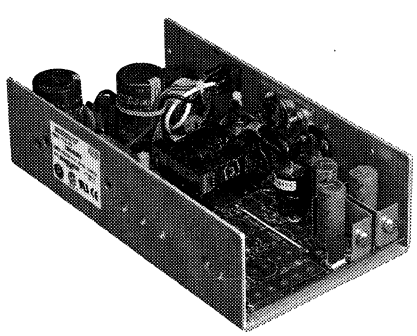
- Universal AC input
- 0.99 typical power factor
- Mag-Amp regulators eliminate interaction between logic and auxiliary outputs
- Compact, low-profile package, only 12" x 8" x 3.38"
- DC power good and AC power fail signals
- True remote inhibit

STANDARD MAX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
MAX-1003-0512	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	
MAX-1004-1203	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	3.3V @ 10A
MAX-1004-1205	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	5V @ 10A
MAX-1004-1212	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	12V @ 10A
MAX-1004-1224	1000	+5V @ 150A	+12V @ 20/30 Apk	-12V @ 10A	12V @ 10A
MAX-1004-1512	1000	+5V @ 150A	+15V @ 20/30 Apk	-15V @ 10A	12V @ 10A
MAX-1004-1524	1000	+5V @ 150A	+15V @ 20/30 Apk	-15V @ 10A	24V @ 5A

SC-100 SC-350
SC-150 SC-360
SC-180 SC-500
SC-250 SC-520

100-150-180-250-350-
360-500-520 WATTS
SINGLE OUTPUT



Featuring:

- Output voltages from 3.3 V to 48 V
- Meets international safety agency requirements
- Remote sense, thermal protection, and OVP
- Cannot be damaged by no load or low line conditions
- AC automatic line selection option
- System air or self cooling options
- Power density to 3.6 watts/in^3

150 WATTS 9" x 5" x 2.5" L FRAME

MODEL	OUTPUT RATING	PWR OUT
SC3.3-30	3.3V @ 30A	100
SC5-30	5V @ 30A	150
SC12-15	12V @ 15A	180
SC15-12	15V @ 12A	180
SC24-7.5	24V @ 7.5A	180
SC28-6.5	28V @ 6.5A	180
SC48-3.7	48V @ 3.7A	180

250 WATTS 9" x 5" x 2.5"

MODEL	OUTPUT RATING	PWR OUT
SC3.3-50	3.3V @ 50A	165
SC5-50	5V @ 50A	250
SC12-21	12V @ 21A	250
SC15-17	15V @ 17A	250
SC24-11	24V @ 11A	250
SC28-9	28V @ 9A	250
SC48-5.5	48V @ 5.5A	250

350 WATTS 11.5" x 5" x 2.5"

MODEL	OUTPUT RATING	PWR OUT
SC5-70	5V @ 70A	350
SC12-30	12V @ 30A	360
SC15-24	15V @ 24A	360
SC24-15	24V @ 15A	360
SC28-13	28V @ 13A	360
SC48-8	48V @ 8A	360

500 WATTS 11.5" x 5" x 2.5"

MODEL	OUTPUT RATING	PWR OUT
SC5-100	5V @ 100A	500
SC12-42	12V @ 42A	500
SC15-34	15V @ 34A	500
SC24-21	24V @ 21A	500
SC28-18	28V @ 18A	500
SC48-11	48V @ 11A	520

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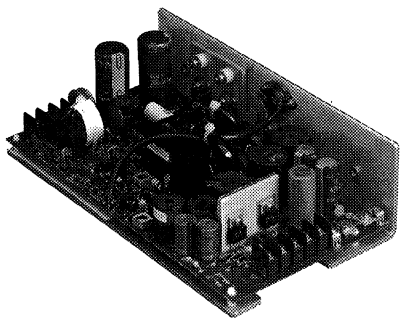
TODD POWER SUPPLIES

MDT-160
MTC-160
MDT-220

160-220 WATTS MULTIPLE OUTPUT

Featuring:

- 9" x 5" x 2.5" package
- Proven low component count design
- High power densities
- Meets international safety agency requirements
- High peak currents for motor starting
- Remote sense, thermal protection, and OVP
- Cannot be damaged by no load or low line conditions
- AC automatic line selection option



STANDARD MAX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
MDT-163-0512R	160	+5V @ 25A	+12V @ 4/9 Apk	12V @ 1.5A	
MDT-164-1212R	160	+5V @ 25A	+12V @ 4/9 Apk	+12V @ 1A	-12V @ 1A
MDT-164-2412R	160	+5V @ 20A	+24V @ 3/6 Apk	+12V @ 1A	-12V @ 1A
MDT-223-0512R	220	+5V @ 30A	+12V @ 6/10 Apk	12V @ 2.5A	
MDT-224-1212R	220	+5V @ 30A	+12V @ 6/10 Apk	+12V @ 1.5A	-12V @ 1.5A
MDT-224-2412R	220	+5V @ 25A	+24V @ 4/8 Apk	+12V @ 1.5A	-12V @ 1.5A

TELECOM MTC SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3
MTC-163-0512	160	+5V @ 30A	+12V @ 1.5A	-12V @ 1.5A
MTC-163-0515	160	+5V @ 30A	+15V @ 1.5A	-15V @ 1.5A

MASS STORAGE MDT-223-1212R

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3
MDT-223-1212R	220	+5V @ 10A	+12V @ 10/16 Apk	-12V @ 1A

DB-250 DBX-275
DC-250 DCT-350
DCT-250 DCX-350
DBT-275 DPS-350

250 WATTS SINGLE OUTPUT
275-350 WATTS MULTIPLE OUTPUT
24/28 AND 48 VDC INPUT

Featuring:

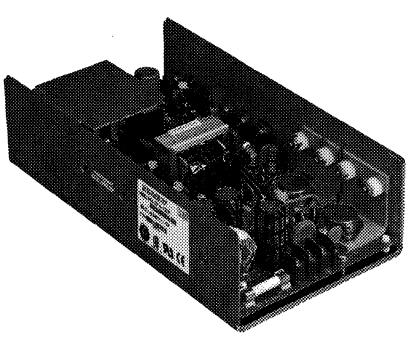
- Over 3 watts/in³ power density
- Meets international safety requirements
- All outputs regulated ±1%
- High peak currents for motor starting
- System air and self cooling options
- "Zero wire" slope program current sharing in DPS series
- Available in dual AC input range

24/28 VDC INPUT – SINGLE OUTPUT

MODEL	OUTPUT RATING	PWR OUT
DB5-50	5 V @ 50A	250
DB12-21	12V @ 21A	250
DB15-17	15V @ 17A	250
DB24-11	24V @ 11A	250
DB28-9	28V @ 9A	250
DB48-5.5	48V @ 5.5A	250

48 VDC INPUT – SINGLE OUTPUT

MODEL	OUTPUT RATING	PWR OUT
DC5-50	5 V @ 50A	250
DC12-21	12V @ 21A	250
DC15-17	15V @ 17A	250
DC24-11	24V @ 11A	250
DC28-9	28V @ 9A	250
DC48-5.5	48V @ 5.5A	250



24/28 VDC INPUT – MULTIPLE OUTPUT

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
DBT-273-0512	275	+5V @ 45A	+12V @ 6A	-12V @ 6A	
DBT-273-0515	275	+5V @ 45A	+15V @ 5A	-15V @ 5A	
DBX-273-0512	275	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	
DBX-274-1205	275	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	5.2V @ 2 A
DBX-274-1224	275	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	24V @ 1.5A

48 VDC INPUT – MULTIPLE OUTPUT

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
DCT-253-0512	250	+5V @ 30A	+12V @ 5A	-12V @ 5A	
DCT-253-0515	250	+5V @ 30A	+15V @ 4A	-15V @ 4A	
DCT-353-0512	350	+5V @ 45A	+12V @ 6A	-12V @ 6A	
DCT-353-0515	350	+5V @ 45A	+15V @ 5A	-15V @ 5A	
DCX-353-0512	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	
DCX-354-1205	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	5.2V @ 2A
DCX-354-1224	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	24V @ 1.5A
DPS-354-1205	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	5.2V @ 2A

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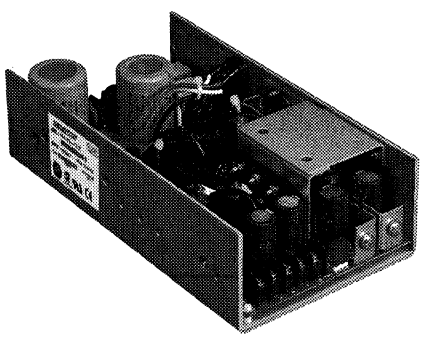
TODD POWER SUPPLIES

MAX-250 MAX-350 MTC-250 MTC-350 MTX-250 MSC-350

250-350 WATTS MULTIPLE OUTPUT

Featuring:

- Over 3 watt/in³ power density
- 80% overall efficiency
- Meets international safety agency requirements
- All outputs regulated ± 1%
- High peak currents for motor starting
- System air or self-cooling options
- AC automatic line selection option
- Available in 24, 28, or 48 Vdc input



STANDARD MAX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
MAX-254-1205	250	+5V @ 35A	+12V @ 8/12 Apk	-12V @ 4A	-5.2V @ 2A
MAX-353-0512	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	
MAX-354-1205	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	-5.2V @ 2A
MAX-354-1212	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	12V @ 2A
MAX-354-1224	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	+24V @ 1.5A
MAX-354-1252	350	+5V @ 50A	+12V @ 8/12 Apk	-5.2V @ 10A	-12V @ 2A
MAX-354-1512	350	+5V @ 40A	+15V @ 4 A	-15V @ 4A	12V @ 2A
MAX-354-2412	350	+5V @ 50A	+24V @ 5/8 Apk	-12V @ 4A	+12V @ 2A

TELECOM MTC SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3
MTC-253-0512	250	+5V @ 30A	+12V @ 5A	-12V @ 5A
MTC-253-0515	250	+5V @ 30A	+15V @ 4A	-15V @ 4A
MTC-353-0512	350	+5V @ 45A	+12V @ 6A	-12V @ 6A
MTC-353-0515	350	+5V @ 45A	+15V @ 5A	-15V @ 5A

MASS STORAGE MSC SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3
MSC-353-0512	350	+5V @ 30A	+12V @ 20/26 Apk	-12V @ 4A
MSC-353-1205	350	+12V @ 30/36 Apk	+5V @ 20A	-12V @ 4A
MSC-353-0512F	400	+5V @ 30A	+12V @ 20/26 Apk	-12V @ 4A
MSC-353-1205F	400	+12V @ 30/36 Apk	+5V @ 20A	-12V @ 4A

SMALL COMPUTER MIX SERIES

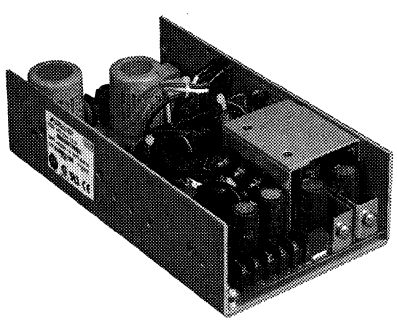
MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
MTX-253-0512	250	+5V @ 35A	+12V @ 8/12 Apk	-12V @ 2A	
MTX-254-1205	250	+5V @ 35A	+12V @ 8/12 Apk	-12V @ 2A	5V @ 1.5A
MTX-254-1212	250	+5V @ 35A	+12V @ 8/12 Apk	-12V @ 2A	12V @ 2A
MTX-254-1215	250	+5V @ 35A	+12V @ 8/12 Apk	-15V @ 1.5A	15V @ 1.5A
MTX-254-1224	250	+5V @ 35A	+12V @ 8/12 Apk	-12V @ 2A	24V @ 1.5A

MPS-350

350 WATTS MULTIPLE OUTPUT SLOPE PROGRAM CURRENT SHARING

Featuring:

- N +1 redundancy and parallel power sharing
- "Zero wire" slope program current sharing for redundancy
- Over 3 watts/in³ power density
- 80% overall efficiency
- All auxiliary outputs regulated ±1%
- Meets international safety agency requirements
- High peak currents for motor starting
- System air or self cooling options
- AC automatic line selection option
- Available in 48 Vdc input



POWER SHARING MPS SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
MPS-353-0512	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	
MPS-354-1205	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	-5.2V @ 2A
MPS-354-1212	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	12V @ 2A
MPS-354-1224	350	+5V @ 50A	+12V @ 8/12 Apk	-12V @ 4A	+24V @ 1.5A

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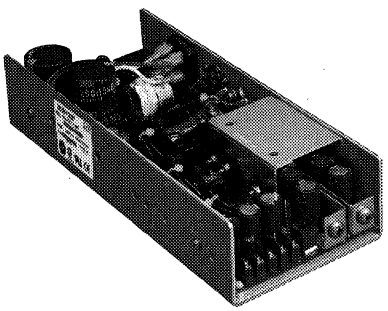
TODD POWER SUPPLIES

MAX-400 MAX-500 MTC-400 MTC-500 MSC-400

400-500 WATTS MULTIPLE OUTPUT



Featuring:

- Over 3.5 watts/in³ power density
- 80% overall efficiency
- VMEbus and Multibus II system compatibility
- All outputs regulated ±1%
- Meets international safety agency requirements
- High peak currents for motor starting
- System air or self cooling options
- AC automatic line selection option

STANDARD MAX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
MAX-403-0512	400	+5V @ 70A	+12V @ 10/16 Apk	-12V @ 6A	
MAX-404-1212	400	+5V @ 70A	+12V @ 10/16 Apk	-12V @ 5A	12V @ 2A
MAX-404-1252	400	+5V @ 70A	+12V @ 10/16 Apk	-5.2V @ 6A	12V @ 2A
MAX-503-0512	500	+5V @ 80A	+12V @ 10/16 Apk	-12V @ 10A	
MAX-504-1205	500	+5V @ 80A	+12V @ 10/16 Apk	-12V @ 10A	5.2V @ 2A
MAX-504-1212	500	+5V @ 80A	+12V @ 10/16 Apk	-12V @ 10A	12V @ 2A
MAX-504-1224	500	+5V @ 80A	+12V @ 10/16 Apk	-12V @ 10A	+24V @ 2A
MAX-504-1252	500	+5V @ 80A	+12V @ 10/16 Apk	-5.2V @ 10A	12V @ 2A
MAX-504-1552	500	+5V @ 80A	+15V @ 10/16 Apk	-5V @ 10A	15V @ 2A
MAX-504-2412	500	+5V @ 80A	+24V @ 5/10 Apk	-12V @ 10A	12V @ 2A

TELECOM MTC SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3
MTC-403-0515	400	+5V @ 50A	+15V @ 6.5A	-15V @ 6.5A
MTC-503-0512	500	+5V @ 70A	+12V @ 10A	-12V @ 10A
MTC-503-0515	500	+5V @ 70A	+15V @ 8A	-15V @ 8A

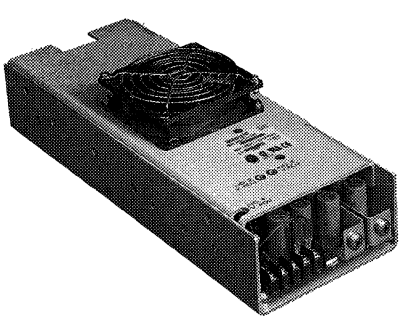
MASS STORAGE MSC SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2
MSC-402-0512*	400	+5V @ 20A	+12V @ 25/36 Apk

*Contact factory for detailed mechanical and electrical specifications. The MSC-402 features input and output connectors, remote sense on Output #1 and Output #2, and remote on/off – all standard.

MAX-700 MAX-750 MSC-750

700-750 WATTS MULTIPLE OUTPUT



Featuring:

- 58% smaller than equivalent shoe box
- Over 4 watts/in³ power density
- 80% overall efficiency
- VMEbus and Multibus II system compatibility
- Meets international safety agency requirements
- All outputs fully regulated ±1%
- High peak current for motor starting
- AC automatic line selection option

STANDARD MAX SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4
MAX-703-0512	700	+5V @ 100A	+12V @ 12/20 Apk	-12V @ 10A	
MAX-704-1205	700	+5V @ 100A	+12V @ 12/20 Apk	-12V @ 10A	5.2V @ 2A
MAX-704-1212	700	+5V @ 100A	+12V @ 12/20 Apk	-12V @ 10A	12V @ 2A
MAX-704-1224	700	+5V @ 100A	+12V @ 12/20 Apk	-12V @ 10A	+24V @ 2A
MAX-704-1252	700	+5V @ 100A	+12V @ 12/20 Apk	-5.2V @ 10A	12V @ 2A
MAX-704-2412	700	+5V @ 100A	+24V @ 6/10 Apk	-12V @ 10A	12V @ 2A
MAX-753-0512	750	+5V @ 120A	+12V @ 12/20 Apk	-12V @ 10A	
MAX-754-1205	750	+5V @ 120A	+12V @ 12/20 Apk	-12V @ 10A	5.2V @ 2A
MAX-754-1212	750	+5V @ 120A	+12V @ 12/20 Apk	-12V @ 10A	12V @ 2A
MAX-754-1224	750	+5V @ 120A	+12V @ 12/20 Apk	-12V @ 10A	+24V @ 2A
MAX-754-1252	750	+5V @ 120A	+12V @ 12/20 Apk	-5.2V @ 10A	12V @ 2A
MAX-754-1512	750	+5V @ 120A	+15V @ 12/20 Apk	-15V @ 8A	12V @ 2A
MAX-754-2412	750	+5V @ 120A	+24V @ 6/10 Apk	-12V @ 10A	12V @ 2A

MASS STORAGE MSC SERIES

MODEL	PWR	OUTPUT #1	OUTPUT #2	OUTPUT #3
MSC-753-0512	750	+5V @ 120A	+12V @ 20/27 Apk	-12V @ 6A

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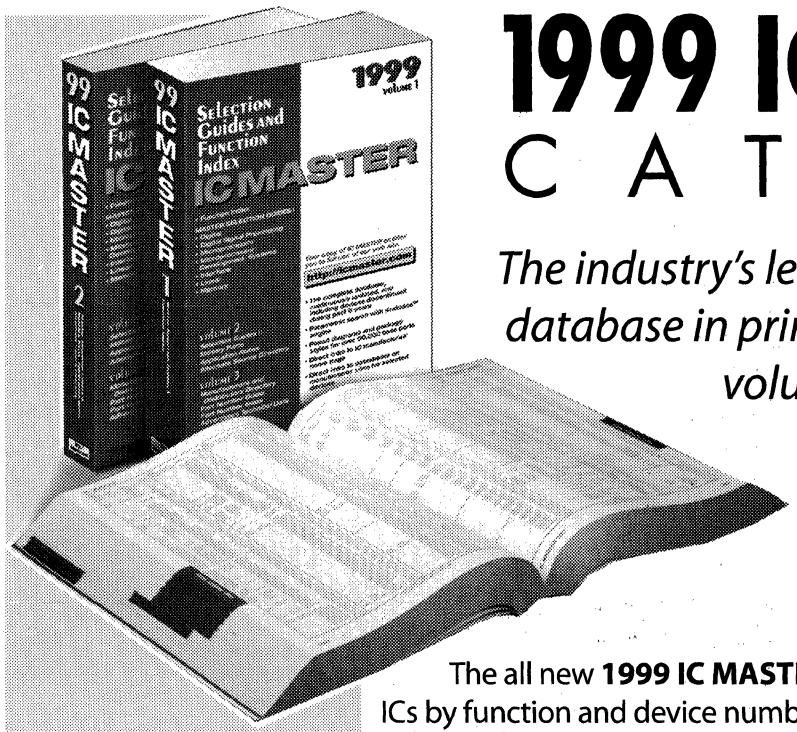

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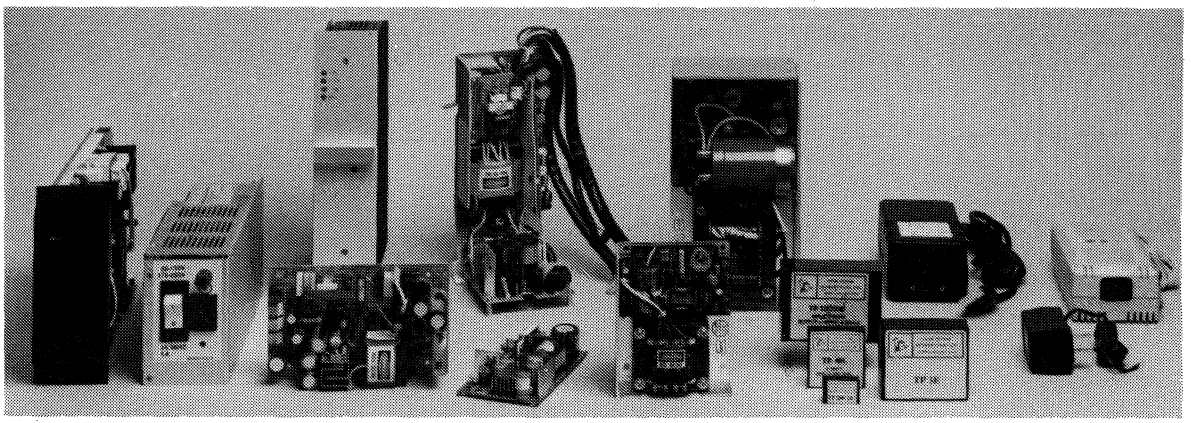

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- Six-Sided Shielding

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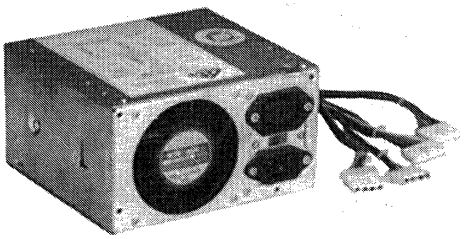
TES, ATX, DC24/48 SERIES SWITCHING POWER SUPPLIES

FEATURES

- Shout Circuit Protection
- Over Voltage Protection
- Over Current Protecton
- UL/CSA/VDE Requirements
- VDE Class B
- 100% Burn-In Test

APPLICATIONS

- Clone Computers
- Industrial Control Computers
- Instrumentation
- General Purpose
- AC Or DC Input
- Medical Application Available
- ATX Computer



TEX, ATX, DC 24/48 SERIES: 200 W, 250W, 300W CASE SIZE: 5.9"(L) X 5.51"(W) X 3.40"(H)

WATTAGE	MODEL #	+3.3VDC	+5VDC	-5VDC	+12VDC	-12VDC	+5VSB	NOTE:
200W	TES 2200	-	22.0	0.5	8.0	0.5	-	
250W	TES 2250	-	25.0	0.5	10.0	0.5	-	
300W	TES 2300	-	30.0	0.5	12.0	0.5	-	
250W	ATX 2506	14.0	25.0	0.5	10.0	0.5	0.75	ATX COMPUTER
300W	ATX 3006	14.0	30.0	0.5	12.0	0.5	0.75	ATX COMPUTER
250W	DC24-2250	-	25.0	1.0	10.0	1.0	-	24VDC INPUT
250W	DC48-2250	-	25.0	1.0	10.0	1.0	-	-48VDC INPUT
250W	TESM-2250	-	22.0	1.0	7.0	1.0	-	MEDICAL

NOTE: SUPER 2200, AND SUPER 2250 WILL BE PHASED OUT AND ARE NOT RECOMMENDED FOR NEW APPLICATIONS.

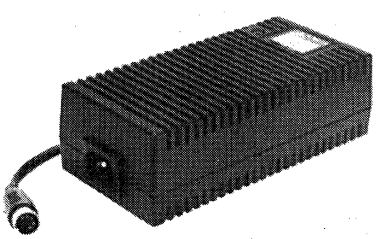
DESKTOP SERIES UNIVERSAL SWITCHING POWER SUPPLIES

FEATURES

- EMI VDE Class B
- No Minimum Load Required
- Single And Multiple Output
- Universal Input 90VAC To 260VAC

APPLICATIONS

- Computer Peripherals
- Hard Disk Drives
- Tape Drives • Modems
- Test Instrumentation Products
- Medical Application Available



DT SERIES: 10W, 20W, 30W, 50W, 70W

		OUTPUT LOAD CURRENT (AMPS)							
WATTAGE	MODEL #	+5VDC	+12VDC	-12VDC	+15VDC	+18VDC	+24VSB	+48VDC	NOTE:
10W	DT410-4	2.0	-	-	-	-	-	-	MEMA5-15P STYLE 3 WIRES PLUG
	DT410-5	-	1.0	-	-	-	-	-	
	DT410-6	-	-	-	-	-	0.5	-	
20W	DT420-1	1.0	1.0	0.3	-	-	-	-	IEC 320 CONNECTOR
	DT420-2	1.0	1.0	-	-	-	-	-	
	DT420-4	4.0	-	-	-	-	-	-	
30W	DT430-1	2.0	1.5	0.3	-	-	-	-	
	DT431-3	-	-	-	-	2.0	-	-	IEC 320 CONNECTOR
	DT430-5	-	2.5	-	-	-	-	-	
	DT430-8	-	-	-	2.0	-	-	-	
	DT430-6	-	-	-	-	-	1.5	-	
50W	DT450-1	3.0	2.5	0.3	-	-	-	-	
	DT450-2	3.5	2.5	-	-	-	-	-	
	DT450-3	-	-	-	-	3.0	-	-	IEC 320 CONNECTOR
	DT450-4RS	8.0	-	-	-	-	-	-	
	DT450-5	-	4.2	-	-	-	-	-	
	DT450-6	-	-	-	-	-	2.3	-	
70W	DT470-3	-	-	-	-	4.0	-	-	
	DT470-5	-	6.0	-	-	-	-	-	
	DT470-14	-	-	-	-	-	-	1.5	IEC 320 CONNECTOR
	DT470-8	-	-	-	5.0	-	-	-	
	DT470-6	-	-	-	-	-	3.0	-	
50W MEDICAL	DT450M-6	-	-	-	-	-	2.3	-	IEC 320 CONNECTOR

NOTE: RS - REMOTE SENSE AVAILABLE

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UV SERIES

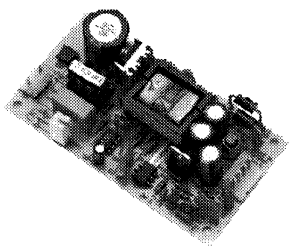
UNIVERSAL INPUT SWITCHING POWER SUPPLIES

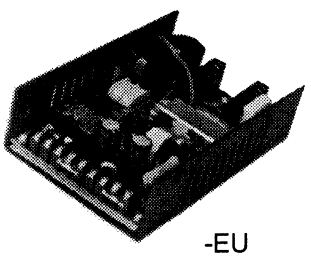
FEATURES

- *90 To 260 VAC Universal Input*
- *Compact & Low Cost*
- *Overload Protection*
- *Overvoltage Protection*
- *Short Circuit Protection*
- *100% Hi-Pot Tested*
- *100% Cycling Burn-In*
- *Built-In Line Filter To Meet Class B*
- *High Efficiency*

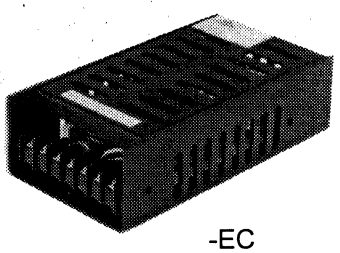
APPLICATIONS

- *Hard Disk Subsystem*
- *External Floppy Disk Systems*
- *External Tape Backup*
- *Terminals*
- *Modems*
- *Printers and Plotters*





-EU



-EC

UV420 SERIES: 20 WATTS, BOARD SIZE: 4.33"(L) X 2.36"(W) X 0.95"(H)

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS)							
	+5VDC	-5VDC	+12VDC	-12VDC	+15VDC	-15VDC	+24VDC	+48VDC
UV420-1, EC,EU	1.0	-	1.0	0.3	-	-	-	-
UV420-3, EC,EU	1.0	-	1.0	-	-	-	-	-
UV420-6, EC,EU	4.0	-	-	-	-	-	-	-
UV420-7, EC,EU	-	-	2.0	-	-	-	-	-
UV420-9, EC,EU	-	-	-	-	-	-	1.0	-

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 20 WATTS

UV430 SERIES: 30 WATTS, BOARD SIZE: 5.12"(L) X 2.76"(W) X 1.13"(H)

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS)							
	+5VDC	-5VDC	+12VDC	-12VDC	+15VDC	-15VDC	+24VDC	+48VDC
UV430-1, EC,EU	2.0	-	1.5	0.3	-	-	-	-
UV430-3, EC,EU	2.0	-	1.5	-	-	-	-	-
UV430-4, EC,EU	1.5	-	-	-	1.2	0.3	-	-
UV430-5, EC,EU	2.0	-	-	-	-	-	0.75	-
UV430-6, EC,EU	6.0	-	-	-	-	-	-	-
UV430-7, EC,EU	-	-	2.5	-	-	-	-	-
UV430-8, EC,EU	-	-	-	-	2.0	-	-	-
UV430-9, EC,EU	-	-	-	-	-	-	1.3	-

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 30 WATTS

UV440 SERIES: 40 WATTS, BOARD SIZE-5.0"(L) X 3.0"(W) X 1.18"(H)

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS)							
	+5VDC	-5VDC	+12VDC	-12VDC	+15VDC	-15VDC	+24VDC	+48VDC
UV440-1, EC,EU	3.0	-	2.0	0.3	-	-	-	-
UV440-2, EC,EU	3.0	-	-	-	1.5	0.3	-	-
UV440-3, EC,EU	3.0	0.3	2.0	-	-	-	-	-
UV440-4, EC,EU	8.0	-	-	-	-	-	-	-
UV440-5, EC,EU	-	-	3.5	-	-	-	-	-
UV440-6, EC,EU	-	-	-	-	2.6	-	-	-
UV440-7, EC,EU	-	-	-	-	-	-	1.7	-
UV440-12, EC,EU	3.0	-	2.0		-	-	-	-
UV440-13, EC,EU	-	-	1.5	1.5	-	-	-	-
UV440-14, EC,EU	-	-	-	-	-	-	-	0.83
UV440-15, EC,EU	3.0	0.5	2.0	0.3	-	-	-	-

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 40 WATTS

UV465 SERIES: 65 WATTS, (150 WATTS PEAK) BOARD SIZE: 5.0"(L) X 3.0"(W) X 1.52"(H)

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS)							
	+5VDC	-5VDC	+12VDC	-12VDC	+15VDC	-15VDC	+24VDC	+48VDC
UV465-1, EC,EU	3.5	-	4.0	0.3	-	-	-	-
UV465-5, EC,EU	13.0	-	-	-	-	-	-	-
UV465-6, EC,EU	-	-	5.5	-	-	-	-	-
UV465-7, EC,EU	-	-	-	-	4.5	-	-	-
UV465-8, EC,EU	-	-	-	-	-	-	3.0	-
UV465-9, EC,EU	-	-	-	-	2.0	2.0	-	-
UV465-12, EC,EU	0.5	-	-	-	-	-	2.5	-
UV465-14, EC,EU	-	-	-	-	-	-	-	1.4
UV465-15, EC,EU	0.5	-	5.0	-	-	-	-	-
UV465-16, EC,EU	0.5	-	-	-	4.0	-	-	-

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 65 WATTS

UV480 SERIES: 80 WATTS, BOARD SIZE: 6.0"(L) X 4.0"(W) X 2.1"(H)

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS)							
	+5VDC	-5VDC	+12VDC	-12VDC	+15VDC	-15VDC	+24VDC	+48VDC
UV480-1, EC,EU	8.0	0.5	3.0	0.5	-	-	-	-
UV480-5, EC,EU	8.0	-	-	-	1.5	1.5	-	-
UV480-6, EC,EU	17.0	-	-	-	-	-	-	-
UV480-11, EC,EU	1.0	-	6.5	-	-	-	-	-
UV480-8, EC,EU	-	-	-	-	6.0	-	-	-
UV480-9, EC,EU	-	-	-	-	-	-	3.8V	-
UV480-10, EC,EU	4.0	-	-	-	0.5	0.5	2.0	-
UV480-12, EC,EU	1.0	-	-	-	-	-	3.3	-

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 80 WATTS

UV4100 SERIES: 100 WATTS, BOARD SIZE: 7.75"(L) X 4.25"(W) X1.14"(H)

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS)							
	+5VDC	-5VDC	+12VDC	-12VDC	+15VDC	-15VDC	+24VDC	+48VDC
UV4100-1, EC,EU	10.0	0.5	3.5	0.5	-	-	-	-
UV4100-2, EC,EU	15.0	2.0	2.0	-	-	-	-	-
UV4100-4, EC,EU	5.0	-	2.0	0.3	-	-	2.0	-
UV4100-5, EC,EU	20.0	-	-	-	-	-	-	-
UV4100-6, EC,EU	1.0	-	9.0	-	-	-	-	-
UV4100-7, EC,EU	1.0	-	-	-	-	-	4.5	-

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 100 WATTS

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- 90 To 260 VAC Universal Input
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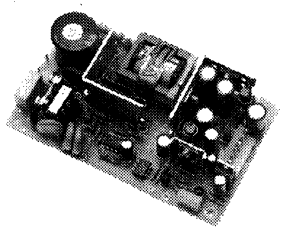
- Overload Protection
- Overvoltage Protection
- Short Circuit Protection
- 100% Hi-Pot Tested
- 100% Cycling Burn-In
- Built-In Line Filter
- High Efficiency

APPLICATIONS

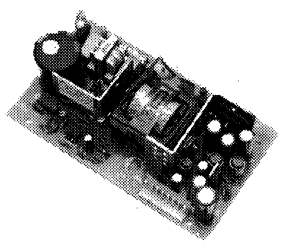
- Robotics Instrumentation
- Color Monitor, CRT Terminal
- External Tape Backup
- Terminals
- Portable Computer Systems
- Printers And Plotters



UV365 SERIES: 65 WATTS, BOARD SIZE-6.00" LONG X 3.50" WIDE X 1.69" HIGH

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS) +5VDC MIN	+5VDC RATED	-5VDC MIN	-5VDC RATED	+12VDC MIN	+12VDC RATED	-12VDC MIN	-12VDC RATED	+15VDC MIN	+15VDC RATED	-15VDC MIN	-15VDC RATED	+24VDC MIN	+24VDC RATED	RIPPLE & NOISE (pk-pk) V1	V2	V3	V4	LINE/LOAD REGULATION % V1	V2	V3	V4
UV365-1	0.50	5.50	0.00	0.50	0.20	2.50	0.00	0.50	–	–	–	–	–	–	50mV	100mV	100mV	100mV	1.0	6.0	3.0	6.0
UV365-2	0.50	6.00	–	–	0.20	2.50	0.00	0.50	–	–	–	–	–	–	50mV	100mV	100mV		1.0	3.0	6.0	
UV365-3	0.50	5.50	0.00	0.50	0.20	3.00	–	–	–	–	–	–	–	–	50mV	100mV	100mV		1.0	6.0	3.0	
UV365-4	0.50	6.00	–	–	0.20	3.00	–	–	–	–	–	–	–	–	50mV	100mV			1.0	3.0		
UV365-5	0.50	13.00	–	–	–	–	–	–	–	–	–	–	–	–	100mV				1.0			
UV365-6	–	–	–	–	0.30	5.50	–	–	–	–	–	–	–	–	100mV				1.0			
UV365-7	–	–	–	–	–	–	–	–	0.30	4.50	–	–	–	–	100mV				1.0			
UV365-8	–	–	–	–	–	–	–	–	–	–	–	–	0.20	3.00	100mV				1.0			

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 65 WATTS

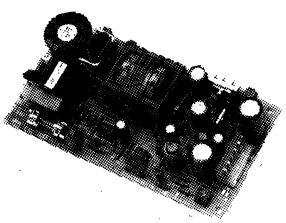


UV385 SERIES: 85 WATTS, BOARD SIZE-7.75" LONG X 4.25" WIDE X 1.69" HIGH

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS) +5VDC MIN	+5VDC RATED	-5VDC MIN	-5VDC RATED	+12VDC MIN	+12VDC RATED	-12VDC MIN	-12VDC RATED	+15VDC MIN	+15VDC RATED	-15VDC MIN	-15VDC RATED	+24VDC MIN	+24VDC RATED	RIPPLE & NOISE (pk-pk) V1	V2	V3	V4	LINE/LOAD REGULATION % V1	V2	V3	V4
UV385-1	0.50	8.00	0.00	0.50	0.20	3.00	0.00	0.50	–	–	–	–	–	–	50mV	100mV	100mV	100mV	1.0	6.0	3.0	6.0
UV385-2	0.50	8.50	–	–	0.20	3.00	0.00	0.50	–	–	–	–	–	–	50mV	100mV	100mV		1.0	3.0	6.0	
UV385-3	0.50	8.00	0.00	0.50	0.20	3.50	–	–	–	–	–	–	–	–	50mV	100mV	100mV		1.0	3.0	6.0	
UV385-4	0.50	8.50	–	–	0.20	3.50	–	–	–	–	–	–	–	–	50mV	100mV			1.0	3.0		
UV385-5	0.50	8.00	–	–	–	–	–	–	0.10	1.50	0.10	1.50	–	–	50mV	100mV	100mV		1.0			
UV385-6	0.50	17.00	–	–	–	–	–	–	–	–	–	–	–	–	100mV				1.0			
UV385-7	–	–	–	–	0.30	7.00	–	–	–	–	–	–	–	–	100mV				1.0			
UV385-8	–	–	–	–	–	–	–	–	0.30	6.00	–	–	–	–	100mV				1.0			
UV385-9	–	–	–	–	–	–	–	–	–	–	–	–	0.20	3.80	100mV				1.0			
UV385-10	0.50	4.00	–	–	–	–	–	–	0.00	.050	0.00	0.50	0.10	2.00	50mV	100mV	100mV		1.0	3.0	6.0	

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 65 WATTS

MEDICAL POWER SUPPLY



FEATURES

- 85 to 264 VAC Universal Input
- Innovative Mosfet Design
- Low Cost
- High Efficiency
- Built-In Line Filter, To Meet FCC Class B
- 100% Hi-Pot Tested
- 100% cycling On-Off Burn-In Test
- Low Leakage Current

NOTE: - EC (Fully Enclosed Chassis)
- EU ('U' Shaped Chassis)

UV440M SERIES: 40 WATTS, BOARD SIZE:3.0"(L) X 5.0"(W) X 1.142"(H)

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS) +5VDC	-5VDC	+12VDC	-12VDC	+15VDC	-15VDC	+24VDC
UV440M-1, EC,EU	3.0	-	2.0	0.3	-	-	-
UV440M-2, EC,EU	3.0	-	-	-	1.6	0.3	-
UV440M-4, EC,EU	8.0	-	-	-	-	-	-
UV440M-5, EC,EU	-	-	3.3	-	-	-	-
UV440M-6, EC,EU	-	-	-	-	2.6	-	-
UV440M-7, EC,EU	-	-	-	-	-	-	1.7

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 40 WATTS

UV460M SERIES: 60 WATTS, BOARD SIZE:3.0"(L) X 5.0"(W) X 1.48"(H)

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS) +5VDC	-5VDC	+12VDC	-12VDC	+15VDC	+24VDC
UV460M-1, EC,EU	5.0	0.5	2.5	-	-	-
UV460M-4, EC,EU	13.0	-	-	-	-	-
UV460M-5, EC,EU	-	-	5.5	-	-	-
UV460M-6, EC,EU	-	-	-	-	4.5	-
UV460M-7, EC,EU	-	-	-	-	-	2.75
UV460M-12, EC,EU	5.0	-	3.0	-	-	-

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 60 WATTS

UV4110M SERIES: 110 WATTS, BOARD SIZE:4.2"(L) X 7.0"(W) X 1.73"(H)

MODEL NUMBER	OUTPUT LOAD CURRENT (AMPS) +5VDC	-5VDC	+12VDC	-12VDC	+15VDC	-15VDC	+24VDC
UV4110-6, EC,EU	-	-	-	-	7.5A	-	-
UV4110-5, EC,EU	-	-	9.2A	-	-	-	-
UV4110-9, EC,EU	-	-	-	-	-	-	5.0

NOTE: EACH OUTPUT CAN PROVIDE A PEAK LOAD CURRENT FOR 30 SECONDS, BUT TOTAL CONTINUOUS LOAD CANNOT EXCEED 110 WATTS

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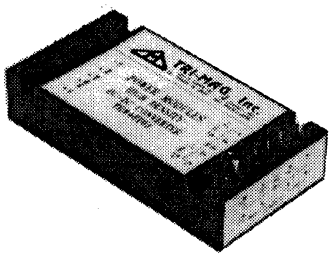
HIGH DENSITY TFE600 SERIES

600 Watt

FRONT-END RECTIFIER & POWER-FACTER CORRECTION



FEATURES

- *PC Board Mountable*
- *Will Power Up to four Tri-Mag, Inc. THW & THX Series Power Modules*
- *Internal EMI Filter and Active Inrush Limiter*
- *Strap or Auto Range for 115/230VAC Dual Input*
- *Thermalloy Conductive Encapsulant*
- *100% Burn-In and Tested*
- *MTBF 280,000 Hours Min.*
- *Universal Input for PFC Module*

600 WATTS, FRONT-END RECTIFIER & PFC SIZE-4.60"(L) X 2.40" (W) X 1.00"(H)

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	FEATURE
TFE600	115VAC	155VDC	
TFE600S	115/230VAC	320VDC	EXTERNAL STRAP
TFE600A	115/230VAC	320VDC	AUTO RANGE
TFE600AP	115/320VDC	380VDC	UNIVERSAL INPUT AND PFC

ON LINE

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FEATURES

- *Compact & Low Cost*
- *Overload Protection*
- *Overvoltage Protection*
- *Short Circuit Protection*
- *100% Hi-Pot Tested*
- *100% Cycling Burn-In*
- *Built-In Line Filter*
- *High Efficiency*

APPLICATIONS

- *Personal Computer*
- *Telecommunication*
- *Medical*
- *Local Area Network*
- *Industrial Control*
- *Process Control*
- *Robotics System*
- *Instrumentation*

UPS, FAX SAVER, POWER SAVER SERIES, 40W, 200W, 250VA, 500VA

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	WATTAGE	TRANSFER TIME	BACK-UP TIME	DIMENSION LxWxH	FIG.
UPS-950	90V-265VAC	12VDC	40W	On Line	2x6VDC/4AH	10"x6"x2" "U" Shape	1
UPS-960	90V-265VAC	12VDC	40W	On Line	2x6VDC/4AH	10"x6"x2" With Cover	2
UPS-9200A	115VAC	+5VAC 20A +12VDC 8A -5VDC 0.5A -12VDC 0.5A 115VAC 100VA	DC:200W AC:100VA	DC:On Line AC:1MS	3-15 min. Depend On Load	5.9"x5.5"x3.4"	3
MFSP-014	85V-265VAC	13.8VDC	40W	On Line	External Battery is Required	1"x5"x1.7"	4

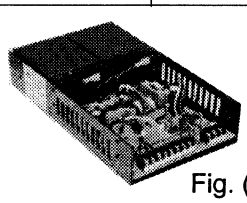
Fig. (1)

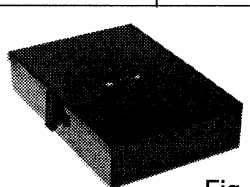
Fig. (2)

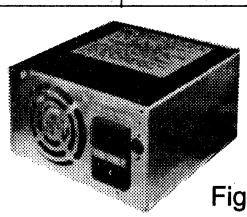
Fig. (3)

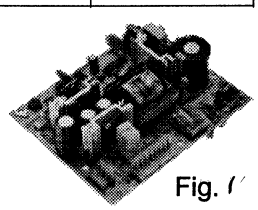
Fig. (4)

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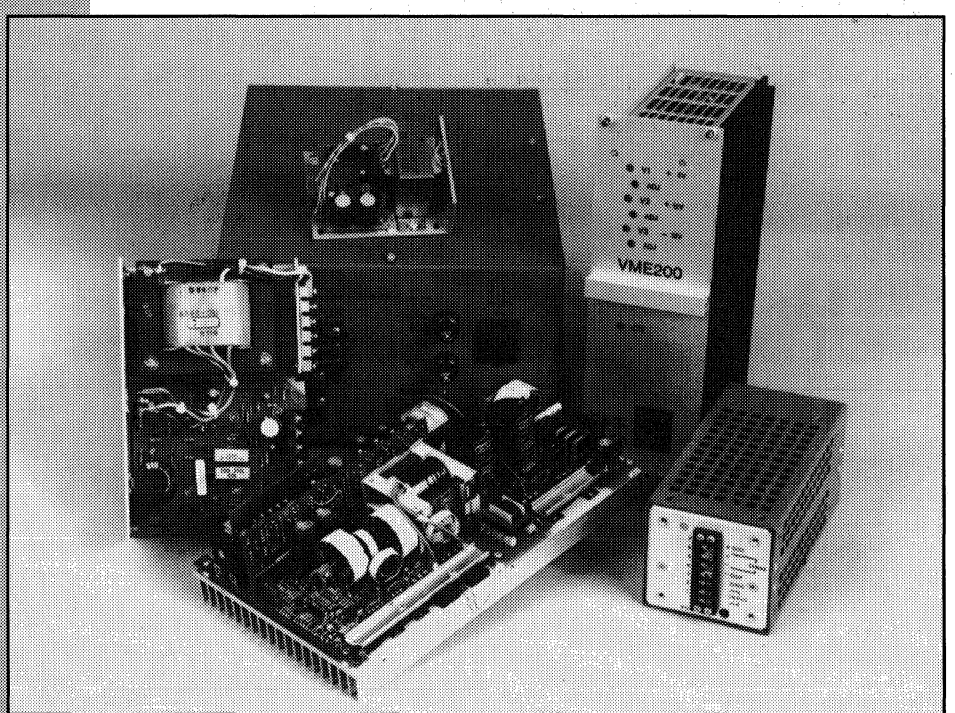

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Switcher - Use where size/weight, high efficiency, hold up time and low cost are major considerations.

Output Voltage	Number of Outputs	Wattage	Input Voltages	Frequency	Packaging	Electrical Specs.
3 VDC to 5000 VDC	Single or Multiple	30 watt to 1000 watt	90 VAC to 270 VAC 48 VDC to 300 VDC	47Hz to 440Hz	VME Bus + See Note 1	See Note 2

Linear - Use where reliability, low noise and simplicity are major considerations.

Output Voltage	Number of Outputs	Wattage	Input Voltages	Frequency	Packaging	Electrical Specs.
3 VDC to 300 VDC	Single or Multiple	15 watt to 560 watt	90 VAC to 270 VAC	47Hz to 63Hz	See Note 1	See Note 2

Ferroresonant - Use where reliability, low EMI, low noise, highest-efficiency and simplicity are major considerations.

Output Voltage	Number of Outputs	Wattage	Input Voltages	Frequency	Packaging	Electrical Specs.
3 VDC to 300 VDC	Single or Multiple	50 watt to 750 watt	90 VAC to 270 VAC	47Hz to 63Hz	See Note 1	See Note 2

AC Frontend - Use in distributed power systems using DC to DC Converters.

Output Voltage	Number of Outputs	Wattage	Input Voltages	Frequency	Packaging	Electrical Specs.
90 VDC to 300 VDC	Single	50 watt to 400 watt	90 VAC to 270 VAC	47Hz to 440Hz	See Note 1	See Note 2

Note 1 - PC Board, Open Frame, Fully Enclosed & Custom
Note 2 - Regulation, Ripple, Noise & EMI

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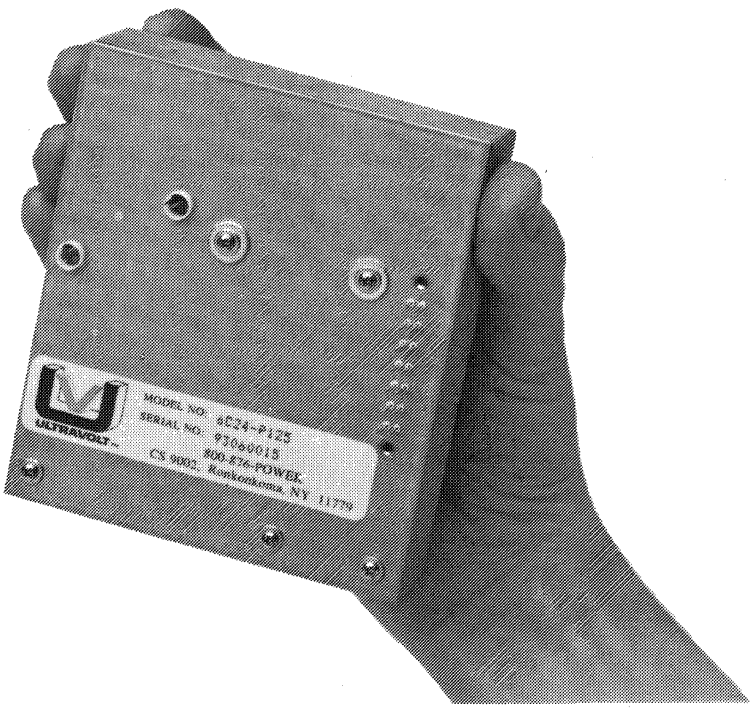

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- **UL-1950, UL-950, IEC-950**

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☐ **250VDC** ☐ **1KVDC** ☐ **4KVDC** ☐ **10KVDC** ☐ **20KVDC** ☐ **30KVDC**

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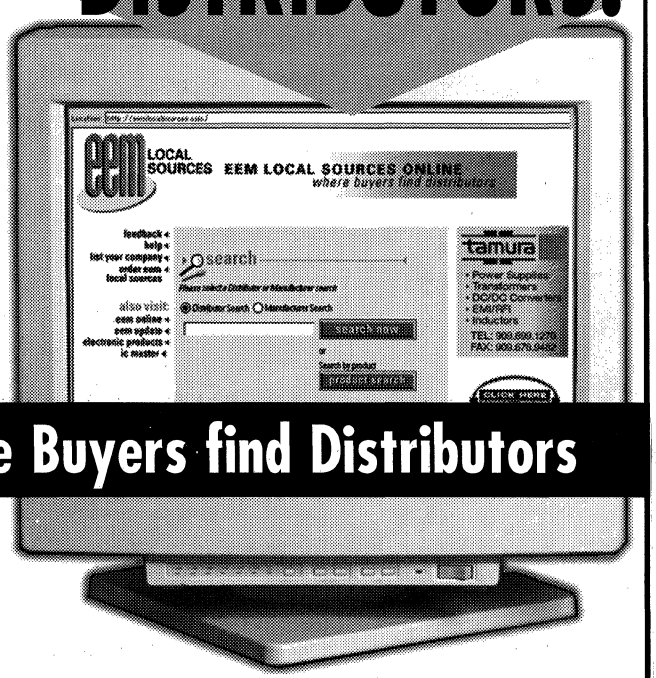

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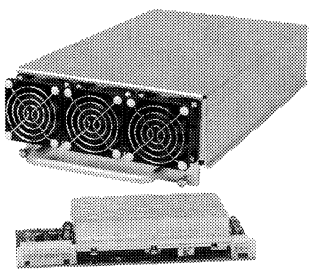

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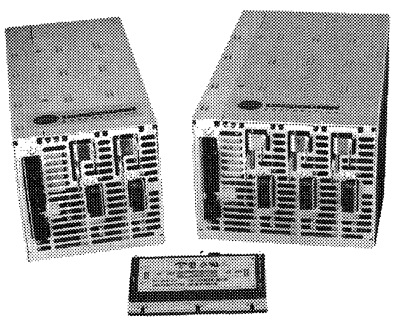

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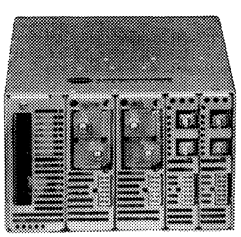

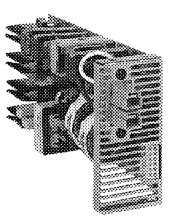

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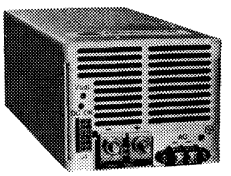

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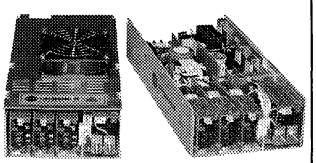

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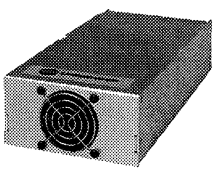

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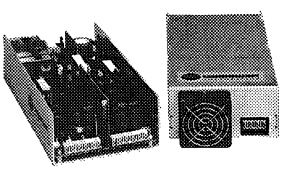

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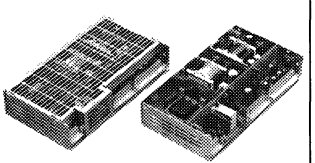

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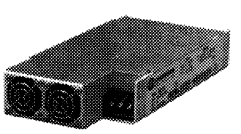

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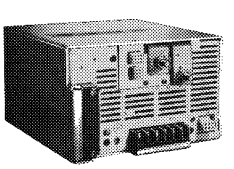

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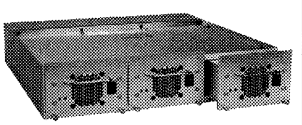

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SINGLE-OUTPUT SWITCHERS

ITEM NO.	MODEL NO.	OUTPUT POWER (WATTS)	OUTPUT	CASE SIZE H X W X D (INCHES)	PFC	B FLTR.	HOT PL	DC IN
1	XB 1000	140	2V 70A	2.1 x 5 x 8		✔		
2	ZB 1000	140	2V 70A	2.5 x 5 x 10.5	✔	✔		
3	FJ 1000	260	2V 130A	4 x 5 x 12	✔			
4	FM 1000	320	2V 160A	5 x 5 x 12	✔			
5	JG 1000	320	2V 160A	5 x 8 x 9				
6	JM 1000	360	2V 180A	5 x 8 x 9				
7	FN 1000	400	2V 200A	5 x 5 x 12	✔			
8	JN 1000	420	2V 210A	5 x 8 x 9				
9	JP 1000	480	2V 240A	5 x 8 x 9				
10	FP 1000	500	2V 250A	5 x 5 x 12.5	✔			
11	FQ 1000	600	2V 300A	5 x 5 x 12.5	✔			
12	NE 9000	198	3.3V 60A	2.5 x 5 x 10.5	✔	✔		✔
13	TNE 9000	198	3.3V 60A	3.5 x 5.5 x 12	✔	✔	✔	✔
14	XB 9000	231	3.3V 70A	2.1 x 5 x 8		✔		
15	ZB 9000	231	3.3V 70A	2.5 x 5 x 10.5	✔	✔		
16	FJ 9000	429	3.3V 130A	4 x 5 x 12	✔			
17	FM 9000	528	3.3V 160A	5 x 5 x 12	✔			
18	FN 9000	660	3.3V 200A	5 x 5 x 12	✔			
19	FP 9000	825	3.3V 250A	5 X 5 X 12.5	✔			
20	FQ 9000	990	3.3V 300A	5 x 5 x 12.5	✔			
21	KR 9N	990	3.3V 300A	5 x 6.7 x 11	✔	✔		
22	KNR 9N	990	3.3V 300A	5 x 6.7 x 11				
23	MD 2000	175	5V 35A	1.75 x 5 x 9	✔	✔		
24	LF 2000	225	5V 45A	2.4 x 5 x 9.9	✔	✔		
25	NE 2000	300	5V 60A	2.5 x 5 x 10.5	✔	✔		✔
26	TNE 2000	300	5V 60A	3.5 x 5.5 x 12	✔	✔	✔	✔
27	XE 2000	350	5V 70A	2.1 x 5 x 8		✔		
28	ZE 2000	350	5V 70A	2.5 x 5 x 10.5	✔	✔		
29	JG 2000	500	5V 100A	5 x 8 x 9				
30	FJ 2000	650	5V 130A	4 x 5 x 12	✔			
31	KP 2L	750	5V 150A	5 x 5.5 x 11	✔	✔		
32	KNP 2L	750	5V 150A	5 x 5.5 x 11				
33	FM 2000	800	5V 160A	5 x 5 x 12	✔			
34	JM 2000	800	5V 160A	5 x 8 x 9				
35	FN 2000	1000	5V 200A	5 x 5 x 12	✔			
36	JN 2000	1000	5V 200A	5 x 8 x 9				
37	JP 2000	1200	5V 240A	5 x 8 x 9				
38	FP 2000	1250	5V 250A	5 x 5 x 12.5	✔			
39	FQ 2000	1500	5V 300A	5 x 5 x 12.5	✔			
40	KR 2Q	1500	5V 300A	5 x 6.7 x 11	✔	✔		
41	KNR 2Q	1500	5V 300A	5 x 6.7 x 11				
42	MD 3000	250	12V 21A	1.75 x 5 x 9	✔	✔		
43	NE 3000	300	12V 25A	2.5 x 5 x 10.5	✔	✔		✔
44	TNE 3000	300	12V 25A	3.5 x 5.5 x 12	✔	✔	✔	✔
45	XF 3000	400	12V 34A	2.1 x 5 x 8		✔		
46	ZF 3000	400	12V 34A	2.5 x 5 x 10.5	✔	✔		
47	XG 3000	500	12V 42A	2.1 x 5 x 8		✔		
48	ZG 3000	500	12V 42A	2.5 x 5 x 10.5	✔	✔		
49	JG 3000	500	12V 42A	5 x 8 x 9				
50	FJ 3000	650	12V 55A	4 x 5 x 12	✔			
51	KP 3L	780	12V 65A	5 x 5.5 x 11	✔	✔		
52	KNP 3L	780	12V 65A	5 x 5.5 x 11				
53	FM 3000	800	12V 67A	5 x 5 x 12	✔			
54	JM 3000	800	12V 67A	5 x 8 x 9				
55	JN 3000	1000	12V 83A	5 x 8 x 9				
56	FN 3000	1000	12V 84A	5 x 5 x 12	✔			
57	JP 3000	1200	12V 100A	5 x 8 x 9				
58	FP 3000	1250	12V 105A	5 x 5 x 12.5	✔			
59	FQ 3000	1500	12V 125A	5 x 5 x 12.5	✔			
60	KNR 3Q	1500	12V 125A	5 x 6.7 x 11				
61	KR 3Q	1560	12V 130A	5 x 6.7 x 11	✔	✔		
62	XF 4000	400	15V 27A	2.1 x 5 x 8		✔		
63	ZF 4000	400	15V 27A	2.5 x 5 x 10.5	✔	✔		
64	XG 4000	500	15V 33A	2.1 x 5 x 8		✔		
65	ZG 4000	500	15V 33A	2.5 x 5 x 10.5	✔	✔		
66	JG 4000	500	15V 33A	5 x 8 x 9				

ITEM NO.	MODEL NO.	OUTPUT POWER (WATTS)	OUTPUT	CASE SIZE H X W X D (INCHES)	PFC	B FLTR.	HOT PL	DC IN
67	FJ 4000	650	15V 44A	4 x 5 x 12	✔			
68	FM 4000	800	15V 54A	5 x 5 x 12	✔			
69	JM 4000	800	15V 54A	5 x 8 x 9				
70	JN 4000	1000	15V 66A	5 x 8 x 9				
71	FN 4000	1000	15V 67A	5 x 5 x 12	✔			
72	JP 4000	1200	15V 80A	5 x 8 x 9				
73	FP 4000	1250	15V 84A	5 x 5 x 12.5	✔			
74	FQ 4000	1500	15V 100A	5 x 5 x 12.5	✔			
75	MD 5000	250	24V 10.4A	1.75 x 5 x 9	✔	✔		
76	LF 5000	350	24V 14.5A	2.4 x 5 x 9.9	✔	✔		
77	NE 5000	350	24V 14.5A	2.5 x 5 x 10.5	✔	✔		✔
78	TNE 5000	350	24V 14.5A	3.5 x 5.5 x 12	✔	✔	✔	✔
79	XF 5000	400	24V 17A	2.1 x 5 x 8		✔		
80	ZF 5000	400	24V 17A	2.5 x 5 x 10.5	✔	✔		
81	XG 5000	500	24V 21A	2.1 x 5 x 8		✔		
82	ZG 5000	500	24V 21A	2.5 x 5 x 10.5	✔	✔		
83	JG 5000	500	24V 21A	5 x 8 x 9				
84	FJ 5000	650	24V 28A	4 x 5 x 12	✔			
85	KP 5L	768	24V 32A	5 x 5.5 x 11	✔	✔		
86	KNP 5L	768	24V 32A	5 x 5.5 x 11				
87	FM 5000	800	24V 34A	5 x 5 x 12	✔			
88	JM 5000	800	24V 34A	5 x 8 x 9				
89	FN 5000	1000	24V 42A	5 x 5 x12	✔			
90	JN 5000	1000	24V 42A	5 x 8 x 9				
91	KP 5P	1000	24V 42A	5 x 5.5 x 11	✔	✔		
92	KNP 5P	1000	24V 42A	5 x 5.5 x 11				
93	JP 5000	1200	24V 50A	5 x 8 x 9				
94	FP 5000	1250	24V 52A	5 x 5 x 12.5	✔			
95	FQ 5000	1500	24V 63A	5 x 5 x 12.5	✔			
96	KNR 5Q	1500	24V 62.5A	5 x 6.7 x 11				
97	KR 5Q	1536	24V 64A	5 x 6.7 x 11	✔	✔		
98	KT 5S	2000	24V 84A	5 x 7.8 x 11	✔	✔		
99	NE 6000	350	28V 12.5A	2.5 x 5 x 10.5	✔	✔		✔
100	TNE 6000	350	28V 12.5A	3.5 x 5.5 x 12	✔	✔	✔	✔
101	LF 6000	375	28V 13.4A	2.4 x 5 x 9.9	✔	✔		
102	XF 6000	400	28V 14A	2.1 x 5 x 8		✔		
103	ZF 6000	400	28V 14A	2.5 x 5 x 10.5	✔	✔		
104	XG 6000	500	28V 18A	2.1 x 5 x 8		✔		
105	ZG 6000	500	28V 18A	2.5 x 5 x 10.5	✔	✔		
106	JG 6000	500	28V 18A	5 x 8 x 9				
107	FJ 6000	650	28V 24A	4 x 5 x12	✔			
108	KP 6L	784	28V 28A	5 x 5.5 x 11	✔	✔		
109	KNP 6L	784	28V 28A	5 x 5.5 x 11				
110	FM 6000	800	28V 29A	5 x 5 x12	✔			
111	JM 6000	800	28V 29A	5 x 8 x 9				
112	FN 6000	1000	28V 36A	5 x 5 x 12	✔			
113	JN 6000	1000	28V 36A	5 x 8 x 9				
114	KP 6P	1000	28V 36A	5 x 5.5 x 11	✔	✔		
115	KNP 6P	1000	28V 36A	5 x 5.5 x 11				
116	JP 6000	1200	28V 42A	5 x 8 x 9				
117	FP 6000	1250	28V 45A	5 x 5 x 12.5	✔			
118	FQ 6000	1500	28V 54A	5 x 5 x 12.5	✔			
119	KR 6Q	1500	28V 54A	5 x 6.7 x 11	✔	✔		
120	KNR 6Q	1500	28V 54A	5 x 6.7 x 11				
121	KT 6S	2000	28V 72A	5 x 7.8 x 11	✔	✔		
122	XF 8000	400	36V 11A	2.1 x 5 x 8		✔		
123	ZF 8000	400	36V 11A	2.5 x 5 x 10.5	✔	✔		
124	XG 8000	500	36V 14A	2.1 x 5 x 8		✔		
125	ZG 8000	500	36V 14A	2.5 x 5 x 10.5	✔	✔		
126	MD 7000	250	48V 5A	1.75 x 5 x 9	✔	✔		
127	LF 7000	375	48V 7.8A	2.4 x 5 x 9.9	✔	✔		
128	NE 7000	400	48V 8.4A	2.5 x 5 x 10.5	✔	✔		✔
129	TNE 7000	400	48V 8.3A	3.5 x 5.5 x 12	✔	✔	✔	✔
130	XF 7000	400	48V 8.5A	2.1 x 5 x 8		✔		
131	ZF 7000	400	48V 8.5A	2.5 x 5 x 10.5	✔	✔		
132	XG 7000	500	48V 10A	2.1 x 5 x 8		✔		

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SINGLE-OUTPUT SWITCHERS (CONTINUED)

ITEM NO.	MODEL NO.	OUTPUT POWER (WATTS)	OUTPUT	CASE SIZE H X W X D (INCHES)	PFC	B FLTR.	HOT PL.	DC IN
133	ZG 7000	500	48V 10A	2.5 x 5 x 10.5	✔	✔		
134	JG 7000	500	48V 10A	5 x 8 x 9				
135	FJ 7000	650	48V 14A	4 x 5 x 12	✔			
136	KP 7L	768	48V 16A	5 x 5.5 x 11	✔	✔		
137	KNP 7L	768	48V 16A	5 x 5.5 x 11				
138	FM 7000	800	48V 17A	5 x 5 x 12	✔			
139	JM 7000	800	48V 17A	5 x 8 x 9				
140	FN 7000	1000	48V 21A	5 x 5 x 12	✔			
141	JN 7000	1000	48V 21A	5 x 8 x 9				

ITEM NO.	MODEL NO.	OUTPUT POWER (WATTS)	OUTPUT	CASE SIZE H X W X D (INCHES)	PFC	B FLTR.	HOT PL.	DC IN
142	KP 7P	1000	48V 21A	5 x 6.7 x 11	✔	✔		
143	KNP 7P	1000	48V 21A	5 x 6.7 x 11				
144	JP 7000	1200	48V 25A	5 x 8 x 9				
145	FP 7000	1250	48V 26A	5 x 5 x 12.5	✔			
146	FQ 7000	1500	48V 31A	5 x 5 x 12.5	✔			
147	KNR 7Q	1500	48V 31A	5 x 6.7 x 11				
148	KR 7Q	1536	48V 32A	5 x 6.7 x 11	✔	✔		
149	KT 7S	2000	48V 42A	5 x 7.8 x 11	✔	✔		

MULTI-OUTPUT SWITCHERS

ITEM NO.	MODEL NO.	OUTPUT POWER (WATTS)	V1 OUT (MAIN)	V2 OUT	V3 OUT	V4 OUT	V5 OUT	CASE SIZE H X W X D (INCHES)	PFC	B FLTR.	HOT PL.	DC IN
DUAL OUTPUT												
1	LF 2300	375	5V 45A	12V 14.5A				2.4 x 5 x 9.9	✔	✔		
TRIPLE OUTPUT												
2	CA 2330	100	+5V 15A	+12V 5A	-12V 5A			1.7 x 4.5 x 8.3	✔	✔		
3	CA 2440	100	+5V 15A	+15.6V 4A	-15.6V 4 A			1.7 x 4.5 x 8.3	✔	✔		
4	LF 2303	375	+5V 45A	+12V 12.5A	12V 2A			2.4 x 5 x 9.9	✔	✔		
5	NF 2330	400	5V 60A	12V 12.5A	12V 6A			2.5 x 5 x 10.5	✔	✔		✔
6	TNF 2330	400	5V 60A	12V 12.5A	12V 6A			3.5 x 5.5 x 12	✔	✔	✔	✔
7	NF 2440	400	5V 60A	15V 10A	15V 6A			2.5 x 5 x 10.5	✔	✔		✔
8	TNF 2440	400	5V 60A	15V 10A	15V 6A			3.5 x 5.5 x 12	✔	✔	✔	✔
QUAD OUTPUT												
9	MD 9233	250	+3.3V 35A	+5V 18A	-12V 6A	5-15V 6A		1.75 x 5 x 9	✔	✔		
10	MD 9244	250	+3.3V 35A	+5V 18A	-15V 6A	5-15V 6A		1.75 x 5 x 9	✔	✔		
11	LF 9323	348	+3.3V 45A	+12V 12.5A	5V 5A	12V 2A		2.4 x 5 x 9.9	✔	✔		
12	NF 9233	400	3.3V 60A	5V 20A	12V 6A	12V 1.5A		2.5 x 5 x 10.5	✔	✔		✔
13	TNF 9233	400	3.3V 60A	5V 20A	12V 6A	12V 1.5A		3.5 x 5.5 x 12	✔	✔	✔	✔
14	CA 2339	100	+5V 15A	+12V 5A	-12V 5A	+3.3V 2A		1.7 x 4.5 x 8.3	✔	✔		
15	CA 2332	100	+5V 15A	+12V 5A	-12V 5A	5V 2A		1.7 x 4.5 x 8.3	✔	✔		
16	CA 2335	100	+5V 15A	+12V 5A	-12V 5A	+24V 2A		1.7 x 4.5 x 8.3	✔	✔		
17	CA 2337	100	+5V 15A	+12V 5A	-12V 5A	48V 1.3A		1.7 x 4.5 x 8.3	✔	✔		
18	CA 2442	100	+5V 15A	+15.6V 4A	-15.6V 4A	5V 4A		1.7 x 4.5 x 8.3	✔	✔		
19	CA 2443	100	+5V 15A	+15.6V 4A	-15.6V 4A	12V 2A		1.7 x 4.5 x 8.3	✔	✔		
20	CA 2445	100	+5V 15A	+15.6V 4A	-15.6V 4A	+24V 2A		1.7 x 4.5 x 8.3	✔	✔		
21	MD 2933	250	+5V 35A	+3.3V 18A	-12V 6A	5-25V 6A		1.75 X 5 X 9	✔	✔		
22	MD 2944	250	+5V 35A	+3.3V 18A	-15V 6A	5-25V 6A		1.75 x 5 x 9	✔	✔		
23	MD 2335	250	+5V 35A	+12V 10A	-12V 6A	5-25V 6A		1.75 x 5 x 9	✔	✔		
24	MD 2445	250	+5V 35A	+15V 10A	-15V 6A	5-25V 6A		1.75 x 5 x 9	✔	✔		
25	LF 2323	375	+5V 45A	+12V 12.5A	5V 5A	12V 2A		2.4 x 5 x 9.9	✔	✔		
26	LF 2335	375	+5V 45A	+12V 12.5A	12V 2A	24V 6A		2.4 x 5 x 9.9	✔	✔		
27	LF 2336	375	+5V 45A	+12V 12.5A	12V 2A	28V 6A		2.4 x 5 x 9.9	✔	✔		
28	LF 2353	375	+5V 45A	+12V 12.5A	24V 2A	12V 2A		2.4 x 5 x 9.9	✔	✔		
29	NF 2933	400	5V 60A	3.3V 20A	12V 6A	12V 1.5A		2.5 x 5 x 10.5	✔	✔		✔
30	TNF 2933	400	5V 60A	3.3V 20A	12V 6A	12V 1.5A		3.5 x 5.5 x 12	✔	✔	✔	✔
31	NF 2332	400	5V 60A	12V 12.5A	12V 6A	5V 1.5A		2.5 x 5x 10.5	✔	✔		✔
32	TNF 2332	400	5V 60A	12V 12.5A	12V 6A	5V 1.5A		3.5 x 5.5 x 12	✔	✔	✔	✔
33	NF 2335	400	5V 60A	12V 12.5A	12V 6A	24V 1 A		2.5 x 5 x 10.5	✔	✔		✔
34	TNF 2335	400	5V 60A	12V 12.5 A	12V 6A	24V 1 A		3.5 x 5.5 x 12	✔	✔	✔	✔
35	NF 2442	400	5V 60A	15V 10A	15V 6A	5V 1.5A		2.5 x 5 x 10.5	✔	✔		✔
36	TNF 2442	400	5V 60A	15V 10A	15V 6A	5V 1.5A		3.5 x 5.5 x 12	✔	✔	✔	✔
37	LF 5323	375	+24V 12A	+5V 15A	12V 4A	12V 2A		2.4 x 5 x 9.9	✔	✔		
38	NF 5233	400	24V 12.5A	5V 20A	12V 6A	12V 1.5A		2.5 x 5 x 10.5	✔	✔		✔
39	TNF 5233	400	24V 12.5A	5V 20A	12V 6A	12V 1.5A		3.5 x 5.5 x 12	✔	✔	✔	✔
QUINT OUTPUT												
40	CA 23332	100	+5V 15A	+12V 5A	-12V 5A	12V 2A	-5V 0.3A	1.7 X 4.5 X 8.3	✔	✔		
41	CA 23352	100	+5V 15A	+12V 5A	-12V 5A	+24V 2A	-5V 0.3A	1.7 X 4.5 X 8.3	✔	✔		
42	CA 23372	100	+5V 15A	+12V 5A	-12V 5A	48V 1.3A	-5V 0.3A	1.7 X 4.5 X 8.3	✔	✔		
43	CA 24432	100	+5V 15A	+15.6V 4A	-15.6V 4A	12V 2A	-5V 0.3A	1.7 X 4.5 X 8.3	✔	✔		
44	CA24452	100	+5V 15A	+15.6V 4A	-15.6V 4A	+24V 2A	-5V 0.3A	1.7 X 4.5 X 8.3	✔	✔		
45	CA 24472	100	+5V 15A	+15.6V 4A	-15.6V 4A	48V 1.3A	-5V 0.3A	1.7 X 4.5 X 8.3	✔	✔		

UNIPOWER CORPORATION

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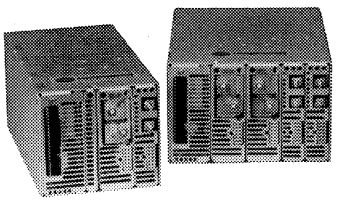
K SERIES: MODULAR, CONFIG. 1-10 Outputs, 800-2000W



FEATURES

- Three Case Sizes
- PFC and Non-PFC Versions
- Meets IEC555-2 (EN61000-3-2)
- Universal Input or Autorange
- Field Replaceable DC Fan
- 40 Standard Output Modules
- Battery Backup Module
- Current sharing
- 5V, 50mA Aux. Isolated Output
- Quick Configuration
- Global and Module Inhibit
- Remote Margin
- Class A or B Input EMI Filter
- Thermal Protection
- Overload Protection-All Outputs
- AC Power Fail & DC Power Good

Battery Backup: Standard module for single and multi-output configurations up to 1200 watts

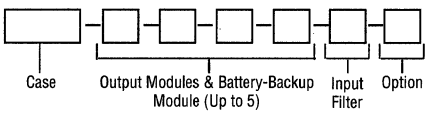
CASE DESIGNATION

Code	PFC	MAX. POWER	SLOTS	CASE SIZE
KP	YES	1800W	3	5 x 5.53 x 11″
KNP	NO	1500W	3	5 x 5.53 x 11″
KR	YES	1800W	4	5 x 6.65 x 11″
KNR	NO	1500W	4	5 x 6.65 x 11″
KT	YES	2000W	5	5 x 7.78 x 11″
KNT	NO	1500W	5	5 x 7.78 x 11″

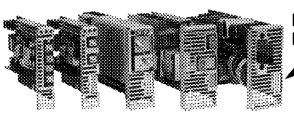
ORDERING GUIDE

A UNIMOD®K Series power system is completely specificed by:
1. Case Code (see Case Designation table and max. power).
2. Output modules codes (See Standard Output Modules table).
3. Input filter code (A or B for Level A or B)
4. Option Code (H for current sharing).

Model Configuration:



For models with PFC the total load cannot exceed 1000W for 85-264VAC in, 1240W for 90-264VAC in and 1800 or 2000W for 180-264VAC in. For non-PFC models the total load cannot exceed 1000W for 90-264VAC in and 1500W for 180-264VAC in.



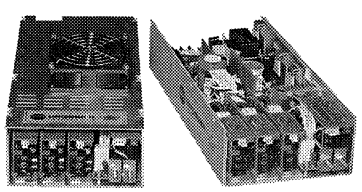
Notes:
1. Lowest cost solution for high power requirements.
2. Recommended for use where space is a premium. Has enhanced monitoring and control features.
3. For use in PFC versions only (KP, KR, KT models).
4. Dual output modules have both outputs folating, full regulation on both outputs, and no minimum load requirements. They do not have remote sensing or other control and supervisory functions.

STANDARD MODULES

(OTHER MODULES AVAILABLE-CONSULT FACTORY)

VOLTAGE & CURRENT	MAX. POWER	SLOTS	MODULE CODE	NOTES
SINGLE OUTPUT MODULES				
2V @ 40A	80W	1	1A	
2V @ 100A	200W	1.5	1C	2
2.5V @ 150A	375W	2	1L	1
3.3V @ 40A	132W	1	9B	
3.3V @ 100A	330W	1.5	9E	2
3.3V @ 150A	495W	2	9L	1
5V @ 20A	100W	1	2A	
5V @ 40A	200W	1	2C	
5V @ 100A	500W	1.5	2G	2
5V @ 120A	600W	1.5	2GA	2
5V @ 150A	750W	2	2L	1
12V @ 10A	120W	1	3A	
12V @ 20A	240W	1	3D	
12V @ 50A	600W	1.5	3H	2
12V @ 65A	780W	2	3L	1
15V @ 8A	120W	1	4A	
15V @ 16A	240W	1	4D	
15V @ 40A	600W	1.5	4H	2
15V @ 52A	780W	2	4L	1
24V @ 5A	120W	1	5A	
24V @ 10A	240W	1	5D	
24V @ 25A	600W	1.5	5H	2
24V @ 32A	768W	2	5L	1
24V @ 33A	800W	1.5	5M	2,3
24V @ 42A	1000W	1.5	5N	2,3
24V @ 42A	1000W	2	5P	1
28V @ 21A	600W	1.5	6H	2
28V @ 28A	784W	2	6L	1
28V @ 29A	800W	1.5	6M	2,3
28V @ 36A	1000W	1.5	6N	2,3
28V @ 36A	1000W	2	6P	1
48V @ 5A	240W	1	7D	
48V @12.5A	600W	1.5	7H	2
48V @ 16A	768W	2	7L	1
48V @ 17A	800W	1.5	7M	2,3
48V @ 21A	1000W	1.5	7N	2,3
48V @ 21A	1000W	2	7P	1
DUAL OUTPUT MODULES				
5V@5A/12V@5A	85W	1	23A	4
12V@5A/12V@5A	120W	1	33C	4
15V@4A/15V@4A	120W	1	44C	4
BATTERY BACKUP MODULE		2	UB	

X & Z SERIES: CONFIG. 400/500W Unlimited Output Comb.



FEATURES

- UNIFLEX® Modular Design
- Up to 5 Outputs
- 0.99 Power Factor (Z Series)
- Meets EN61000-3-2 (Z-Series)
- Up to 6 Watts/Cubic Inch
- Open Frame and Cased Versions
- Universal Input, 90-264 VAC (Z)
- Wide Range Adj. Auxiliary Outputs
- Single & Dual Low Power Outputs
- Outputs from 2VDC to 48VDC
- Remote Sense & Inhibit Standard
- Class A or B EMI Input Filter
- OVP and Overload Protection
- Thermal Protection
- AC Power Fail Signal

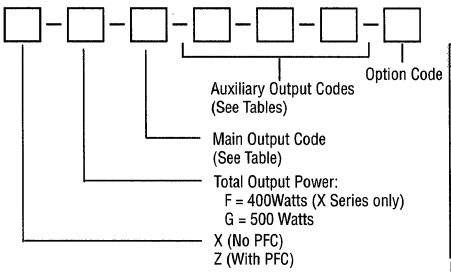
Case Sizes-Inches

SERIES	OPEN FRAME	TOP FAN	END FAN
X	2.1 x 5 x 8	3.4 x 5 x 8	2.5 x 5 x 9.4
Z	2.5 x 5 x 10.5	3.8 x 5 x 10.5	2.5 x 5 x 11.6

SINGLE-OUTPUT MODELS

MAX. WATTS	OUTPUT VOLTS/AMPS	MODEL NO.	MODEL NO.
140	2V 70A	XB1000	ZB1000
230	3.3V 70A	XB9000	ZB9000
350	5V 70A	XE2000	ZE2000
400	12V 34A	XF3000	ZF3000
	15V 27A	XF4000	ZF4000
	24V 17A	XF5000	ZF5000
	28V 14A	XF6000	ZF6000
	36V 11A	XF8000	ZF8000
	48V 8.5A	XF7000	ZF7000
500	12V 42A	XG3000	ZG3000
	15V 33A	XG4000	ZG4000
	24V 21A	XG5000	ZG5000
	28V 18A	XG6000	ZG6000
	36V 14A	XG8000	ZG8000
	48V 10A	XG7000	ZG7000

Multi-Output Model Configuration:



Note:
Power fail signal is standard on all units with a 5V main output.

MULTI-OUTPUT MODELS MAIN OUTPUT

VOLTAGE	CURRENT	WATTS	CODE
3.3V	70A	230	9
5V	70A	350	2
12V	34A	400	3
15V	27A	400	4
24V	17A	400	5
28V	14A	400	6
36V	11A	400	8
48V	8.5V	400	7

AUXILIARY OUTPUT, WIDE-RANGE ADJUSTABLE OUTPUT MODULES

VOLTAGE RANGE	MAX. CURRENT	WATTS WATTS	NORMAL FACT. SET	CODE
2V-6V	15A	90W	5V	2
5V-15V	12A	150W	12V	3
5V-15V	12A	150W	15V	4
15V-26.5V	7A	150W	24V	5

AUXILIARY OUTPUT, LOW-POWER FIXED-OUTPUT MODULES

TYPE	OUTPUT	CODE
Single	5V 2A	2A
	12V 2A	3A
	15V 2A	4A
	24V 1.25A	5A
Dual	5V 2A, 5V 2A	2B
	5V 2A, 12V 2A	2C
	5V 2A, 24V 1.25A	2D
	12V 2A, 12V 2A	3B
	12V 2A, 24V 1.25A	3C
	15V 2A, 15V 2A	4B

OPTIONS	
A	Autorange (115 / 230VAC)
CN	Class B Filter, Cased with End Fan
F	Current sharing (All But Low Pwr. Outputs)
M	Top-MountedFan with Cover
N	End-Mounted Fan with Case
K	Power Fail, Non-5V Main Output

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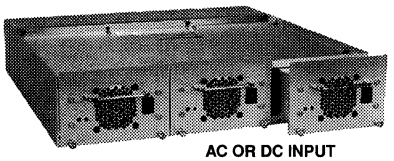
3900 Coral Ridge Drive • Coral Springs, FL 33065
Tel: 954-346-2442 • Fax: 954-340-7901

Full Specs at: www.unipower-corp.com

TN, TNQ SERIES: HOT-PLUG SYSTEM 1-4 Outputs, 400W Modules



AC OR DC INPUT

MODULE FEATURES

- High-Reliability Connectors
- Integral Isolation Diodes
- Active Power Factor Correction
- Meets IEC555-2 (EN61000-3-2)
- Universal AC Input: 85-264VAC
- DC Input: 40-75VDC
- 3.3V & 24V Outputs Standard
- Level B EMI Filter Standard
- Input Power Fail & Output Power Good
- LED Indicators for Above
- Remote Sense on V1 & V2
- Remote Inhibit
- Thermal Protection
- Aux. Outputs Fully Isolated

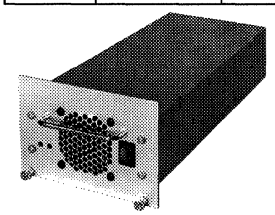
RACK FEATURES

- Standard 2U, 19-Inch Rack Mount
- True Hot-Plug Replacement
- Four Standard Interface Options
- 800W, 2+1 Redundant
- 1200W, Non-Redundant

HOT-PLUG MODULE ORDERING GUIDE

(OTHER MODULES AVAILABLE-CONSULT FACTORY)

	MAX. WATTS	V1 OUT	V2 OUT	V3 OUT	V4 OUT	MODEL NO. (AC)	MODEL NO. (DC)
			SINGLE OUTUT				
	200	3.3V @ 60A				TNE9000	TNQE9000
	300	5V @ 60A				TNE2000	TNQE2000
	300	12V @ 25A				TNE3000	TNQE3000
	350	24V @ 14.5A				TNE5000	TNQE5000
	350	28V @ 12.5A				TNE6000	TNQE6000
	400	48V @ 8.3A				TNE7000	TNQE7000
			MULTI-OUTPUT				
DUAL MAIN	400	3.3V @ 60A	5V @ 20A	12V @ 6A	12V @ 1.5A	TNF9233	TNQF9233
	400	5V @ 60A	3.3V @ 20A	12V @ 6A	12V @ 1.5A	TNF2933	TNQF2933
	400	5V @ 60A	12V @ 12.5A	12V @ 6A	—	TNF2330	TNQF2330
	400	5V @ 60A	12V @ 12.5A	12V @ 6A	5V @ 1.5A	TNF2332	TNQF2332
	400	5V @ 60A	12V @ 12.5A	12V @ 6A	24V @ 1A	TNF2335	TNQF2335
	400	5V @ 60A	15V @ 10A	15V @ 6A	—	TNF2440	TNQF2440
	400	5V @ 60A	15V @ 10A	15V @ 6A	5V @ 1.5A	TNF2442	TNQF2442
	400	24V @ 12.5A	5V @ 20A	12V @ 6A	12V @ 1.5A	TNF5233	TNQF5233



OPTION CODE	OUTPUT CONNECTIONS V1 OUT	OUTPUT CONNECTIONS AUX. OUT (V2, V3, V4)	REMOTE SWITCH
A	BUS BARS WITH 0.25-INCH STUDS	J2, LMI 117108-01 0.25" TAB TERM. 8-POSITION	NO
B	J1, POSITRONICS POWER-LOCK, 24 PIN PLC 24M3N0A1	J3, POSITRONICS POWER-LOK, 12PIN PLC12M3N0A1	YES

MODULE SIZE: 3.5"H x 5.5"W x12"D
RACK SIZE: 3.5"H x 17"W x 16.1"D

RACK ORDERING GUIDE

The hot-plug modules and the mating 19-inch rack are separate items and must be ordered separately.
HOT PLUG MODULES: Order quantity using model no. from the table at the left. Add option codes as suffixes.
MATING 19-INCH RACK: Order as shown below. Select the desired output connector and remote switch option from the table below and insert the code letter A or B in each box.

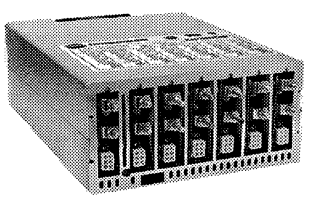
TNR2U or TNQR2U – □ – □ – □

- Remote Switch Option
- Aux. Output (V2, V3, V4) Connector (0 if none)
- Main Output (V1) Connector

AvailableBlank Module Panel, Order No. 256-1513-000

OPTIONS	
S	Front-Panel Switch
G	5-Bit Programmable V1 Output

U SERIES: MODULAR, CONFIGURABLE 3-14 Outputs, 400-800 Watts

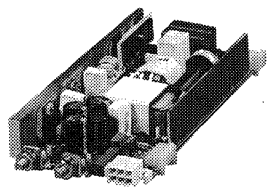


FEATURES

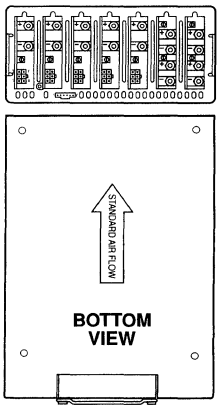
- 15 Standard Output Modules
- Instant Configuration
- Fully Modular Design
- Outputs from 2VDC to 48VDC
- ±10% Output Adjustment Range
- Current Share Option
- Single & Dual Output Modules
- Worldwide Autorange Input
- No Load Operation on All Outputs
- Global & Module Inhibit
- Overload & Overvoltage Protected
- Thermal Warning & Protection
- AC Power Fail & DC Power Good
- Rear Mounted DC Ball Bearing Fan
- Size: 3.75"H x 8"W x 11"D

STANDARD OUTPUT MODULES

MAX. WATTS	MODULE CODE	OUTPUT	ADJUST RANGE
	SINGLE OUTPUT		
80	B	2V 40A	±10%
132	C	3.3V 40A	±10%
100	F	5V 20A	±10%
200	G	5V 40A	±10%
120	H	12V 10A	±10%
240	J	12V 20A	±10%
120	K	15V 8A	±10%
240	L	15V 16A	±105
120	M	24V 5A	±10%
240	N	24V 10A	±10%
120	P	48V 2.5A	±10%
240	Q	48V 5A	±10%
	DUAL OUTPUT MODULES		
85	R	5V 5A/12V 5A	±10%
120	S	12V 5A/ 12V 5A	±10%
120	T	15V 4A/15V 4A	±10%



CODE	OPTIONS
H	Current Share (All Single Output Modules)



ORDERING GUIDE

The U Series UNIMOD® power system should be ordered as follows, choosing the Module Codes from the table of Standard Output Modules and the Option code from the Option table:

UM – □ – □ – □ – □ – □ – □

- Output Module Codes (Up to 7)
- Option Code

The maximum total load power cannot exceed 800 watts, and the maximum load power for each module cannot exceed its rated value shown in the table. The position of the modules will be determined at the factory and filler panels will be provided for empty slots.

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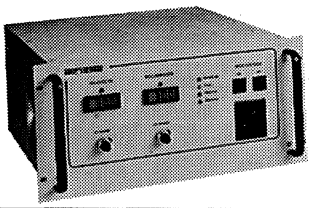
General Purpose High Voltage DC Power Supplies 2 to 20 Kilowatts

GENERAL PURPOSE POWER SUPPLIES FROM UNIVERSAL VOLTRONICS ARE BASED ON EFFICIENT, RELIABLE MOSFET — AND IGBT-BASED CIRCUIT DESIGNS, AND ARE AVAILABLE IN NUMEROUS MODEL VARIANTS (WITH VERY COMPETITIVE DELIVERY)



A Stable Range of High Voltage Power Supplies

Universal Voltronics' line of BRC switching power supplies are notable for low ripple, fast transient response, endurance to repetitive arcing, and stable output even in the face of line voltage and load changes. Power is converted at switching frequencies above 20kHz, and controlled using pulse width modulation techniques.

These power supplies are based on MOSFETs and IGBTs in power switching configurations, which offer many advantages over SCR-based designs, including turn-off in nanoseconds for fault clearing.

UVC switchers provide precise regulation of both voltage and current, with automatic smooth crossover between constant voltage and constant current modes as the load or setting changes. Front panel mode indicator LEDs automatically show which regulating mode (current or voltage) is controlling the supply. Ten-turn locking potentiometer controls for voltage and current are located on the front panel to allow full-range adjustment of voltage or current with 0.1 percent resolution.

For the high voltage section, Universal Voltronics provides a choice of insulation methods as appropriate to the application: systems with air-insulated stacks, encapsulated HV modules, or separate oil-filled tanks.

Typical Universal Voltronics Power Supply Applications

- Medical/Industrial CO_2 Lasers
- Medical/Industrial X-ray Systems
- Electrostatic Paint, Powder, and Lubricant Deposition Systems
- Vapor Deposition, Sputtering, Plasma Etching Systems
- Electron/Ion-Beam, and Semiconductor Processing
- Microwave Systems, TWT Systems
- Laboratory and Prototyping Usage

Features

- Voltage Levels from 1 to 200 kV
- Power Levels from 2 to 20 kW
- Voltage and current regulation as tight as 0.01%
- Ripple as low as 0.1% of rated voltage
- Positive, Negative, or Field Reversible output
- Input power choices from 220V single phase to 480V three-phase
- Remote analog (0-10V) control for both voltage and current
- LCD Meters Standard, LED Meters Optional
- Instrumented Front Panel Standard, OEM Blank Front Panel Optional
- Air Insulated, encapsulated, and oil filled designs available
- Automatic crossover

Typical Specifications

Input: 220V 1Ø, 208V 3Ø, 380V 3Ø, 480 3Ø, 50-60 Hz

Output: Adjustable, 0 to full rating. Rating current may be drawn at any voltage setting.

Voltage Regulation: ±0.05% for normal line ±10%
±0.05% no load to full load

Current Regulation: ±0.05% for nominal line ±10%
±0.05% over compliance range of 10% to 100%

Ripple: 0.5% RMS of rated V Standard
0.1% RMS of rated V Available

Stability: 0.02% per hour, 0.1% per eight hours, Typical after half-hour warm-up.

Temp. Coefficient: 0.02% per deg. C Typical

Protection: An overcurrent relay is provided for short circuit turnoff. A series resistor is included in the output circuit to limit peak short circuit current.

Dimensions: 2-4 kW: 7"H x 16"D
4-10 kW: 8 3/4"H x 18"D
10-20 kW: 10 1/2"H x 21"D
All units are 19" rack mount.

MODEL NUMBERS

POWER LEVEL	RATED VOLTAGE									
	1 kV	2 kV	3 kV	5 kV	10 kV	20 kV	30 kV	50 kV	100 kV	200 kV
2kW	BRC-1-2000	BRC-2-1000	BRC-3-660	BRC-5-400	BRC-10-200	BRC-20-100	BRC-30-66	BRC-50-40	BRC-100-20	BRC-200-10
3kW	BRC-1-3000	BRC-2-1500	BRC-3-1000	BRC-5-600	BRC-10-300	BRC-20-1000	BRC-30-100	BRC-50-60	BRC-100-30	BRC-200-15
4kW	BRC-1-4000	BRC-2-2000	BRC-3-1300	BRC-5-800	BRC-10-400	BRC-20-200	BRC-30-130	BRC-50-80	BRC-100-40	BRC-200-20
6kW	BRC-1-6000	BRC-2-3000	BRC-3-2000	BRC-5-1200	BRC-10-600	BRC-20-300	BRC-30-200	BRC-50-120	BRC-100-60	BRC-200-30
10kW	BRC-1-10000	BRC-2-5000	BRC-3-3000	BRC-5-2000	BRC-10-1000	BRC-20-500	BRC-30-300	BRC-50-200	BRC-100-100	BRC-200-50
15kW	BRC-1-15000	BRC-2-7500	BRC-3-5000	BRC-5-3000	BRC-10-1500	BRC-20-750	BRC-30-500	BRC-50-300	BRC-100-150	BRC-200-75
20kW	BRC-1-20000	BRC-2-10000	BRC-3-6600	BRC-5-4000	BRC-10-2000	BRC-20-1000	BRC-30-660	BRC-50-400	BRC-100-200	BRC-200-100

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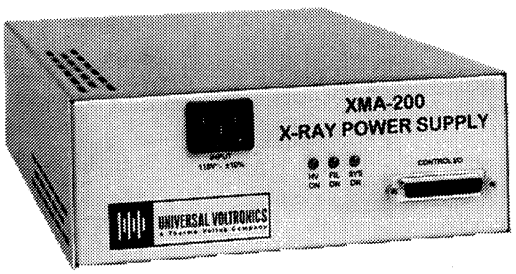
X-Ray Power from an Experienced Source

Universal Voltronics X-ray Power Sources are designed for use in industrial or medical applications where a compact, stable power source with both high voltage and filament outputs is desired. Our power supplies are notable for reliability, low stored energy, and stable output during input voltage and load changes. Power in our switchmode topology is converted at switching frequencies above 20kHz. If our standard models don't meet your specifications-call us and establish contact with the best custom X-ray power supply designers in the business!

200 WATT X-RAY POWER SUPPLY MODEL XMA SERIES



FEATURES

- Emission current regulated
- Voltage ranges from 0 to 15kV through 0 to 60kV
- Filament voltages of 3, 6, 9, 12 Vac.
- Low ripple (0.5% RMS max)
- Precise regulation (±0.1%)
- Compact size
- Remote analog control of voltage and emission current
- Remote HV and filament current monitoring
- Overvoltage, short circuit and arc protection
- Very low stored energy

Electrical Specifications

Input	115 Vac/230 Vac (Specify) Single Phase 50/60 Hz
High Voltage Output:	Adjustable, 0 to full rating. Rated current may be drawn at any voltage setting.
HV Voltage & Current Output:	(See table 1).
HV Regulation:	±0,1% for ±10% line changes and 0-100% load changes.
HV Ripple:	0.5% RMS max.
HV Stability:	0.1% typical.
HV Polarity:	Negative (Positive Ground).
Filament Output:	Filament voltage floating at high voltage.
Filament Voltage & Current:	(See table II).
Filament Regulation (Emission Current):	±0.1%
Indicators:	High voltage ON LED (red). Filament ON LED (red). System ON LED (green).
Temp. Coefficient:	100 ppm per deg. C Typical.
Protection:	Short circuit and arc protected.

Mechanical Specifications

Dimensions:	14.0" x 8.0" x 3.0" (228.6 x 127 x 44.5mm).
Weight:	approx. 10 lbs. (5kg).
Enclosure:	Aluminum with Iridite Finish.
Connectors:	*AC Input* — 3 wire IEC cord receptacle. I/O — 25-position DB/25 Sub Connector. *Output* — 18" Flying lead with female Alden Connector.

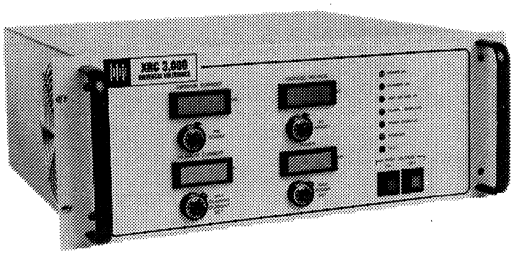
Table I: HV Voltage and Current Output

Model	Voltage	Current
XMA-20-10	20kV	10mA
XMA-30-7	30kV	7mA
XMA-40-5	40kV	5mA
XMA-60-3	60kV	3mA

Table II: Filament Outputs

Suffix	Voltage	Current
-F1	3V	8A
-F2	6V	6A
-F3	9V	4A
-F4	12V	3A

3.5KW X-RAY POWER SUPPLY MODEL XRC -60- 80



Mechanical Specifications

Size:	19" x 7" High (483 mm x 178 mm :17" Deep (432 mm)
Weight:	55 Pounds (25 kgs)
Output:	75kV, 3 Conductor Federal Standard X-ray Connector
Remote Connections:	25 Pin Sub D Connector on Rear Panel

FEATURES

- Power factor correction
- High frequency switching technology utilized on both cathode and filament power supplies
- EMI reduction circuits on input line
- Emission current control of x-ray tube current
- Remote interlock (contact closure)
- Internal filament current limit
- Remote-local control
- Automatic ramp of the high voltage and emission current to preset values

Electrical Specifications

INPUT

Voltage:	208 ± 10% (187V - 229V)
Phase:	Single
Frequency:	50/60 Hz.
Current:	24 Amperes

OUTPUT "HIGH VOLTAGE"

Voltage:	0-60kV
Current:	0-80 mA
Max Power:	3.5kW
Regulation	
Voltage:	±0.01%
Emission Current:	±0.01%
Ripple Voltage:	0.03% rms below 1 kHz 0.5% rms above 1 KHz
Polarity:	Negative (Positive Ground)

OUTPUT FILAMENT

Voltage:	12V AC (WRT High Voltage)
Current:	4.0AC RMS

CONTROLS

LOCAL and/or REMOTE

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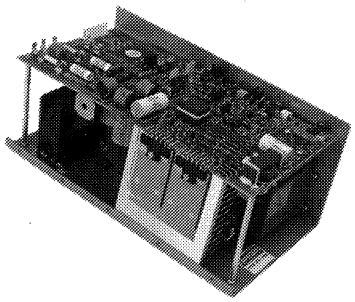
Series **BCO_2**

CO_2 Laser Power Supplies With Superpulse Capability



300 Watt and 700 Watt High Voltage Power Supplies for OEM Use In Carbon Dioxide Medical and Industrial Lasers

FEATURES

- Superpulse capability
- Ballastless
- Compact
- Lightweight
- Air cooled
- Potted high-voltage sections
- Precise Regulation
- Positive or Negative output
- Open frame or enclosed designs
- Meets UL 544 guidelines for leakage current
- Open and short circuit protected
- Remote analog output control

Universal Voltronics Series BCO_2 high voltage power supplies are optimized for use in mid-power carbon-dioxide laser applications. Of particular significance are the Superpulse capabilities of this series: maximum pulse currents of up to 60 mA and repetition rates to 5 kHz are available at up to 100% duty cycle. Series BCO_2 provides full power at 75% of maximum voltage. Power in this series is switched at a 42 kHz switching frequency for best efficiency and lowest heat loss. UVC BCO_2 power supplies operate without ballast resistors.
Series BCO_2 is ideal for original equipment CO_2 laser applications because of its compact footprint, efficiency, open-frame and enclosed configurations, and remote controlled design.

Electrical Specifications

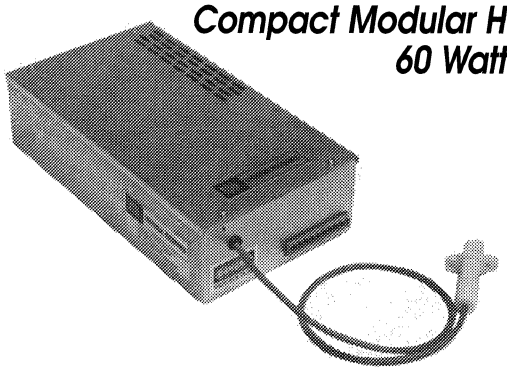
Model	BCO_2 300	BCO_2 700
Output:	300 Watt	700 Watt
Ignition Voltage*:	30 kV	50 kV
Maximum Continuous Voltage:	25 kV	36 kV
Maximum Available Current:	1mA @ 25 kV 10 mA @ 18 kV 15 mA @ 15 kV 25 mA @ 12 kV	2 mA @ 36 kV 12 mA @ 28 kV 35 mA @ 20 kV 40 mA @ 12 kV
Maximum Pulse Current:	40 mA	60 mA
Maximum Steady State Current:	25 mA	35 mA
Maximum CW Power Output:	300 W	700 W
Current Regulation:	± 1% of F.S. (1 to 25 mA)	± 1% of F.S. (1 to 40 mA)
Main Switching Frequency:	42 kHz	
Pulse Rep Rate:	DC to 5 kHz	
Pulse Duty Cycle:	0-100%	
Input Voltage:	120 or 220 Vac ± 10% 50/60 Hz (specify)	
Input Current:	5 A/2.5 A	10 A/6 A
Metering Signal - Current:	0-5 V = 0-25 mA	0-10 V = 0-50 mA
Internal Setpoint Controls:	NA	one-turn potentiometers
Remote Setpoint Signals:	Same as metering Signals	
Remote HV on Signal:	5 V @ 5 mA into Opto - Isolator or Contact Closure	

*Other voltages available

Mechanical Specifications

Outline Dimensions:	12.25" x 6.75" x 3" (LWH) 312 x 172 x 76mm	13" x 6.75" x 5.25" (LWH) 330 x 172 x 133mm
Weight:	4.2 Lbs.	11.2 Lbs.
HV Insulation:	HV assembly potted in repairable RTV	
Mounting Position:	Any	
HV Output:	Dry cable well with 1 meter long cable	
Interface Connector:	10 PIN Panduit	
Mounting Hardware:	(4) 10-32 UNC inserts	

Compact Modular High Voltage DC Power Supplies 60 Watts, 5 to 30 Kilovolts



OUTPUT		MODEL DESIGNATION				
POLARITY	+	BMV-5-12P	BMV-10-6P	BMV-15-4P	BMV-20-3P	BMV-30-2P
	-	BMV-5-12N	BMV-10-6N	BMV-15-4N	BMV-20-3N	BMV-30-2N
MAX RATING	kV	5	10	15	20	30
	mA	12	6	4	3	2

ELECTRICAL SPECIFICATIONS

Input:	24 Vdc (23-27 Vdc), 4.0 A (typical) at full load
Output:	Adjustable, 0 to full rating. Rated current may be drawn at any voltage setting.
Voltage Regulation:	±0.01% for input of 23-27 Vdc ±0.01% no load to full load
Current Regulation:	±0.05% for input of 23-27 Vdc ±0.05% over compliance range of 10% to 100%
Ripple:	0.1% P-P of maximum output voltage
Stability:	0.2% per eight hours, Typical after half-hour warm-up.
Temp. Coefficient:	100 ppm per deg. C Typical.
Protection:	Short circuit and arc protected
Enable:	Low = HV on; Open = HV off

MECHANICAL SPECIFICATIONS

Dimensions:	9.0" x 5.0" x 1.75" (228.6 x 127 x 44.5 mm)
Enclosure:	Aluminum with Iridite Finish
Mounting Hardware:	(4) 8-32 UNC threaded studs
Connectors:	Input — 10-position Phoenix P/N MSTB 1.5/10 Output — 18" Flying lead with female Alden connector

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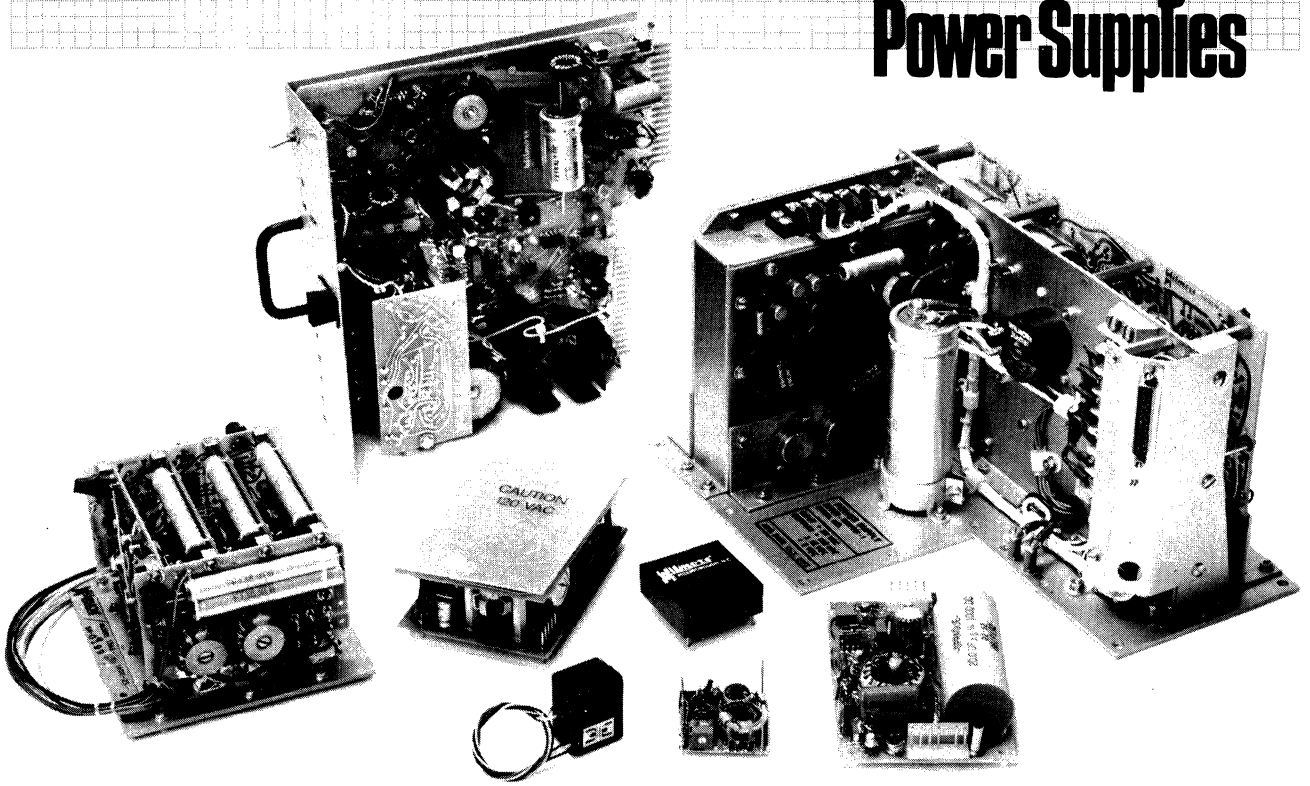
Wilmore

Custom-Designed Power Supplies



- **Multiple Output**
- **High Voltage**
- **Open Frame**
- **Encapsulated**
- **Modular**

The majority of our work is the design and manufacture of custom switching power supplies and dc-to-dc converters.
More than twenty years ago our transistor-switching power supplies began flying on spacecraft. Today we ship thousands of custom-designed industrial power supplies each month to a wide base of original equipment manufacturers. We are familiar with environments as demanding as diesel locomotives and as favorable as air-conditioned equipment bays. Our products operate daily from telecom and utility station batteries, vehicular electrical systems, low-voltage industrial ac circuits, and commercial ac power. We probably have had experience with applications similar to yours.

We combine the ability to deliver prototypes quickly and the production resources to manufacture competitively.
Systems engineers and power supply designers face the difficult task of electrically, mechanically, and thermally integrating a power supply into the system. The task can be further complicated by time constraints. Wilmore excels at this phase of program support, delivering carefully-conceived prototypes often in just a few weeks. Our responsiveness continues through to the production phase. Wilmore's two assembly plants in North Carolina were built from the ground up to produce power supplies in volume. We are a competitive domestic manufacturer with the flexibility to meet difficult production schedules.

Our New Products Group would like to hear from you.
Your inquiry will be answered promptly by the people who will be responsible for the design and prototyping of your power supply. If you need a quotation on your completed specification, or if you just want to discuss your application, please give our New Products Group a call. We would appreciate the opportunity to help solve your power conversion problems.

Please see our pages in sections 4025 and 4050.

WILMORE ELECTRONICS CO., INC.
P.O. Box 1329, Hillsborough, N.C. 27278 • Telephone: (919) 732-9351
FAX: (919) 732-9359

POWERED BY

Because power needs come in infinite variations, so do Vicor power solutions. Vicor's comprehensive line of power solutions

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Sunnyvale, CA 94086
Tel: (408) 522-5280
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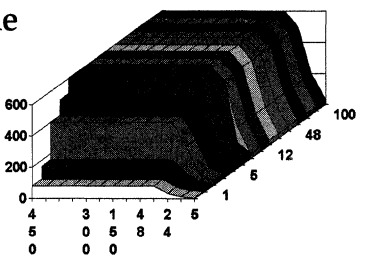
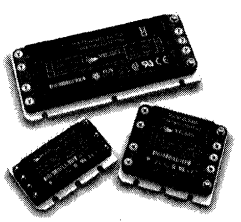
COMPONENT POWER MODULES

Vicor component converters come in thousands of combinations:

- Any DC input from 4.5 - 450V
- Any AC input including universal input, autoranging, or PFC
- Any output from 1 - 100 Vdc
- Any power from 25 - 600W (parallelable)





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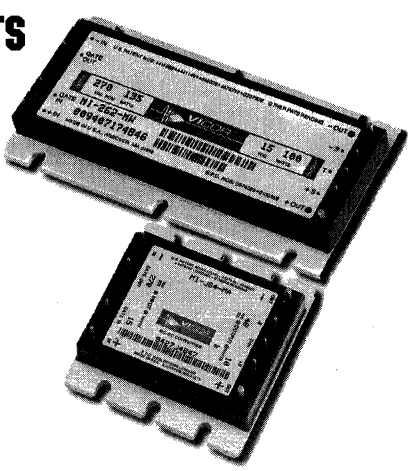
COTS POWER COMPONENTS FOR MILITARY POWER SYSTEMS

Vicor defense products include:

- Power modules
- Input and output filters
- AC front ends
- Complete power supplies



Call (800) 735-6200 today, or visit our web site at www.vicr.com and ask for your free product catalog. This catalog includes Vicor's complete line of component power modules and accessories, configurable power supplies and custom power solutions.

VICOR

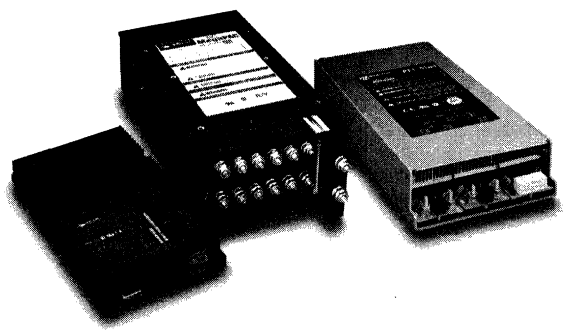
includes modular, high-density DC-DC converters and accessory components, configurable power supplies, and custom power solutions.

CONFIGURABLE POWER SUPPLIES

Vicor's compact, configurable power solutions come in thousands of combinations:

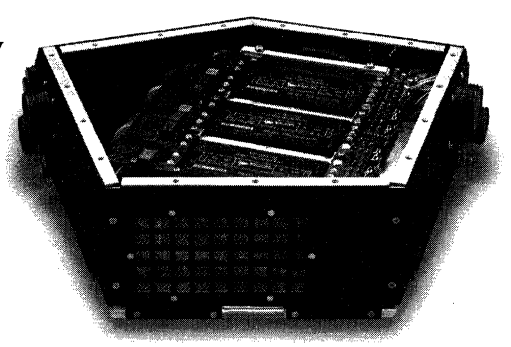
- AC-DC switchers
- DC-DC switchers
- 50 - 2000W
- 1 - 20 outputs
- With or without fans

QUICKTURNS



CUSTOM POWER SOLUTIONS

Vicor Integration Architects, located throughout the U.S., design, manufacture and arrange for agency approvals on your component-based custom or customized solution.



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25 Frontage Road, Andover, MA 01810
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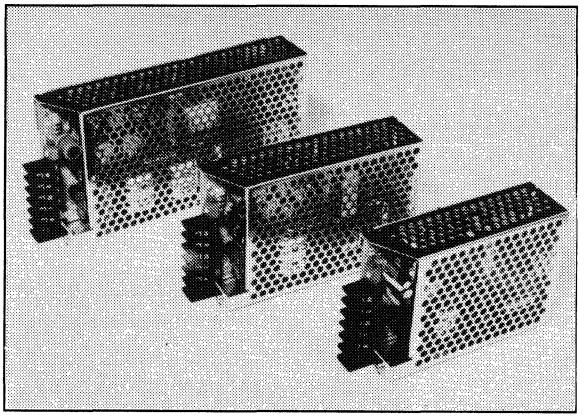
Volgen **Volgen** America

Quality First



AC/DC Switching Power Supplies

* Over Eight Standard Series to Choose From
* Power Ranges From 10 Watts to 300 Watts
* CE Compliance Including IEC-801 and Power Factor Correction
* World Safety Approvals - UL, cUL, CSA, & TUV
* Quality & Reliability - Metal Chassis, Safety Cover, High MTBF

SINGLE OUTPUT SWITCHING POWER SUPPLIES

SERIES	Rated Power	Model Name	AC Input	Output	Agency Markings: Output	Output	UL, cUL, TUV, CE, TUV/EMC Output	Output	Output	Size (Inches)
SPU	15watts	SP15U-	85 - 264V	3.3VDC, 3.0A	5VDC, 3.0A	12VDC, 1.3A	15VDC, 1.0A	24VDC, 0.7A	48VDC, 0.35A	4.8x2.9x1.2
SPU	30watts	SP30U-	85 - 264V	3.3VDC, 6.0A	5VDC, 6.0A	12VDC, 2.6A	15VDC, 2.1A	24VDC, 1.4A	48VDC, 0.7A	5.4x3.1x1.2
SPU	50watts	SP50U-	85 - 264V	3.3VDC, 10A	5VDC, 10A	12VDC, 4.6A	15VDC, 3.7A	24VDC, 2.3A	48VDC, 1.2A	7.04x3.5x1.29
SPU**	100watts	SP100U-	85 - 264V		5VDC, 20A	12VDC, 8.6A	15VDC, 7.0A	24VDC, 4.4A	48VDC, 2.2A	8.46x4.37x1.5
SPU**	150watts	SP150U-	85 - 264V		5VDC, 30A	12VDC, 13A	15VDC, 10.6A	24VDC, 6.7A	48VDC, 3.4A	10.19x4.92x1.77

**= Power Factor Correction

SERIES	Rated Power	Model Name	AC Input	Output	Agency Markings: Output	Output	UL, cUL, TUV, (CE, TUV-i ver. only) Output	Output	Output	Size (Inches)
SXU/i	15watts	SX15U/i-	85- 132 or 170-264V		5VDC, 3.0A	12VDC, 1.3A	15VDC, 1.0A	24VDC, 0.7A		3.89x2.7x1.33
SXU/i	30watts	SX30U/i-	85- 132 or 170-264V		5VDC, 6.0A	12VDC, 2.6A	15VDC, 2.1A	24VDC, 1.4A		4.68x2.7x1.33
SXU/i	50watts	SX50U/i-	85- 132 or 170-264V		5VDC, 10A	12VDC, 4.2A	15VDC, 3.4A	24VDC, 2.2A		5.27x3.34x1.45
SXU/i	100watts	SX100U/i-	85- 132 or 170-264V		5VDC, 20A	12VDC, 8.6A	15VDC, 7.0A	24VDC, 4.4A		7.04x3.66x1.53
SXU/i	150watts	SX150U/i-	85- 132 or 170-264V		5VDC, 30A	12VDC, 12.5A	15VDC, 10.0A	24VDC, 6.5A		7.63x3.66x1.89

Note: U = US input voltage range, i = European input voltage range

MULTIPLE OUTPUT SWITCHING POWER SUPPLIES

SERIES	Rated Power	Model Name	AC Input	Agency Markings: UL, cUL, TUV (CE) Output 1	Output 2	Output 3	Size (Inches)
ERK-U	15watts	ERK15U-1212	85 - 264V	5V, 2A	12V, .3A	(-)12V, .3A	5.5x3.85x1.41
ERK-U	15watts	ERK15U-1515	85 - 264V	5V, 2A	15V, .3A	(-)15V, .3A	5.5x3.85x1.41
ERK-U	30watts	ERK30U-1212	85 - 264V	5V, 4A	12V, .2A	(-)12V, .5A	7.08x3.85x1.41
ERK-U	30watts	ERK30U-1515	85 - 264V	5V, 4A	15V, 1.2A	(-)15V, .7A	7.08x3.85x1.41
ERK-U	50watts	ERK50U-1212	85 - 264V	5V, 6A	12V, 2.5A	(-)12V, .5A	7.94x4.05x1.57
ERK-U	50watts	ERK50U-1515	85 - 264V	5V, 6A	15V, 1.2A	(-)15V, 1.2A	7.94x4.05x1.57
ERK-U	70watts	ERK70U-1212	85 - 264V	5V, 8A	12V, 2.5A	(-)12V, 1.0A	9.44x4.05x1.77
ERK-U	70watts	ERK70U-1515	85 - 264V	5V, 8A	15V, 1.5A	(-)15V, 1.5A	9.44x4.05x1.7

SERIES	Rated Power	Model Name	AC Input	Agency Markings: UL, cUL, TUV (CE) Output 1	Output 2	Output 3	Size (Inches)
SPU	15watts	SP15U-0522T	85- 264V	5V, 2.0A	12V, .5A	(-)12V, .5A	5.15x3.28x1.29
SPU	15watts	SP15U-0533T	85- 264V	5V, 2.0A	15V, .45A	(-)15V, .45A	5.15x3.28x1.29
SPU	30watts	SP30U-0522T	85- 264V	5V, 4A	12V, 1.2A	(-)12V, .6A	6.33x3.50x1.29
SPU	30watts	SP30U-0533T	85- 264V	5V, 4A	15V, 1.0A	(-)15V, .5A	6.33x3.50x1.29
SPU	50watts	SP50U-0522T	85- 264V	5V, 6A	12V, 2.0A	(-)12V, 1A	7.55x3.66x1.49
SPU	50watts	SP50U-0533T	85-264V	5V, 6A	15V, 1.4A	(-)15V, 1A	7.55x3.66x1.49
SPU	80watts	SP80U-0522T	85-264V	5V, 10A	12V, 3.0A	(-)12V, 1.5A	8.73x3.93x1.57
SPU	80watts	SP80U-0533T	85-264V	5V, 10A	15V, 2.4A	(-)15V, 1.2A	8.73x3.93x1.57

Note: U = US input voltage range, i = European input voltage range

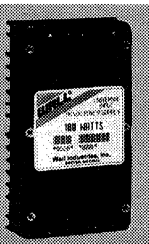
❖❖❖ CALL FOR OTHER REQUIREMENTS, ADAPTERS, & MODIFIED UNITS ❖❖❖

SEE OUR PAGE IN SECTION 4025

Volgen America, Inc.
1690 McCandless Drive, Milpitas, CA 95035
Phone: 408-941-9696 • 1-888-2-VOLGEN • Fax: 408-941-9697 • Website: www.volgen.com

AC/DC POWER SUPPLIES STANDARD PRODUCT

Wall Industries, Inc.

				
PARAMETERS	LINEAR DESIGN	LINEAR DESIGN	SWITCHING DESIGN	SWITCHING DESIGN
POWER LEVEL	**TO 3 WATTS**	**TO 15 WATTS**	**TO 20 WATTS**	**TO 100 WATTS**
INPUT VOLTAGES	105-125*	105-125*	105-125*	85-264VAC
OUTPUT VOLTAGES	5, 10, 12, 15	5, 6, 10, 12, 15, 18, 20, 24, 28	5, 12, 15, 19, 24	5, 12, 15, 24, 48
# OF OUTPUTS	SINGLE AND DUAL	SINGLE, DUAL, AND TRIPLE	SINGLE	SINGLE
CASE DIMENSIONS	2.0 X 2.0 X 0.88" for T5S200	2.5 X 3.5 X 0.88" for W5S500	2.5 X 3.5 X 1.25" for E5S1000	2.8 X 3.8 X .84" for FE5S-30
LINE AND LOAD REGULATION	REGULATED	REGULATED	REGULATED	REGULATED
NOISE	<1mV RMS	<1mV RMS	<7mV RMS	1% of Vout or 50mV p-p (whichever is greater)
ISOLATION LEVEL	1500V RMS	1500V RMS	1500V RMS	3750VAC
SERIES NAME	T	W	E	FE

* Several options available for alternate AC input ranges as well as alternate mounting schemes, consult factory.

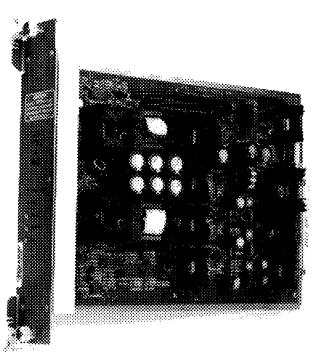
See Wall Industries' Catalog pages on the INTERNET for more information on these AC/DC power supplies or DC/DC converters:

www.wallind.com e-mail: wallind@nh.ultranet.com

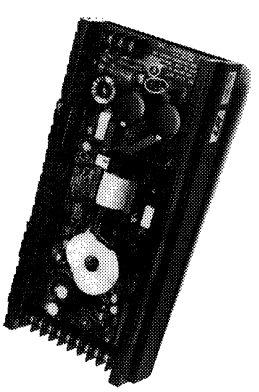
Telephone ringing generators and power supply contract assembly available **ISO9001 REGISTERED BY UL**

CUSTOM POWER SOURCES

For more information regarding Wall Industries, Inc. DC/DC converters or AC/DC power supplies, contact the factory. Individual data sheets on standard and custom product are available upon request.



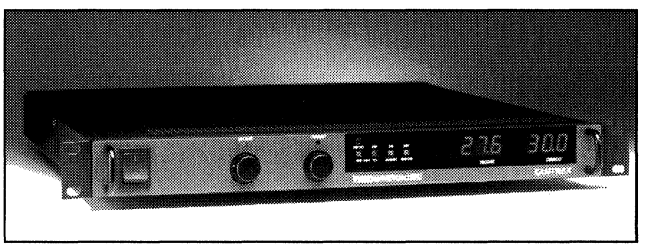
Looking for a Custom AC or DC input power source? Wall provides DC output custom supplies ranging from 5 to 1800 Watts output power in single and multiple outputs, regulated and non-regulated, isolated and non-isolated available.



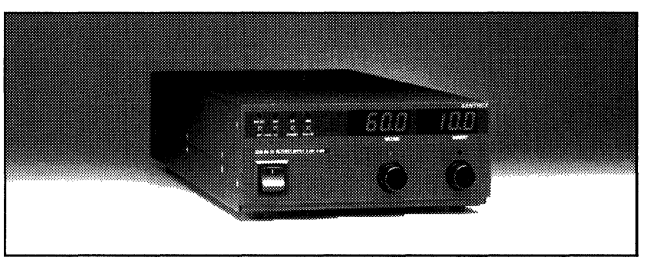
Wall Industries Inc.
5 Watson Road, Exeter, NH 03833 USA ☎ : 603/778-2300 FAX: 603/778-9797

Xantrex Gives You Power Supplies That Deliver Power You Can Rely On...

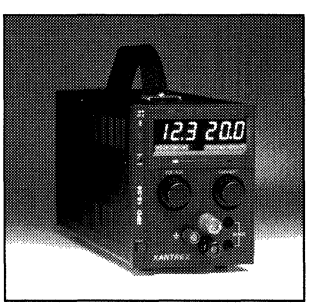
Xantrex has the range of power supplies you need for virtually any application. Reliable, dependable, flexible and programmable – our products will fit your particular needs. For additional models or other input voltages please call us. And, if you need a customized power supply – call immediately. We're experts at designing for specific applications.



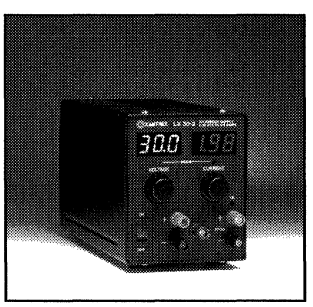
XFR Model 40-30



XHR Model 60-10



HPD Model 15-20



LX Model 30-2

XT & HPD Series – High Performance

- Line/Load Regulation: 0.01%, + 2mV; 0.01% + 250mA
- Noise & Ripple (20-20MHz):1mV rms; 1mV p-p
- Maximum Voltage Differential from O/P to safety ground: 400Vdc.
- Transient Response Time: <100µs
- Maximum Remote Sense Line Drop Compensation: 0.6V/line
- AC Input: 104-127Vac, 57-63Hz;
- Stability: 0.05%

LX Series– Rugged And Economical

- Line/Load Regulation: 0.02%, + 2mV; 0.05% + 250µA
- Maximum Voltage Differential from O/P to safety ground: 500Vdc
- Transient Response Time: 100µs
- AC Input: 104-127Vac, 47-63Hz;
- Maximum I/P Current @ Low AC Line Limit: 1.5A (60W Dual), 4.0A (120W Dual, 60W Quad)
- Fixed O/P Range: +5V ±4%, 0-3A

XFR Series – Power Ranges From 1.2-2.8KW

- Line Regulation: 0.05%, + 2mV; 0.05% + 2mA
- Load Regulation: 0.075% + 5mV; 0.075% + 5mA
- Noise & Ripple (0-20MHz) model dependent:10-50mV rms; 75-500mV p-p
- Maximum Voltage Differential from O/P to safety ground: 600Vdc.
- Transient Response Time: <3ms.
- Maximum Remote Sense Line Drop Compensation: 5V/line
- AC Input: 85-130Vac, or 190-264Vac, 47-63Hz;
- Stability: 0.05%

XHR Series – The Next Generation

- Line/Load Regulation: 0.01%, + 2mV; 0.01% + 1mA
- Noise & Ripple (0-20MHz): 5mV-50mV rms (model dependent); 50mV-500mV p-p (model dependent)
- Maximum Voltage Differential from O/P to safety ground: 600Vdc.
- Transient Response Time: 1ms
- Maximum Remote Sense Line Drop Compensation: 5V/line
- AC Input: 85-250Vac, 47-63Hz; power factor corrected @ 0.98 min. Current harmonics meet EN61000-3-2
- Stability: 0.05%

X5 XANTREX 5 YEAR WARRANTY

GPIB

RS232

IEEE-488

PFC

CE

ISO 9001

All products are noted with the above icon options to help you quickly identify their benefits. And of course, we back up every product with a 5 year guarantee!

Selection Guide

Volts	Amps	Model
0-7	0-6	XT 7-6
0-7.5	0-80	XHR 7.5-80
0-7.5	0-130	XHR 7.5-130
0-7.5	0-140	XFR 7.5-140
0-7.5	0-300	XFR 7.5-300
0-12	0-220	XFR 12-220
0-15	0-4	XT 15-4
0-15	0-20	HPD 15-20
0-20	0-3	LX 20-3, LXQ 20-3
0-20	0-3	XT 20-3
0-20	0-6	LX 20-6
0-20	0-30	XHR 20-30
0-20	0-50	XHR 20-50
0-20	0-60	XFR 20-60
0-20	0-130	XFR 20-130
0-30	0-2	LX 30-2, LXQ 30-2
0-30	0-2	XT 30-2
0-30	0-4	LX 30-4
0-30	0-10	HPD 30-10
0-40	0-15	XHR 40-15
0-40	0-25	XHR 40-25
0-40	0-30	XFR 40-30
0-40	0-70	XFR 40-70
0-60	0-1	LX 60-1, LXQ 60-1
0-60	0-1	XT 60-1
0-60	0-2	LX 60-2
0-60	0-5	HPD 60-5
0-60	0-10	XHR 60-10
0-60	0-18	XHR 60-18
0-60	0-20	XFR 60-20
0-60	0-46	XFR 60-46
0-100	0-6	XHR 100-6
0-100	0-10	XHR 100-10
0-100	0-12	XFR 100-12
0-100	0-28	XFR 100-28
0-120	0-0.5	XT 120-0.5
0-150	0-4	XHR 150-4
0-150	0-7	XHR 150-7
0-150	0-8	XFR 150-8
0-150	0-18	XFR 150-18
0-300	0-2	XHR 300-2
0-300	0-3.5	XHR 300-3.5
0-300	0-4	XFR 300-4
0-300	0-9	XFR 300-9
0-600	0-1	XHR 600-1
0-600	0-1.7	XHR 600-1.7
0-600	0-2	XFR 600-2
0-600	0-4	XFR 600-4

Specifications subject to change without notice.

...And Great Options For Computer Control.

Do you need to control your power supplies with a computer? Xantrex offers you three easy options for digital control. All our interface cards fit into our power supplies saving you bench or rack space. Order with or without the interface option.

Interface connectors and switches are mounted on the power supply's rear panel. When installed, the interface activates the front panel LED indicators dedicated to computer control.

Standard Interface Features

- 16-bit resolution for programming/readback of voltage or current.
- Safe control with programmable over voltage protection (OVP).
- Standardized commands for complete communication with any of the supplies in the system.
- User-programmable isolated fault, polarity, isolation, remote disconnect.
- LED status signals: isolation, polarity, error, system malfunction, address, service request (except RS-232), and over voltage protection (OVP).
- Local Lockout capability protects devices under test (except RS-232).
- Fast, easy-to-use software calibration.
- Designed-in versatility of interfaces which can be used with all Xantrex programmable DC power supplies.

Instrument Drivers For Computer Control

- Control from an on-screen "virtual" instrument. Functions include: sending and receiving messages, making queries, displaying information,configuring the output.
- For use with the IEEE-488 standard.

Analog Programming Interface (APG)

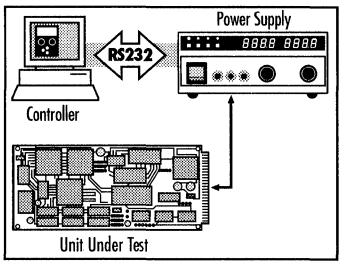
- Internal card includes analog signal control of voltage and current, overvoltage protection (OVP), remote on/off, and master/slavetracking.
- For the XT and HPD Series power supplies.
- Standard in the XHR and XFR Series.

Isolated Interface (ISOL)

- Complete remote programming control of either the unit's output voltage or its current using analog program signals.
- Signals may be biased at any potential relative to the supply's return line within its maximum voltage differential specification.
- For the XHR and XFR Series power supplies.

RS-232 Interface

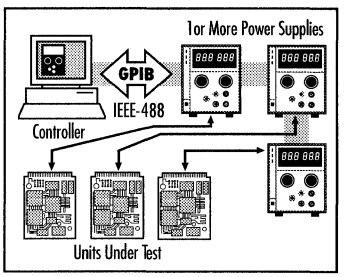
- Control simple test systems, such as one or two instruments. No computer interface is required.
- It uses the command set and most of the user-programmable features employed by all our other interfaces.
- RS-232 protocol operates over longer cable distances than IEEE-488.



RS-232 Interface

GPIB Interface

- For building complete remote control test systems.
- Single channel interface using IEEE-488 communications.
- Each power supply resides at one port on the communications bus and responds to a complete set of computer commands for all remote programming applications.
- Provides IEEE-488 Service Request and Local Lockout capabilities.



GPIB Interface

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Web Site: www.xantrex.com
E-mail: xantrex@xantrex.com

How To Contact Us

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8587 Baxter Place, Burnaby, BC, Canada V5A 4V7
Tel: 604-415-4600 Fax: 604-415-4674

US Office:
3873 Airport Way, Box 9754, Bellingham, WA USA 98227 9754
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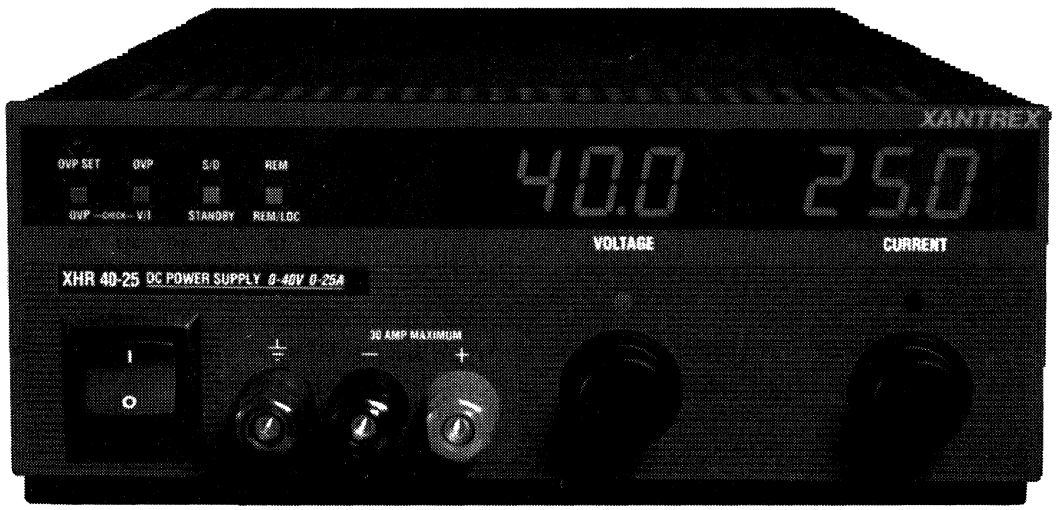
120VAC In–1000 Watts DC Out



Power Factor Correction

Power Factor Correction (PFC) lets you plug our 1000 watt XHR half rack DC power supply into any standard 120VAC, 15 amp wall socket. Drawing only 11 amps, the XHR (Xantrex Half Rack) requires no special wiring. PFC also gives you a Universal Input of 85-250VAC.

Soft Switching

Xantrex's new Zero Voltage Crossing "Soft" Switching technology dramatically reduces switching transients. Ripple as low as 5mV makes it a quiet switcher.

Small Foot Print/Half Rack Mount

This unit takes up less room on the bench, is stackable and fits side-by-side with other half rack instruments in your test console. Size: 3.5 x 8.5 x 17 in., and it weighs only 12 pounds.

Programmable

Analog, RS-232 or GPIB. LabVIEW® Drivers.

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- 600W and 1000W (7.5 - 600V/1-130A).
- Rear connectors AND front panel binding posts-if you want them.
- Software calibration with GPIB option.
- CE, UL, CSA, FCC and IEC 1000-3-2.
- 5 year warranty.
- Xantrex is ISO 9001 certified.

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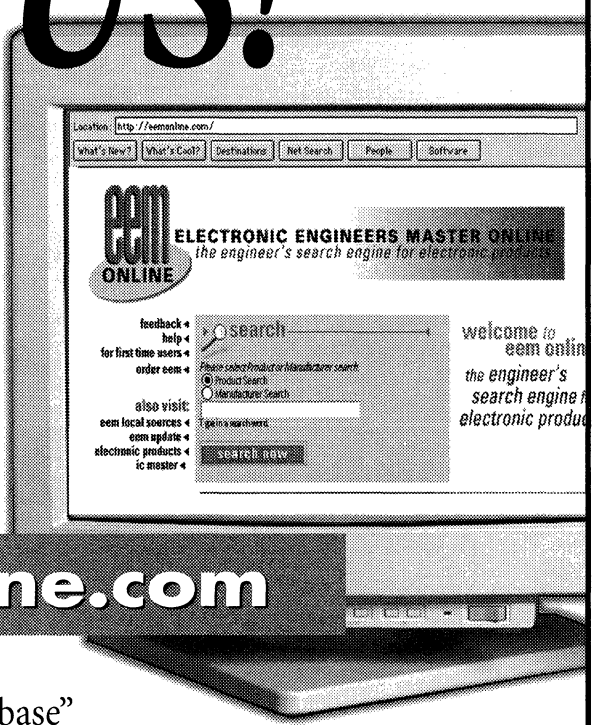

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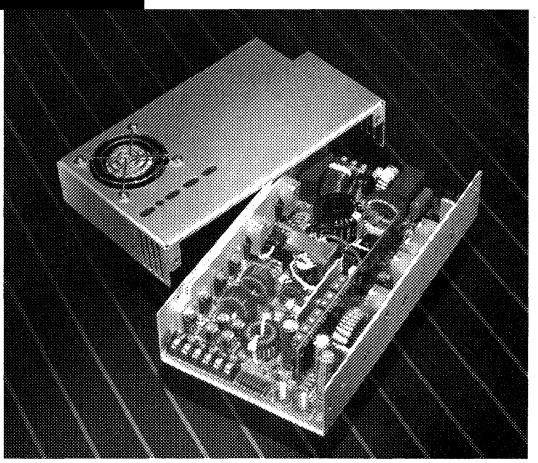
XENTEK POWER SYSTEMS
PFC SERIES POWER SUPPLIES



Features

- POWER FACTOR CORRECTED GREATER THAN 0.99 AT FULL LOAD
- TWO TO FIVE OUTPUTS
- UP TO 3.5 WATTS/IN^3
- REMOTE SENSE
- FULLY ISOLATED OUTPUTS
- ON-BOARD EMI FILTERING
- LOW NOISE & RIPPLE
- OVERLOAD, OVERVOLTAGE, REVERSE VOLTAGE & THERMAL PROTECTION
- TWO-YEAR WARRANTY
- V1 MARGIN (±5%) AND REMOTE ADJUST INCLUDED
- REMOTE ON/OFF OPTION
- FAN/COVER OPTION
- POWER GOOD OPTION FOR ALL OUTPUTS
- ELECTRONIC PRELOAD OPTION

MODEL SPECIFICATIONS

	PFC200	PFC300	PFC400	PFC500
Total Max Output Power	200W	300W	400W	500W
Total Max Output Power (when equipped with internal fan)	250W	350W	450W	550W
Main Output Options (V@A)	2@25 3.3@25 5@25 12@10.4 15@8.3 24@5.2 28@4.5 48@2.6	2@40 3.3@40 5@40 12@17 15@13.5 24@8.5 28@7.25 48@4.25	2@60 3.3@60 5@60 12@25 15@20 24@12.5 28@10.75 48@6.25	2@80 3.3@80 5@80 12@33.5 15@26.75 24@16.75 28@814.5 48@8.5
Auxiliary Outputs	4 outputs per unit maximum 3.3 – 48 VDC 1 – 20 Amperes			
Dimensions HxWxD (inches)	9x5x2	10x5x2	10x5x2.5	11.5x5x2.5

Specifications

AC Input: 85-264VAC, 47-63Hz
INPUT PROTECTION: Fuse
HOLD-UP TIME: 20ms @ nominal line and full load
INPUT TRANSIENT PROTECTION: Meets EN61000-4
MINIMUM LOAD: 10% on main output
(optional preload – no main load required)
EFFICIENCY: 70% typical
AC POWER FAIL SIGNAL: TTL low 5ms before loss of regulation
(TTL high, optional)
POWER GOOD SIGNAL: TTL low (TTL high, optional)
EMI FILTERING: VDE, CISPR 11 & 22 and FCC Level B
OUTPUT OVERSHOOT: <1% @ turn-on or turn-off
REVERSE VOLTAGE PROTECTION: Up to full current rating, all outputs
ADJUSTABILITY: See table
LINE & LOAD REGULATION:
Line <0.1% and Load <0.2% for outputs >3A
Line <0.2% and Load <3% for outputs ≤3A
CROSS REGULATION:
<0.1%, for outputs >3A
<0.2%, for outputs ≤3A
REMOTE SENSE: All outputs >3A
PARD (RIPPLE & NOISE): 1% or 50mV (whichever is greater);
20 MHz bandwidth limit
OVER TEMPERATURE PROTECTION: Thermal shutdown, automatic recovery
TRANSIENT RESPONSE: 2% or 150mV (whichever is greater);
Maximum deviation with a load change of 25%
@ 1 Ampere/µsec slew rate; Response time is <200µsec to within 1%
OPERATING TEMPERATURE: 0-50°C, full rating; Derate linearly to 50% at 70°C
HUMIDITY: up to 90%, non-condensing
OPERATING ALTITUDE: 0 to 7,000'; Derate linearly to 80% at 10,000'
COOLING: 30 CFM of air through chassis for full power operation; Up to 50 Watts of additional output power is available with Xentek Fan and Cover option
STORAGE TEMPERATURE: -40°C to +85°C
STORAGE ALTITUDE: 0 to 40,000'
WARRANTY: 2 years
AGENCY LISTINGS: Meets UL 1950;
CSA 22.2 No. 950-95; "CE" Mark;
TUV EN 60 950, 1992

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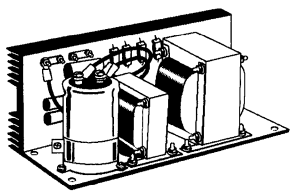
XENTEK POWER SYSTEMS
LINEAR POWER SUPPLIES

XE EXTENDED PERFORMANCE SINGLE OUTPUT POWER SUPPLIES



XE Features

- **0 TO 55C OPERATING TEMP WITHOUT DERATING**
- **0.1% PARD**
- ADJUSTABLE OUTPUT VOLTAGE RANGES FROM 5VDC TO 25VDC
- ELECTROSTATICALLY SHIELDED TRANSFORMER
- FOLDBACK CURRENT LIMITING
- SHORT CIRCUIT AND REVERSE VOLTAGE PROTECTION
- REMOTE SENSING

XE Specifications

INPUT: 115/230VAC ±10%, 47-440Hz
OUTPUT: Floating, adjustable
LINE REGULATION: ±0.05% for 10% line change. (0.2% for 20% change.)
LOAD REGULATION: ±0.05% for 50% load change. (0.2% for 100%.)
TRANSIENT RESPONSE: <50µs for 50% load change.
NOISE AND RIPPLE: 0.1% peak-to-peak
OPERATING TEMPERATURE: 0-55C, derate 2%/°C to 71C. (0-40C, XE20 only.)
TEMPERATURE COEFFICIENT: ±0.01%/°C, max.
STABILITY: ±0.1% max for 24 hrs, after warmup.
MECHANICAL SPECIFICATIONS:

	L(IN)	W(IN)	H(IN)	WT.(LBS)
XE20	4.50	4.00	2.75	2.8
XE30	5.75	4.38	3.50	4.8
XE60	6.25	5.25	4.87	9.1
XE90	8.50	5.50	4.87	12.3
XE120	12.00	5.62	4.88	18.3
XE180	9.62	8.50	4.88	24.5
XE240	11.94	9.25	4.88	32.5

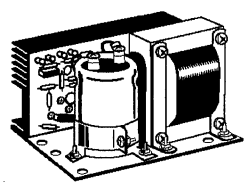
STANDARD MODELS

Output RANGE (VdC)		Output Current (A) XE 20	XE 30	XE 60	XE 90	XE 120	XE 180	XE 240
-5	5	4.0	6.0	12.0	18.0	25.0	36.0	50.0
-5	6	3.3	5.0	10.0	13.0	18.0	26.0	36.0
-12	11	2.5	4.2	8.4	11.1	12.9	18.7	25.8
-12	12	2.4	4.0	8.0	10.2	12.1	18.1	24.2
-12	13	2.2	3.7	7.4	9.6	11.5	16.6	23.0
-15	14	2.2	3.5	7.0	9.0	11.0	16.0	22.0
-15	15	2.1	3.3	6.6	8.4	10.3	14.7	20.6
-15	16	1.9	3.0	6.0	7.6	9.5	13.8	19.0
-24	20	1.6	2.4	4.8	6.2	7.6	10.4	15.2
-24	21	1.6	2.4	4.8	6.2	7.6	10.4	15.2
-24	22	1.5	2.2	4.4	5.7	7.0	10.1	14.0
-24	23	1.5	2.2	4.4	5.7	7.0	10.1	14.0
-24	24	1.2	2.0	4.0	5.0	6.5	9.3	13.0
-24	25	1.2	2.0	4.0	5.0	6.5	9.3	13.0

OTHER VOLTAGE/CURRENT COMBINATIONS ARE AVAILABLE IN OEM QUANTITIES.

ALL STANDARD MODELS ARE RECOGNIZED UNDER UL478

XXU UNREGULATED POWER SUPPLIES



XXU Features

- **0-50C OPERATING TEMPERATURE WITHOUT DERATING**
- **VIRTUALLY ZERO EMI/RFI**
- EXCELLENT SOURCE OF BULK DC POWER FOR DISTRIBUTED POWER SYSTEMS
- IDEAL FOR RELAYS, STEPPER MOTORS AND LAMP LOADS

* FOR 115 VAC INPUT WITH ±10% OUTPUT ADJUSTMENT VIA INPUT TAP CHANGE, REPLACE XXU WITH XU IN MODEL NUMBER..

XXU Specifications

INPUT*:115/230VAC, 50/60HZ.
OUTPUT: Floating fixed output at full load rating per model selection chart.
LOAD REGULATION:
15%, 0-50% of rating, typical;
9%, 50-100% of rating, typical.
RIPPLE: 3% rms, maximum at full load.
OPERATING TEMPERATURE:
0-50C. (Derate 2%/°C to 71C.)
OVERCURRENT PROTECTION: FUSE.

MECHANICAL SPECIFICATIONS:

	L(in)	W(in)	H(in)	Wt.(lbs)
15XXU	4.62	2.62	2.09	1.5
30XXU	5.88	3.19	2.62	2.6
60XXU	6.25	3.69	3.00	4.0
100XXU	7.12	4.00	3.25	6.3
200XXU	8.10	5.00	3.88	12.3
500XXU	9.00	5.62	4.62	20.5
750XXU	9.50	8.00	5.56	31.0

XU STANDARD MODELS

DASH NO.	15XXU VDC/A	30XXU VDC/A	60XXU VDC/A	100XXU VDC/A	200XXU VDC/A	500XXU VDC/A	750XXU VDC/A
-7	7.5/1.8	7.5/3.0	7.5/6.0	8.5/10.0	-	-	-
-12	11.0/1.2	12.0/2.4	12.0/4.8	12.5/7.0	-	-	-
-16	17.0/0.9	16.0/1.8	16.0/3.6	17.0/6.0	-	-	-
-24	25.0/0.6	26.5/1.2	26.5/2.4	25.5/3.5	27.5/7.5	24.6/20.0	24.0/30.0
-48	48.0/0.3	48.0/0.6	48.0/1.2	48.0/1.8	47.0/4.0	48.0/10.0	48.0/15.0

OTHER VOLTAGE/CURRENT COMBINATIONS ARE AVAILABLE IN OEM QUANTITIES.

ALL STANDARD MODELS ARE RECOGNIZED UNDER UL478

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DC/DC Converters

High Reliability, Low Cost Standard Pinouts!

- **Output power from 3 to 60 Watts**
- **Single/dual/triple outputs**
- **Wide-range inputs from 4.5 to 75V**
- **Standard packages and pinouts**
- **Isolated (>2000V) and non-isolated**
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- **Modifications and customs for OEM's**

When your high-performance electronics demand the power-supply accuracy, regulation and transient response that only comes from power processing at the "point-of-use," think DATEL. Our broad line of 3-60W DC/DC converters are optimized for today's distributed power architectures. Emphasizing quality, low cost, and industry-standard pinouts, DATEL DC/DC's reduce costs and improve long-term reliability in new and existing systems.

NEW

Call today for your free catalog on DATEL's complete line of DC/DC Converters!

Output Configuration	Range of Output Powers (Watts)	Output Voltages (Volts)	Range of Rated Output Currents (Amps)	Input Voltage Ranges (Volts)	Package Dimensions (Inches)	Starting Price (USA, 1000's)
Single (Non-Isolated)	5-50 (20 Models)	2.1 to 3.3	2 - 20	4.75-13.6, 6-16.5	1 x 1, 2 x 1, 2 x 2	$29
Single (Isolated)	3-60 (105 Models)	3.3, 5, 5.2, 12, 15	0.2 - 18	4.5 - 9 4.7 - 7.5 9 - 18 9 - 36 18 - 36 18 - 72 36 - 75	1.25 x 0.8 1 x 1 2 x 1 2 x 2 2.4 x 2.3 2 x 3	$31
Dual (Isolated)	3-50 (70 Models)	±5, ±12, ±15	±0.1 - ±4			$31
Triple (Isolated)	8-40 (35 Models)	+5 and ±12 +5 and ±15	0.8 - 5 ① ±0.1 - ±1			$50

① For triple-output models, listed output currents are primary/auxiliary.

ISO 9001 Registered

See page D•1955 for details

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DC-DC CONVERTERS

Manufacturer	Starting EEM Page No.	Output Wattage Range, W	Number of Outputs (max.)	Input Voltage Range, V	Output Voltage Range, V	Output Current Range, I	Isolation Voltage (Vdc min.)	Power Density (W/IN³)	EMI/RFI Shielding (yes/no)	Regulated Outputs (yes/no)	Applications
AAK Corp.	D•1885	1-10	1	5-9	5	500, 1500	400			Yes	
					12	350, 600	400			Yes	
					15	300, 500	400			Yes	
				10-48	24	200, 350	400			Yes	
					48	150, 250	400			Yes	
			2	5-9	±5	±150, ±250	400			Yes	
					±24	±100, ±200	400			Yes	
		2-50	1	1.5-48	3.3-5	250, 1000	500			Yes	
					12	300, 800	500			Yes	
					15	250, 750	500			Yes	
					24	200, 600	500			Yes	
					28	100, 500	500			Yes	
			2		±5	±250, ±750	500			Yes	
					±12	±150, ±500	500			Yes	
					±15	±150, ±450	500			Yes	
			3		5, ±12	.5/0.2	500			Yes	
						2/0.5	500			Yes	
					5, ±15	.5/0.2	500			Yes	
						2/0.5	500			Yes	
Abbott Electronics	D•1890	up to 200	1,2,3	14-400	2-48		500	up to 50	Yes	Yes	Industrial, military
Acon, Inc.	D•1914	2-200	1,2,3,5	9-75	3.3, ±15	to 1.5A	500	up to 38		Yes	
Advanced Conversion	D•1929	100-9,000	6	18-270	5-400	100A-	1500		Yes	Yes	Rail, OEM, Custom
Apex Microtechnology Corp.	D•1930	6W	1	11V-50V	5V, 3V	2ADC-1.2 ADC	500V	17	Yes	Yes	
		22.5W	1	16V-40V	3V, 5V, 12V, 15V	5.5 ADC-1.5ADC			Yes	Yes	
Applied Power Conversion	D•1931	5-5K	1-5	24	5-500 40 Standard	2-3A-50A			Yes	Yes	Telecom, computer, medical, industrial
Arnold Magnetics	D•2122	Up to 2000	1-10		2-300	100A			Yes	Yes	Aerospace, Scientific, Geophysical, Process control, Transportation, Nuclear industries
Artesyn Technologies	D•1934	100-150	1	36-75	3.3-15	0-30A				Yes	
		75	2	36-75	5/3.3	0-15A				Yes	
		33-50	1	18-75	3.3-15	0-10A				Yes	
		50-75	1	18-75	3.3-15	0-15A				Yes	
		66-100	1	18-75	3.3-15	0-20A				Yes	
		3	1, 2	9-75	±5, 3.3-15	±250-600mA					
		40	1	18-75	2.9-15	3.3-8					
		40	3	18-75	5V/±12	6A/±0.4					
		20	1	4.5-5.5	1.5-3.3	0-6					
Astec America, Inc.	D•1940	1-12K	3	5-300	1.5-300	50	1500	75	4	4	Telecom/Computer, Text/Industrial, Networking
Avel Lindberg, Inc.	D•1944	40-500	3	8-140	12-24	8-25	500	up to 5.5	Yes	Yes	Mobile communications, Cellular communications, Datacom, Instrumentation, Radio, Avionics, Marine
Calex Manufacturing Co. Inc.	D•1946	0.5-60	3	1.8-72	3-15	.05-10A	1544	17	Yes	Yes	Control
Conversion Devices	D•1912	1-500	1-3	4.5-160	2-48	.05-60	500-8000	up to 90	Yes	Yes	Computers, industrial applications
Custom Power Systems	D•1953	1-2K	10	4.5-400	2-400	0.01-1000A	1500	up to 10	Yes	Yes	Computers, industrial applications
Datel, Inc.	D•1955	5-50	1	4.5-5.5, 10.4-13.6	2.5, 3.3	2-20A	None	44	Yes	Yes	Distributed power systems in Telecom, Datacom, Computer, Networking, Instrumentation and Industrial-control equipment
		3-5	1,2	4.5-9, 9-18 18-36,18-72 36-72	5, 12, 15 ±5,±12,±12	85-1000mA	1000	11.1	Yes	Yes	
		6-11	1,2,3	4.7-7.25, 9-18, 18-72	3.3, 5, 5.2 12, 15 ±5,±12,±15	275 2500mA	1000	13.3	Yes	Yes	
		12-15	1,2	9-36, 18-72	3.3,5,12,15 ±5,±12,±15	500-3650mA	750	8.33	Yes	Yes	
		14-20	1,2,3	4.7-7.5, 9-36, 18-75	3.3,5,5.2 12, 15 ±5,±12,±15	500-4850mA	1000	11.2	Yes	Yes	
		16-20	1	9-36, 18-72	3.3,5,12,15	1300-4850mA	500	11.2	Yes	Yes	
		25-40	1,2,3	10-36,18-36, 18-75,36-75	5,12,15 ±5,±12,±15	1-8A	1000	13.3	Yes	Yes	
		50-60	1	18-36,36-75	3.3,5,12,15	3.3-18A	1000	27	Yes	Yes	

TAMURA Customs Deliver Flexibility

Fine tune your local DC power:

- Increase or decrease distributed voltage
- Polarity reversing
- 5, 12, 24 and 48VDC inputs
- 1 to 3.5VDC battery input
- Single and dual outputs
- 48VDC input — quad outputs
- Isolated and non-isolated outputs

ISO REGISTERED 9001/9002

TAMURA offers a broad, up-to-date product line of single in-line (SIP), case and open style DC-DC converters. Output power ranges from 0.3VA to 10.0VA with models for a wide variety of circuit functions.

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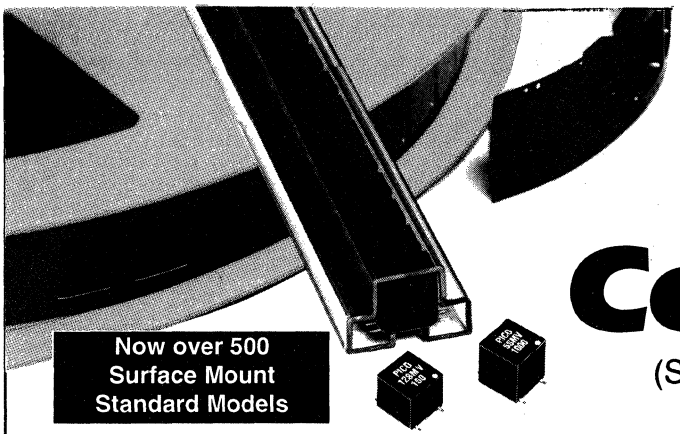
DC-DC CONVERTERS

Manufacturer	Starting EEM Page No.	Output Wattage Range, W	Number of Outputs (max.)	Input Voltage Range, V	Output Voltage Range, V	Output Current Range, I	Isolation Voltage (Vdc min.)	Power Density (W/IN³)	EMI/RFI Shielding (yes/no)	Regulated Outputs (yes/no)	Applications
DPA Solutions	D•1965	Up to 2800	1	85-265VAC	200-	Up to 6A 400VDC	500	up to 39	Yes	Yes	Front ends for powering DC-DC modules
Ericsson Components	D•1966	0.3-150	3	5-60	2-30	0.026-30	500-1500		Yes	Yes	Telecom, datacom, computers, industrial control, avionics
ETRI, Inc.	D•1978	.3-30	1-3	5-48	.33-40		500-3000	up to 20		Yes	Telecom, Computers, Medical, Industrial
Flat Transformer Technology Corp.	D•1981										Extremely Low Leakage Transformer for SMPS
Globtek, Inc.	D•1982	5-100	4	4.5-72	3.3-28	0-25	up to 4000	up to 30	Yes	Yes	Telecom, Data processing, Process control, Communication, Instrumentation
International Power Devices, Inc.	D•1984	1-500	3	3.3-48	1.2-15	1-30					
International Power Sources, Inc.	D•1986	1-150	4	9-36, 20-72, 180-380, 110-175, 85-140	5-48, 1000-4000	30mA, 30A	1000	30	Yes	Yes	Telecommunications, Instrumentation, Portable Equipment, Medical Distributed Power, Industrial Controls and Network Equipment
Interpoint Corp.	D•1989	1.5-100	3	5-400	2.2-28	up to 16A	500	up to 70	Yes	Yes	
Intronics, Inc.	D•1994	1-400	5	5-125	5-48	.1-50A	500	15	Yes	Yes	Telecom, Mobile, Industrial
Kappa Technologies, Inc.	D•2000	1-15	3	3.3-48	3.3-15		500-4000		Yes	Yes	LAN, WAN, Industrial, Commercial
KGS Electronics, Inc.	D•2001	20-500	3	12-28	0-28	1-30	300	7	No	Yes	Airborne lighting and misc. DC
Lambada Advanced Analog, Inc.	D•2002	5-120	3	16-400	3.3-28	0.1-16	500	84	Yes	Yes	Military/Aerospace Electronics
Lambada Novatronics	D•2004	50-600	1	28-270	2-28	2-100	500	18-60	No	Yes	Military and High Reliability
Logitek, Inc.	D•2005	25-150 5, 15, 30	4 3	14-36 16-36	±15, 5-29 ±15, 5-15				Yes Yes	Yes Yes	
LZR Electronics	D•2009	3 5-6 10 15 40 60 18-45	2 2 2 2 3 2 3	4.5-72 9-72 9-75 9-72 9-72 9-72 18-36	±15, 5-15 ±15, 3.3-15 ±15, 3.3-24 ±15, 3.3-15 ±15, 3.3-15 ±15, 3.3-15		1500 1500 1500 1600 1600 1600 500V			Yes	
Melcher, Inc.	D•2012	1-650	4	5-372	0-48	0-43	500		Yes/No	Yes	
Modular Devices	D•2019	3.25-120	6	8-270	2-1500	20mA-15A	1000	>50	Yes	Yes	Military, Aeropace, Proton rad hard environments, and Custom
Newport Components, Inc.	D•2028	.25-25	1,2	3.3-72	3.3-30	16mA-7.3	1000, 1500, 3000, 5200, 6000	up to 32	No	Yes	Control Systems, Instrumentation, Power Supplies, Telecoms
Pico Electronics, Inc.	D•2033	500	3	3.3-380	3.3-5000	20A	500-7000		Yes	Yes	
Polytron Devices, Inc.	D•2110	1/2-60	4	5-72	4.5-72		1500		Yes	Yes	Computer, Telecom., many other industrial and commercial applications



PICO ULTRA-MINIATURE DC-DC Converters

(See EEM pages D•2033 - D•2106)

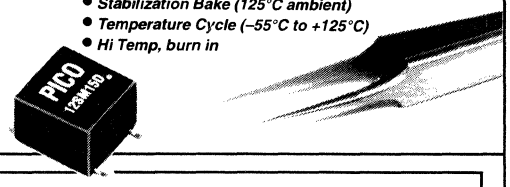
SURFACE MOUNT • PC BOARD MOUNT • SINGLE & DUAL OUTPUT

Lowest Possible Profile • Ideal for Industrial or Military Applications

(Over 1500 standard models up to 500 watts)

PICO's Surface Mount SM and SMV Series *3.3 to 1000 VDC Output Standard*

- *1.25 watt output at 70° ambient*
- *Ultra-miniature size 3.5 grams*
- *5 input voltage ranges 5, 12, 24, 28 and 48 VDC*
- *Up to 1000 volts DC output*
- *Up to 1500 volts input/output isolation*
- *No heat sink or electrical derating required*
- *Plug-In models available*
- *MIL-STD 883 options available*
  - *Expanded operating temp (–55°C to +85°C)*
  - *Stabilization Bake (125°C ambient)*
  - *Temperature Cycle (–55°C to +125°C)*
  - *Hi Temp, burn in*



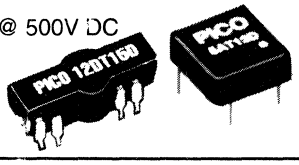
***New* Series VV up to 5000 VDC Output**

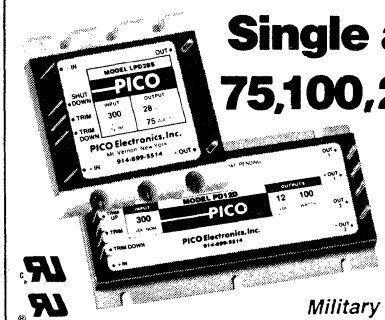
PICO's AT/DT Series

0.2" Ht. up to 0.75 Watts

New Surface Mount Models SAT/SDT

- No Output Capacitors Required
- –25°C to +70°C ambient
- Input voltage ranges 3, 5, 9 and 12V DC
- Isolated 100 megohm @ 500V DC
- Input/output isolation
- Single and dual output
- No heat sink required





Single and Dual 75,100,200 Watt Power Modules

3.3 to 100 VDC Output

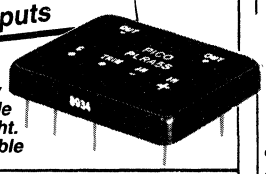
Military Upgrades AVAILABLE

PICO's Wide Input Voltage Series

2 to 30 Watts, 2 to 100 VDC Output

- Over 500 Standard Models
- Single, Dual & Triple Output
- Remote Disable Pin Standard
- From 2 - 100 VDC Output now Standard
- 500 VDC Isolated Input to Output
- All Units Shielded

5 to 170 VDC Inputs



Low Profile .300" ht. Available

PICO's NEW UAC SERIES

Power Factor Corrected
Universal AC Input, Regulated, Isolated
DC Output to 200 Watts in ONE Module

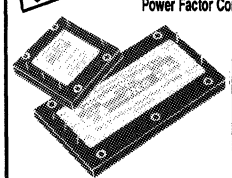
New

See Pages D•2096 and D•2097

- Universal Input Voltage, 85 to 265 VAC
- Isolated Output
- Power Factor Corrected, 0.99%
- Space Saving Design, One Module Replaces Two
- Special Output Voltages Available
- Regulated Output Voltage
- Made in the USA, Fully Encapsulated

Unity Power Factor Front End for...AC-DC Applications!

New 250 Watt and 500 Watt Models Power Factor Corrected



See Pages D•2098 and D•2099

New Harmonic Attenuators (PHA-I and LPHA1 Series) for use with PICO High Power DC-DC Converters for 3.3 to 100 VDC Single and Dual Outputs or 365 VDC regulated output direct from unit.

MILITARY DC-DC Converters

Up to 500 VDC Output

- –55° to + 85°C Operating Temperature
- QPL Components
- Wide Input Models Available

Now Available
- Selected MIL-STD-883 environmental screening available

See PICO's full Catalog immediately on the internet

http://www.picoelectronics.com

PICO Electronics, Inc.
143 Sparks Avenue, Pelham, NY 10803-1889
Call Toll Free 800-228-9747
FAX: 914-738-8225

DC-DC CONVERTERS

Manufacturer	Starting EEM Page No.	Output Wattage Range, W	Number of Outputs (max.)	Input Voltage Range, V	Output Voltage Range, V	Output Current Range, I	Isolation Voltage (Vdc min.)	Power Density (W/IN^3)	EMI/RFI Shielding (yes/no)	Regulated Outputs (yes/no)	Applications
Powerbox USA Inc.	D•2116	0.5W-10KW	4	4.5-300	2.1-300	0.1A-300	500	58	Yes	Yes	Telecommunications, Medical, Computer and peripherals, Industrial, Robotics
Power-One	D•2117	1-30	3	5, 9-18, 18-36, 36-72	5, 12, 15, 3.3	up to 6	1500	17	Yes	Yes	Datacom, Industrial, Distribution power
Power Trends	D•2119	5-200	2	3.3-75	1.1-22	100mA-32	1500	50-100	No	Yes	Industrial, Computer, Telecom, Datacom
Rantec Microwave & Electronics, Inc.	D•2121	100, 250	3	24, 48, 310	2.1-24	30-40	4500	58	Yes	Yes	Military
RO Associates, Inc.	D•2124	40-250	3	20-32, 36-72, 220-400	2.1-28	2.5-60	4500	58	Yes	Yes	Telecom, Ind. computers
Schaefer, Inc.	D•2126	50-10K	4	10-900VDC, 10-30 AC	4.5-400	.25-300	3300		Yes	Yes	RR/Transit comm. and Signaling, Telecomm., Industrial Process Control, Power Stations, Emergency Shut Down Systems
Tamura Corp./AALTAM	D•1886	<500W	3	1-400	3-60	.05A-80A	0-4000	15	Yes	Yes	Industrial automation, test equipment, medical equipment
Todd Products Corp.	D•2127	1-300	1-4	2-400	2-400	1-40	2000	>50	Yes	Yes	Telcom, distributed power
Tri-Mag Inc.	D•2131	1-250	4	5-380	3.3-48	50mA-50A	500	23	Yes	Yes	Industrial, Tele-comm., Medical Equipment
UltraVolt, Inc.	D•2135	4-250	3	9-32	125-35K	500mA-2A	15K		Yes/No	Yes	Virtually unlimited
Vicor Corp.	D•2136	25-200	1-20	10-425	1-100	0-400	4000	≤120	Yes	Yes	Defense, EDP, Communications, Transportation, Industrial, Medical, Test
Volgen	D•2138	1-25	3	9-72	3.3-15	.025-3A	500-1500	13	Yes	Yes	Telecomm, distributed power, isolating loads minor, on-board conversions, other DC conversion requirements
Voltex Co., Inc.	D•2139	25-300	5	9-130	3-300	.05-70	500	7.5	Yes	Yes	Telecommunications, Control Systems, Instrumentation, Automotive, RF Systems, Aircraft
Wall Industries	D•2140	.5-1800	6	4.5-400	3.3-3000	50mA-20	4240	36	Yes/No	Yes/No	Telecom, Instrumentation, Process control, Medical, Communications
Wilmore Electronics Company, Inc.	D•2142	2-4000	1-4	12-250	5-130	up to 160	≥1500	up to 3.0	Yes	Yes	Telecommunications, SCADA systems, mobile communications, cellular communication sites (powering comm. elect, equip. on locomotives/ light-rail vehicles)

SYMBOLS USED BY INTERNATIONAL REGULATORY AGENCIES

These symbols appear on many electrical/electronic components distributed in the world market. They indicate that a country's standard-setting agency has approved the design of the component and/or a testing agency has approved the performance of the component in meeting the standard. This page lists only those countries that have a *symbol* to represent their authority.

Argentina (IRAM) Instituto Argentino de Racionalization de Materiales

Australia (SAA) Standards Association of Australia

Austria (ÖVE) Öesterreichischer Verband für Elektrotechnik

Belgium (CEB) Comité Electrotechnique Belge

Brazil (ABNT) Associação Brasileira de Normas Teonicas

Canada (CSA) Canadian Standards Association

Czechoslovakia Urad pro Normalizaci a Mereni (Office for Standards and Measurements)

Denmark (DEK) Dansk Elektroteknisk Komite (Danish Electrotechnical Committee)

Egypt (EOS) Egyptian Organization for Standardization and Quality Control

Finland (SETI) Electrical Inspectorate

France (UTE) Union Technique de l'Électricité

Germany, Democratic Republic of (East) (ASMW) Amt für Standardi-sierung Messwesen und Warenprufung (Office for Standardization, Metrology and Quality Control)

Germany, Federal Republic of (West) (DKE) Deutsche Electrotechnische Kommission im DIN und VDE (German Electrotechnical Commission of DIN and VDE)

Greece (ELOT) The Hellenic Organization of Standardization

Hong Kong Hong Kong Standards & Testing Centre

Hungary (MSZH) Magyar Szabvanyugi Hivatal (Hungarian Office for Standardization)

India (ISI) Indian Standards Institute "Manak Bhavan"

Indonesia Badan Kerjasama Standardisasi LIPI-YDNI (LIPI-YDNI Joint Standardization Committee)

Iran Institute of Standards and Industrial Research of Iran

Ireland (IIRS) Institute for Industrial Research and Standards

Israel (SII) Standards Institution of Israel

Italy (CEI) Comitato Elettrotecnico Italiano (Italian Electrotechnical Committee)

Japan (JISC) Japanese Industrial Standards Committee Agency of Industrial Science and Technology

Korea, Republic of (South) Industrial Advance Administration

Mexico (DGN) Dirección General de Normas Secretaria de Patrimonio y Fomento Industrial Puente de Tecamachalco

Netherlands (NEC) Nederlands Elektrotechnisch Comite

New Zealand (SANZ) Standards Association of New Zealand

Norway (NEK) Norsk Elektroteknisk Komite (Norwegian Electrotechnical Committee)

Pakistan Pakistan Standards Institution

Poland Polski Komitet Normalizacji Miar i Jakosci (Polish Committee for Standardization, Measures and Quality Control)

Portugal (CEP) Comissão Electrotécnica Portuguesa

Romania Institutul Roman de Standardizare (Romanian Standards Institute)

Singapore Singapore Institute of Standards and Industrial Research

South Africa (SABS) South African Bureau of Standards

Spain (IRANOR) Instituto Nacional de Racionalización y Normalización

Sweden (SEK) Svenska Elektriska Kommissionen (Swedish Electrotechnical Commission)

Switzerland (SEV) Schweizerischer Elektrotechnischer Verein Postfach

Turkey (TSE) Turk Standardlari Enstitusu (Turkish Standards Institution)

United Kingdom (BSI) British Standards Institution

United States (NEMA) National Electrical Manufacturers Association

United States (ANSI) American National Standards Institute

Venezuela CODELECTRA en Conjunto con COVENIN Avda. Ppal.

Yugoslavia Federal Institute of Standardization

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DC/DC MR SERIES 1 to 10 Watts
COMPACT ENCAPSULATED REGULATED SINGLE(S) DUAL(D)

INPUT VIN (VDC)	OUTPUT VOUT (VDC)	IOUT (MA)	CASE	MODEL	PRICING 1-9	10-UP
* Insert Vin		Prices increase w/ >Vout/Iout				
SINGLE 5	500	MR	*MR5S.5		$39	$36
	1500	RB	*MR5S1.5		59	56
5-9 12	350	MR	*MR12S.35		39	36
	600	RB	*MR12S.6		59	56
15	300	MR	*MR15S.3		39	36
	500	RB	*MR15S.5		59	56
10-48 24	200	MR	*MR24S.2		39	36
	350	RB	*MR24S.35		59	56
48	150	MR	*MR48S.15		39	36
	250	RB	*MR48S.25		59	56
DUAL ±5	± 150	MR	*MR5D.15		39	36
5-9	± 250	RB	*MR5D.25		59	56
±24	±100	MR	*MR24D.1		39	36
	± 200	RB	*MR24D.2		59	56

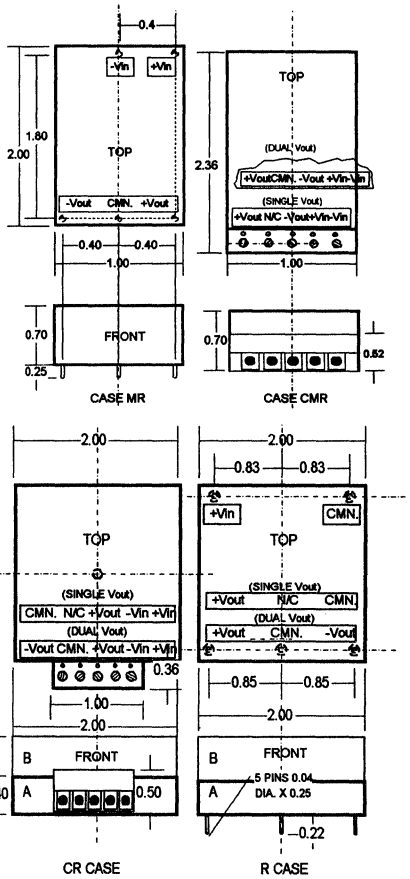
VOLTAGE /CURRENT COMBINATIONS ARE AVAILABLE WITHIN THE WATTAGE RATING S ABOVE.

SPECIFICATIONS	
PARAMETER	LIMIT
VIN TOLERANCE:	±10%
REGULATION LINE:	70MV
LOAD:	
VIN REFLECTED RIPPLE:	<50MVRMS
RIPPLE/NOISE:	< 50MVRMS
ISOLATION VIN/VOUT:	400VDC
TEMPERATURE COEFFICIENT:	0.02%/ C
OPERATING:	-25 C TO 71 C
STORAGE:	-55 C TO 85 C
SHORT CIRCUIT PROTECTTION:	AUTO-RECOVERY

MODEL NO. STRUCTURE FOR VOLTAGE/CURRENT NOT SHOWN ABOVE.
SAMPLE INPUT 12VDC OUTPUT: 24V@150MA

VIN — **12 MR 24 D .15**

SERIES ——— ———IOUT
VOUT——— —NO. OF OUTPUTS



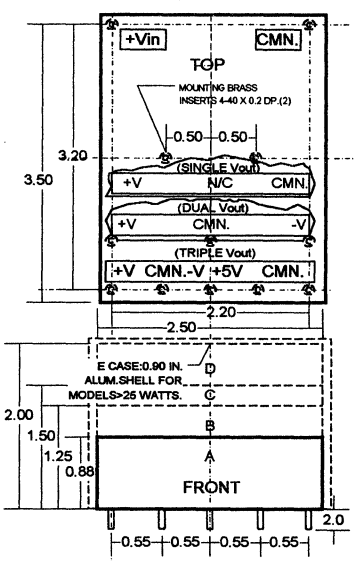
DC/DC R SERIES 2to 50 Watts
HIGH RELIABILITY REGULATED SINGLE(S) DUAL(D) TRIPLE(T)

INUT VIN (VDC)	OUTPUT VOUT (VDC)	IOUT(MA)	CASE	MODEL	PRICING 1-9	10-UP
* INSERT REQUIRED VIN		PRICE INCREASE W/ >VIN				
SINGLE 3.3/ 5	250	RA	*R5S.25		$71	$63
	1000	CA	*R5S1		98	89
12	300	RA	*R12S.3		71	63
	800	CA	*R12S.8		98	89
1.5-48 15	250	RA	*R15S.25		71	63
	750	CA	*R15S.75		85	89
24	200	RA	*R24S.2		71	63
	600	CA	*R24S.6		98	89
28	100	RA	*R28S.1		71	63
	500	CB	*R28S.5		98	89
DUAL ± 5	±250	RB	*R5D.25		$ 75	$66
	±750	CA	*R5D.75		93	84
1.5-48 ±12	±150	RA	*R12D.1		80	72
	± 500	CA	*R12D.5		98	89
± 15	± 150	RA	*R15D.15		89	82
	± 450	CC	*R15D.45		113	99
TRIPLE 5±12	.5/0.2A	CC	*R512T.5.2		119	110
1.5- 48 5±12	2/0.5A	CC	*R512T2.5		139	127
5±15	.5/0.2A	CD	*R515T.5.2		119	110
5±15	2/0.5A	CE	*R515T2.5		139	127

SPECIFICATIONS	
PARAMETER	LIMIT
REGULATION : LINE :	0.05%
LOAD :	0.1%
VOUT RIPPLE/NOISE :	25MVRMS
VIN TOL ERANCE:	10%
VIN REFLECTED RIPPLE :	1% VIN
ISOLATION INPUT:	500VDC
VOUT TOLERANCE :	1%
EFFICIENCY :	>75%
TEMPERATURE COEFFICIENT:	0.02%
OPERATING:	-25-+71C
STORAGE :	-55-+85C
SHORT CIRCUIT PROTECTION :	AUTO-RECOVERY

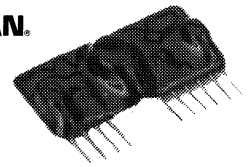
MODEL NO. STRUCTURE FOR VOLTAGE /CURRENT NOT SHOWN ABOVE.
SAMPLE: INPUT: 24VDC OUTPUT: 3.3V@1.5A

VIN — **24 R 3.3 S 1.5** - OPTION
SERIES ——— —— IOUT
VOUT——— — NO.OF OUTPUTS



NON-ISOLATED SINGLE-IN-LINE DC to DC CONVERTERS

MICROTRAN



Tamura DC/DC converters provide board level DC power conversion eliminating costly regulator circuitry, additional off-board power supplies and avoid time consuming safety agency certification. Single output SIP models complement the main power supply by providing polarity reversing, voltage boosting, voltage decreasing and direct battery input.

FEATURES

- Input Volt:±20%; 5VDC, ±10%;24VDC,±30%.
- Output Volt: ±1% Econo/ Battery, ±5%.
- Line Reg: 0.8%; Econo,1.2%; BAN/BAP. 5VDC, 2%; 12/15VDC, 1%
- Load Reg: 1.5%, 30-100% FL.
- Efficiency: 60% to 72% typ.
- Temp Coef: ≤0.03%/°C; 5 VDC out Econo, 0.05%/°C; 12VDC out Econo/Battery, 0.1%/°C.
- Operating Freq: 50-300kHz, FL to NL.
- Ripple/Noise: 60mV typ, ≤100mVp-p.
- Operating Temp: -10°C to +70°C FL.
- Storage Temp: -30°C to +85°C.
- Humidity: up to 95% RH max
- Case Mat'l: UL94-V0 epoxy.
- Insul. Resistance: ≥50MΩ at 500VDC.

SINGLE-IN-LINE CONVERTERS-SIP SERIES

POLARITY REVERSING NON-ISOLATION CONVERTERS

MODEL No.	Vin (VDC)	Vout (VDC)	Iout (ma)	C_1 (uf)	C_2 (uf)	$C_{3,4}$ (uf)	CKT
NAN-0505	5	-5	20.0	47	47	—	7
NAN-0512	5	-12	8.5	47	22	—	7
NCN-0505	5	-5	60.0	100	220	—	7
NCN-0512	5	-12	25.0	100	100	—	7

VOLTAGE BOOSTING NON-ISOLATION CONVERTERS

MODEL No.	Vin (VDC)	Vout (VDC)	Iout (ma)	C_1 (uf)	C_2 (uf)	$C_{3,4}$ (uf)	CKT
NAP-0512	5	12	8.4	47	22	—	7
NAP-0515	5	15	6.7	47	22	—	7
NAP-0524	5	24	4.2	47	10	—	7
NCP-0512	5	12	25.0	100	47	—	7
NCP-0515	5	15	20.0	100	47	—	7
NCP-0524	5	24	12.5	100	22	—	7
NDP-0512	5	12	42.0	220	100	—	7
NDP-0515	5	15	34.0	220	100	—	7
NDP-0524	5	24	21.0	220	47	—	7
NFP-0512	5	12	84.0	220	220	100	8
NFP-0515	5	15	67.0	220	220	47	8
NFP-0524	5	24	42.0	220	220	47	8

ECONOMY LINE NON-ISOLATION CONVERTERS

MODEL No.	Vin (VDC)	Vout (VDC)	Iout (ma)	C_1 (uf)	C_2 (uf)	$C_{3,4}$ (uf)	CKT
RCN-0505	5	-5	60.0	100	220	—	10
RCN-0512	5	-12	25.0	100	100	—	10
RCN-0515	5	-15	20.0	100	100	—	-10
RCN-1205	12	-5	60.0	47	220	—	10
RCN-1212	12	-12	25.0	47	100	—	10
RFP-2405	24	5	200.0	47	470	—	11
RHP-2405	24	5	400.0	100	1000	—	12

BATTERY INPUT NON-ISOLATION CONVERTERS

MODEL No.	Vin (VDC)	Vout (VDC)	Iout (ma)	C_1 (uf)	C_2 (uf)	$C_{3,4}$ (uf)	CKT
BAN-0205	1≤3.5	-5	10.00	47	47	—	13
BAN-0212	1≤3.5	-12	4.17	47	22	—	13
BAN-0215	1≤3.5	-15	3.33	47	22	—	13
BAP-0205	1≤3.5	5	10.00	47	47	—	13
BAP-0212	1≤3.5	12	4.17	47	22	—	13
BAP-0215	1≤3.5	15	3.33	47	22	—	13

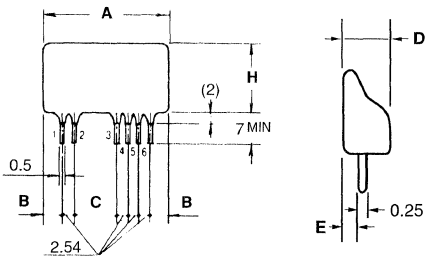
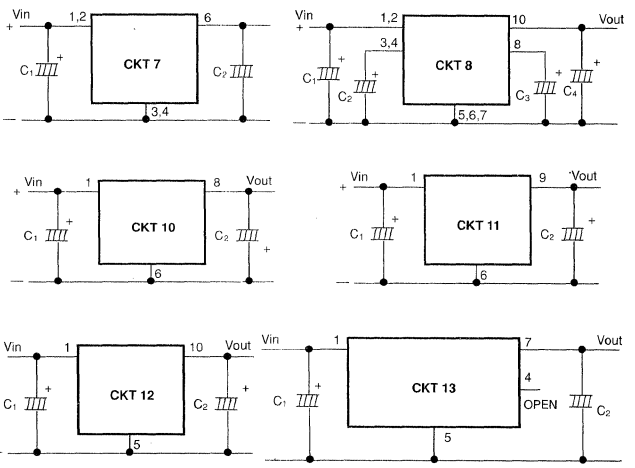


FIG. 2
TYPICAL SIP OUTLINE

SERIES PREFIX	DIMENSIONS (mm)						
	A	B	C	D	E min	H	WT (gm)
NAN,NAP	21.0	2.63	5.08	8	0.5	17	2.3
NCN,NCP	24.4	4.58	5.08	8	0.5	17	2.8
NDP	29.5	4.59	10.16	8	0.5	17	3.3
NFP	36.5	3.01	10.16	8	0.5	17	4.4
RCN	24.4	4.59	10.16	8	0.5	17	2.5
RFP	27.4	4.59	10.16	10	0.5	17	3.0
RHP	32.0	4.58	5.08	10	0.5	22	4.8
BAN,BAP	21.0	2.38	5.08	10	2.9	10	1.8

Note 1: Pin dia. = .75mm.



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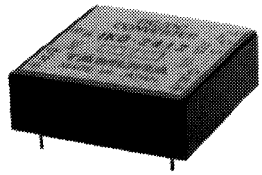
ISOLATED TYPE DC to DC CONVERTERS

tamura
MICROTRAN

Tamura's isolation models in a dual-in-line package (DIP) have single and dual outputs from 300 to 3,000 mW with built in noise filter inductors and overload protection. For telecom requirements there are 48VDC quad output devices.



FEATURES

- Input Volt: 5VDC, ±10%; others ±20%.
- 48VDC range, 42 to 60V.
- Output Volt: ±1%, Telcom, ±2%.
- Line Reg: 0.5%; -0505, 0.8%; Telcom, 1%.
- Load Reg: 3.0%; 5VDC out, 6%; Telcom, 8%.
- Efficiency: 60% to72% typ.
- Temp. Coef: <0.03/°C.
- Overload Protection: 130-200% FL.
- Operating Freq: 50-300kHz, FL to NL.
- Ripple/Noise: 60mV typ, 100mV p-p max.
- Operating Temp: -10°C to +70°C. FL
- Storage Temp: -30°C to +85°C.
- Humidity: up to 95% RH. max.
- Case Mat'l: UL94V-0 epoxy; 0.33mm alum., 3.0W series.

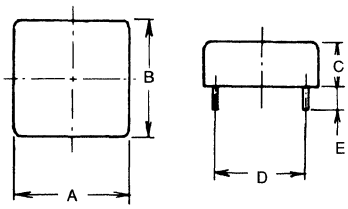
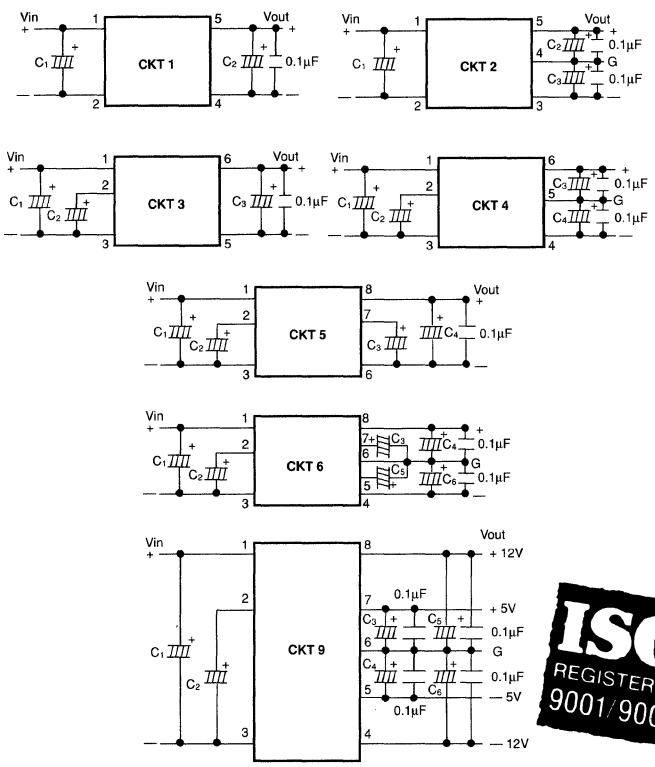


FIG. 1 TYPICAL DIP OUTLINE

SERIES PREFIX	DIMENSIONS: (mm) A	B	C max	D	E min	WT (gm)
ICS/ICD	20.1	20.1	8.5	16.0	4	6.3
IDS/IDD	24.6	24.6	10.5	20.5	5	11.5
IFS/IFD/IFQ	26.9	28.9	10.5	22.8	5	14.7
IKS/IKD/IKQ	36.4	36.4	12.0	28.0	4	29.9



ISOLATION DC/DC CONVERTERS-DIP SERIES

0.3 WATT

MODEL No.	Vin (VDC)	Vout (VDC)	Iout (ma)	C_1 (uf)	C_2 (uf)	C_3 (uf)	CKT
ICS-0505	5	5	60	100	100	—	1
ICS-0512	5	12	25	100	47	—	1
ICD-0512	5	±12	12.5	100	22	22	2
ICS-1205	12	5	60	47	100	—	1
ICS-1212	12	12	25	47	47	—	1
ICD-1212	12	±12	12.5	47	22	22	2
ICS-2405	24	5	60	22	100	—	1
ICS-2412	24	12	25	22	47	—	1
ICD-2412	24	±12	12.5	22	22	22	2

0.5 WATT

MODEL No.	Vin (VDC)	Vout (VDC)	Iout (ma)	C_1 (uf)	C_2 (uf)	$C_{3,4}$ (uf)	CKT
IDS-0505	5	5	100	220	220	220	3
IDS-0512	5	12	42	220	220	100	3
IDD-0512	5	±12	21	220	220	47	4
IDS-1205	12	5	100	47	47	220	3
IDS-1212	12	12	42	47	47	100	3
IDD-1212	12	±12	21	47	47	47	4
IDS-2405	24	5	100	22	22	220	3
IDS-2412	24	12	42	22	22	100	3
IDD-2412	24	±12	21	22	22	47	4

1.0 WATT

MODEL No.	Vin (VDC)	Vout (VDC)	Iout (ma)	$C_{1,2}$ (uf)	$C_{3,4}$ (uf)	$C_{5,6}$ (uf)	CKT
IFS-0505	5	5	200	470	330	—	5
IFS-0512	5	12	84	470	100	—	5
IFD-0512	5	±12	42	470	47	47	6
IFS-0524	5	24	42	470	47	—	5
IFS-1205	12	5	200	100	330	—	5
IFS-1212	12	12	84	100	100	—	5
IFD-1212	12	±12	42	100	47	47	6
IFS-2405	24	5	200	47	330	—	5
IFS-2412	24	12	84	47	100	—	5
IFD-2412	24	±12	42	47	47	47	6

3.0 WATT

MODEL No.	Vin (VDC)	Vout (VDC)	Iout (ma)	$C_{1,2}$ (uf)	$C_{3,4}$ (uf)	$C_{5,6}$ (uf)	CKT
IKS-0505	5	5	600	2200	1000	—	5
IKD-0512	5	±12	125	2200	100	100	6
IKD-0515	5	±15	100	2200	100	100	6
IKS-0524	5	24	125	2200	100	—	5
IKS-1205	12	5	600	470	1000	—	5
IKS-1212	12	12	250	470	330	—	5
IKD-1212	12	±12	125	470	100	100	6
IKS-2405	24	5	600	100	1000	—	5
IKS-2412	24	12	250	100	330	—	5
IKD-2412	24	±12	125	100	100	100	6

48V-MULTI OUTPUT

MODEL No.	Vin (VDC)	Vout (VDC)	Iout (ma)	$C_{1,2}$ (uf)	$C_{3,4}$ (uf)	$C_{5,6}$ (uf)	CKT
IFQ-48A	48	±5 ±12	33.0 7.1	10	100	22	9
IKQ-48A	48	±5 ±12	67.0 14.2	22	220	33	9

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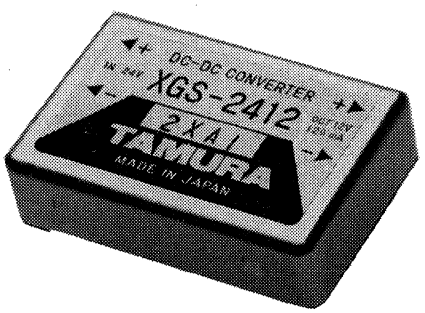
MICROTRAN.

1.5W TO 3.0W SHIELDED DC to DC CONVERTERS

FEATURES

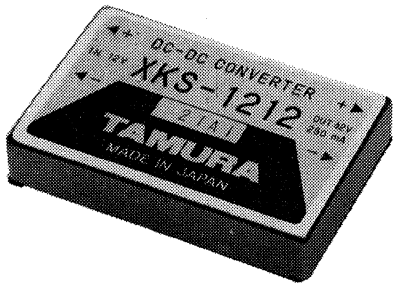
- No External Circuitry Required
- Compact and lightweight.
- Input regulation: 1% max.
- Load regulation: 1% max.
- Ripple noise: 100mVp-p max.
- Temperature coefficient: 0.03%/°C
- Overcurrent protection: automatic reset type
- Ambient temperature : (operating) -20°C~70°C (-20°C:50% -10°C~60°C:100% 70°C:50%)
- Withstand voltage: Primary•secondary•case 500V AC for one minute
- Vibration/Shock: 1.5mm•10~55Hz, 3 directions each 2 hour/50G MAX



1.5W SINGLE OUTPUT DC-DC CONVERTORS

MODEL NO.	INPUT VOLTAGE (V)	OUTPUT VOLTAGE (V)	OUTPUT CURRENT (mA)
XGS-0505	5.0 (4.5~6.0)	5.0	30~300
XGS-0512	5.0 (4.5~6.0)	12.0	12~120
XGS-0515	5.0 (4.5~6.0)	15.0	10~100
XGS-1205	12.0 (8.0~16.5)	5.0	30~300
XGS-1212	12.0 (8.0~16.5)	12.0	12~120
XGS-1215	12.0 (8.0~16.5)	15.0	10~100
XGS-2405	24.0 (18.0~32.0)	5.0	30~300
XGS-2412	24.0 (18.0~32.0)	12.0	12~120
XGS-2415	24.0 (18.0~32.0)	15.0	10~100

weight = 15g max

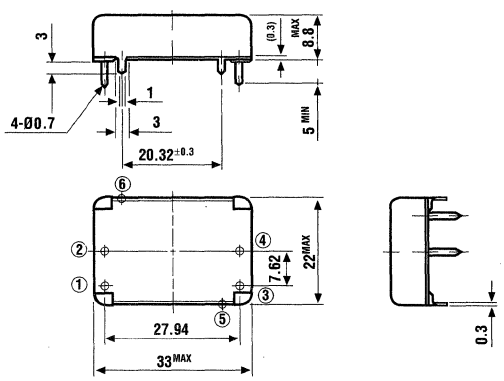


3.0W SINGLE OUTPUT DC-DC CONVERTORS

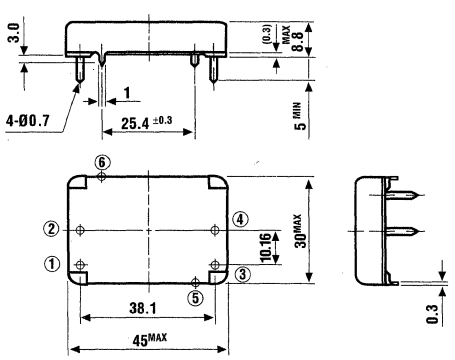
MODEL NO.	INPUT VOLTAGE (V)	OUTPUT VOLTAGE (V)	OUTPUT CURRENT (mA)
XKS-0505	5.0 (4.5~5.5)	5.0	50~500
XKS-0512	5.0 (4.5~6.0)	12.0	25~250
XKS-0515	5.0 (4.5~6.0)	15.0	20~200
XKS-1205	12.0 (9.6~14.4)	5.0	50~500
XKS-1212	12.0 (9.6~14.4)	12.0	25~250
XKS-1215	12.0 (9.6~14.4)	15.0	20~200
XKS-2405	24.0 (18.0~32.0)	5.0	50~500
XKS-2412	24.0 (18.0~32.0)	12.0	25~250
XKS-2415	24.0 (18.0~32.0)	15.0	20~200
XKS-4805	48.0 (56.0~72.0)	5.0	50~500

weight = 25g max

XGS MECHANICAL DIMENSIONS



XKS MECHANICAL DIMENSIONS



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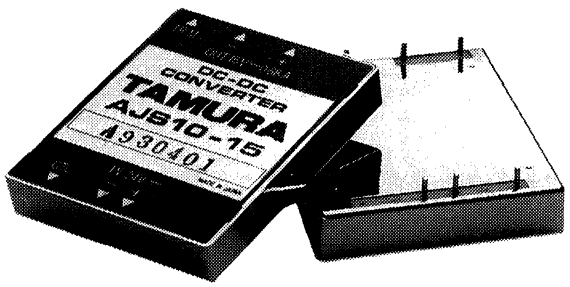
10W TO 25W SHIELDED DC to DC CONVERTERS

MICROTRAN

Tamura's 10W and 25W ultra thin type DC-DC converters are recommended for communication equipment, measurement instrumentation, Factory Automation control equipment, or any application that requires high reliability and high power density.



FEATURES

- No external circuitry required
- Compact and lightweight
- Efficiency 81% typical
- Ultra-thin: 8.5mm (most suitable for DS mounting)
- Long life design: Electrolytic capacitors are not used
- Wide range input voltage
- Six-side shield
- Output voltage variable range: ±10% (outer trimmer used)
- Remote control: Provided
- Operation ambient temperature: -25~+60°C
- Withstand voltage: 500VDC for 1 min.

10W SINGLE OUTPUT ISOLATED DC-DC CONVERTORS

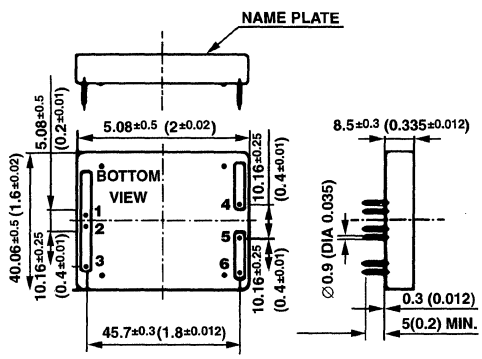
MODEL NO.	INPUT VOLTAGE RANGE (V)	OUTPUT VOLTAGE (V)	OUTPUT CURRENT (mA)	OUTPUT POWER (W)
AJS10-5	18~36VDC	5.0	2.00	10.0
AJS10-12	18~36VDC	12.0	0.84	10.0
AJS10-15	18~36VDC	15.0	0.68	10.0
AKS10-5	36~72VDC	5.0	2.00	10.0
AKS10-12	36~72VDC	12.0	0.84	10.0
AKS10-15	36~72VDC	15.0	0.68	10.0

25W* SINGLE OUTPUT ISOLATED DC-DC CONVERTORS

MODEL NO.	INPUT VOLTAGE RANGE (V)	OUTPUT VOLTAGE (V)	OUTPUT CURRENT (mA)	OUTPUT POWER (W)
AJS25-5	18~36VDC	5.0	5.00	25.0*
AJS25-12	18~36VDC	12.0	2.10	25.0*
AJS25-15	18~36VDC	15.0	1.70	25.0*
AKS25-5	36~72VDC	5.0	5.00	25.0*
AKS25-12	36~72VDC	12.0	2.10	25.0*
AKS25-15	36~72VDC	15.0	1.70	25.0*

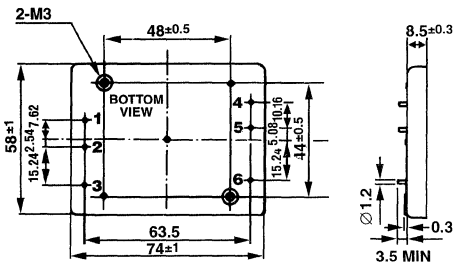
* output power based on -30° to +80°C base plate temperature

10W MECHANICAL DIMENSIONS



PIN No.	PIN FUNCTION
1	- INPUT
2	+ INPUT
3	CONTROL
4	- OUTPUT
5	+ OUTPUT
6	TRIM

25W MECHANICAL DIMENSIONS



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The ability to produce power supplies of the highest quality, while meeting the stringent requirements of MIL-I-45208, NAVMAT P4855-1, or MIL-STD-454 design and workmanship specifications, is the foundation of Abbott's commitment to excellence. To further ensure the reliability of field proven designs, selective power supplies are subjected to rigorous environmental stress screening, including MIL-STD-883.

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DC/DC Converters

Series	Input Volt	Power	Output Voltage	# outputs	EMI	Transient	Case Size
NB15S	14-40	15	2,3.3,5,5.2,12,15	Single	Ext Filter	Mil-STD-704D	3.0 x 1.0 x 0.38
AB20S	14-32	20	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	2.20 x 2.80 x .85
AW20S	90-160	20	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	2.50 x 3.00 x .85
NB30D	14-40	30	2,3.3,5,5.2,12,15	Dual	Ext Filter	Mil-STD-704D	3.0 x 2.0 x 0.38
AB35S	14-32	35	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	2.50 x 3.50 x .85
AB35D	14-32	35	±5,±12,±15	Dual	Mil-STD-461C	Mil-STD-704A	2.50 x 3.50 x .85
AW35S	90-160	35	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	3.00 x 3.50 x .85
AW35D	90-160	35	±5,±12,±15	Dual	Mil-STD-461C	Mil-STD-704A	3.00 x 3.50 x .85
NB45T	14-40	45	2,3.3,5,5.2,12,15	Triple	Ext Filter	Mil-STD-704D	3.0 x 3.0 x 0.38
AB50S	14-32	50	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	3.00 x 3.85 x .85
AB50D	14-32	50	±5,±12,±15	Dual	Mil-STD-461C	Mil-STD-704A	3.00 x 3.85 x .85
AW50S	90-160	50	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	3.25 x 4.00 x .85
AW50D	90-160	50	±5,±12,±15	Dual	Mil-STD-461C	Mil-STD-704A	3.25 x 4.00 x .85
AM50S	100-300	50	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	3.25 x 4.25 x .85
AM50T	100-300	50	(5,±12) (5,±15)	Triple	Mil-STD-461C	Mil-STD-704A	3.50 x 4.50 x .85
NB50S	14-40	50	2,3.3,5,5.2,12,15,24,28	Single	Ext Filter	Mil-STD-704D	3.0 x 1.5 x 0.38
NB50T	14-40	50	5,±12 or ±15	Triple	Ext Filter	Mil-STD-704D	3.0 x 2.0 x 0.38
SMH50S	18-36	50	2,3.3,5,5.2,12,15,24,28,48	Single	Ext Filter	Mil-STD-704D	2.4 x 2.3 x 0.5
SMH50S(270)	200-400	50	2,3.3,5,5.2,12,15,24,28,48	Single	Ext Filter	Mil-STD-704D	2.4 x 2.3 x 0.5
NB80T	14-40	80	2,3.3,5,5.2,12,15,24,28	Triple	Ext Filter	Mil-STD-704D	3.0 x 3.5 x 0.38
AB100S	18-32	100	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	3.50 x 4.50 x .85
AW100S	90-160	100	2,3.3,5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	3.75 x 5.25 x .85
AM100S	200-300	100	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	4.25 x 6.00 x .85
NB100	14-40	100	2,3.3,5,5.2,12,15,24,28	Single,Dual	Ext Filter	Mil-STD-704D	3.0 x 3.0 x 0.38
SMH100S	18-36	100	2,3.3,5,5.2,12,15,24,28,48	Single	Ext Filter	Mil-STD-704D	2.4 x 2.3 x 0.5
SM100S	18-36	100	2,3.3,5,5.2,12,15,24,28,48	Single	Ext Filter	Mil-STD-704D	2.4 x 4.6 x 0.5
SM100D	18-36	100	5,12,15	Dual	Ext Filter	Mil-STD-704D	2.4 x 4.6 x 0.5
SMH100S(270)	200-400	100	2,3.3,5,5.2,12,15,24,28,48	Single	Ext Filter	Mil-STD-704D	2.4 x 2.3 x 0.5
SM100S(270)	200-400	100	2,3.3,5,5.2,12,15,24,28,48	Single	Ext Filter	Mil-STD-704D	2.4 x 4.6 x 0.5
SM100D(270)	200-400	100	5,12,15	Dual	Ext Filter	Mil-STD-704D	2.4 x 4.6 x 0.5
NB150	14-40	150	2,3.3,5,5.2,12,15,24,28	Single,Triple	Ext Filter	Mil-STD-704D	3.0 x 4.5 x 0.38
AB200S	18-32	200	5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	4.25 x 5.50 x .85
AW200S	90-160	200	2,3.3,5,5.2,12,15,24,28	Single	Mil-STD-461C	Mil-STD-704A	4.50 x 6.50 x .85
SM200D	18-36	200	5,12,15	Dual	Ext Filter	Mil-STD-704D	2.4 x 4.6 x 0.5
SM200D(270)	200-400	200	5,12,15	Dual	Ext Filter	Mil-STD-704D	2.4 x 4.6 x 0.5
SM200S	18-36	280	2,3.3,5,5.2,12,15,24,28,48	Single	Ext Filter	Mil-STD-704D	2.4 x 4.6 x 0.5
SM200S(270)	200-400	280	2,3.3,5,5.2,12,15,24,28,48	Single	Ext Filter	Mil-STD-704D	2.4 x 4.6 x 0.5

Series	Input Volt	Power	Filter Type	EMI	Transient	Case Size
NBF50	15-40	50	EMI Filter	Mil-STD-461D		1.75 x 1.5 x 0.38
NBF150	15-40	150	EMI FIlter	Mil-STD-461D		3.0 x 2.0 x 0.38
SMF200	28	200	EMI Filter	Mil-STD-461D		2.4 x 2.3 x 0.5
SMF200(270)	270	280	EMI FIlter	Mil-STD-461D		2.4 x 2.3 x 0.5
SM1275	14-40		Transient Suppressor		Mil-STD-704A	2.4 x 2.3 x 0.5
SMRA	2-48		Ripple Attenuator			2.4 x 2.3 x 0.5
SMR	85-130 Vac		AC Rectifier			2.4 x 2.3 x 0.5

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MARTEK POWER

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NB15S

Industrial and **Military** Power Supplies

NB SERIES

High Density DC to DC Converters

Features

- .38 Inch Profile
- Remote Turn On (TTL)
- Output Voltage Trim Pin
- Over Temperature Protection
- MIL-STD-883 Screening (Military Version)
- Output Overvoltage/Overcurrent Protection

Input Characteristics

	Min.	Typ.	Max.	Units
Input Voltage	14	28	40	Vdc
Brown Out (75% of Full Load)		12		Vdc
No Load Power Dissipation		1	2	Watt
Inrush Charge			1	mc
Reflective Ripple Current		22		%
Logic Disable Current (Sink)		100	150	µA
Logic Disable Power In		1	2	W
Input Ripple Rejection (120 Hz)		55		dB
Input Ripple Rejection (800 Hz)		40		dB
Efficiency (FL)	75	82		%
3.3 Vdc Output (FL)	70	76		%
2 Vdc Output (FL)	60	65		%

EMI: Units conform to MIL-STD-461D (on the input leads) with companion filter

Input Transient : Units conform to MIL-STD-704D for transients up to 50V for 0.1 second

Output Characteristics

	Min.	Typ.	Max.	Units
Set Point Accuracy			1	% V_{out}
Load Regulation		5	25	mV
Line Regulation		2	10	mV
Ripple P-P (10 MHz)		50	100	mV
Trim Range	100		115	% V_{out}
Overvoltage Protection		125		% V_{out}
Transient Response (Vout 1%) Time/Overshoot				
20-80% Load		350/250		µS/mV
Low Line - High Line		300/300		µS/mV
50-100% Load		250/200		µS/mV
Temperature Drift		0.01	0.02	%/°C
Long Term Drift		0.01	0.02	%/1KHrs
Current Limit	105	125	150	% I_{out}
Short Circuit Current	25		75	% I_{out}
Turn On Time		2		mS
Logic Turn On Time		2		mS

Selection Chart

Nominal Output Voltage	Output Current (Amps)	Model Number (Industrial)	Model Number (Military)
2	3.0	NB15SI/2-A	NB15SM/2-A
3.3	3.0	NB15SI/3.3-A	NB15SM/3.3-A
5	3.0	NB15SI/5-A	NB15SM/5-A
5.2	2.9	NB15SI/5.2-A	NB15SM/5.2-A
12	1.25	NB15SI/12-A	NB15SM/12-A
15	1.0	NB15SI/15-A	NB15SM/15-A

Temperature Characteristics

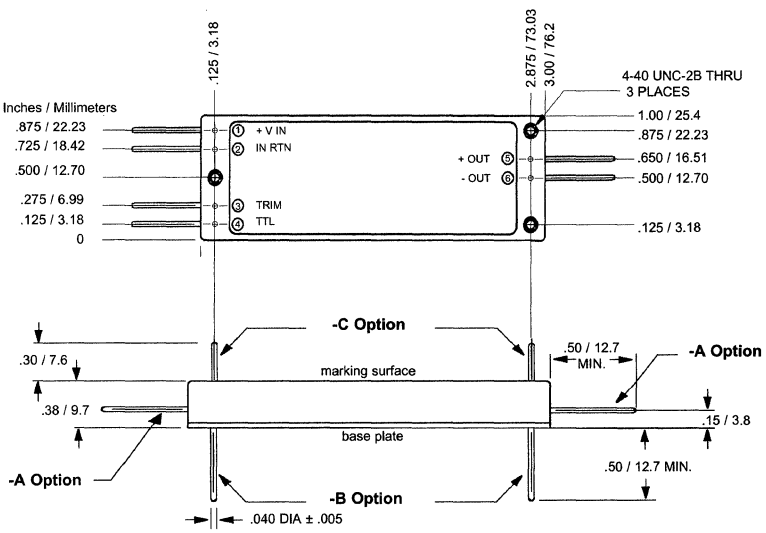
	Min.	Typ.	Max.	Units
Operating				
Industrial Grade	-40		+71	°C
Military Grade	-55		+100	°C
Storage (Ambient)	-55		+125	°C
Over Temperature Shutdown				
Industrial Grade		+75		°C
Military Grade		+105		°C
Thermal Resistance				
Case - Ambient		3		°C/W

Isolation Characteristics

	Min.	Typ.	Max.	Units
Isolation:				
Input to Output	500			Vdc
Output to Base	250			Vdc
Input to Base	250			Vdc
Input to Output Capacitance		0.022		µF
Insulation Resistance				
(@50 Vdc)	50			MOhm

Military Grade - MIL-STD-883 Screening

Case Drawings



Mechanical Characteristics

Weight		1.8			oz.
		50			grams
Size	3.0	x 1.0	x 0.38		inch
	76.2	x 25.4	x 9.7		mm.
Volume		1.14			$inch^3$
		18.7			cm^3

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.40

Material: Pin - Brass (Solder Plating)
Baseplate - Aluminum 5052-H32
Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting: Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (3 places).
D Option: 0.115 DIA thru holes (3 places).

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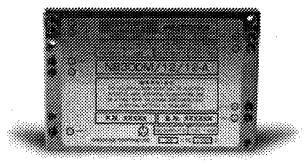
NB30D

Industrial and **Military** Power Supplies

NB SERIES

High Density DC to DC Converters



Features

- .38 Inch Profile
- Remote Turn On (TTL)
- Output Voltage Trim Pin
- Over Temperature Protection
- MIL-STD-883 Screening (Military Version)
- Output Overvoltage/Overcurrent Protection

Input Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Input Voltage	14	28	40	Vdc
Brown Out (75% of Full Load)		12		Vdc
No Load Power Dissipation		1	2	Watt
Inrush Charge			1	mc
Reflective Ripple Current		22		%
Logic Disable Current (Sink)		100	150	µA
Logic Disable Power In		1	2	W
Input Ripple Rejection (120 Hz)		55		dB
Input Ripple Rejection (800 Hz)		40		dB
Efficiency (FL)	75	82		%
3.3 Vdc Output (FL)	70	76		%
2 Vdc Output (FL)	60	65		%

EMI: Units conform to MIL-STD-461D (on the input leads) with companion filter

Input Transient : Units conform to MIL-STD-704D for transients up to 50V for 0.1 second

Output Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Set Point Accuracy			1	% V_{out}
Load Regulation		5	25	mV
Line Regulation		2	10	mV
Ripple P-P (10 MHz)		50	100	mV
Trim Range	100		115	% V_{out}
Overvoltage Protection		125		% V_{out}
Transient Response (Vout 1%) Time/Overshoot				
20-80% Load		350/250		µS/mV
Low Line - High Line		300/300		µS/mV
50-100% Load		250/200		µS/mV
Temperature Drift		0.01	0.02	%/°C
Long Term Drift		0.01	0.02	%/1KHrs
Current Limit	105	125	150	% I_{out}
Short Circuit Current	25		75	% I_{out}
Turn On Time		2		mS
Logic Turn On Time		2		mS

Selection Chart

Nominal Output Voltage	Dual Output; Per Channel Output Current (Amps)
2	3.0
3.3	3.0
5	3.0
5.2	2.9
12	1.25
15	1.0

Temperature Characteristics

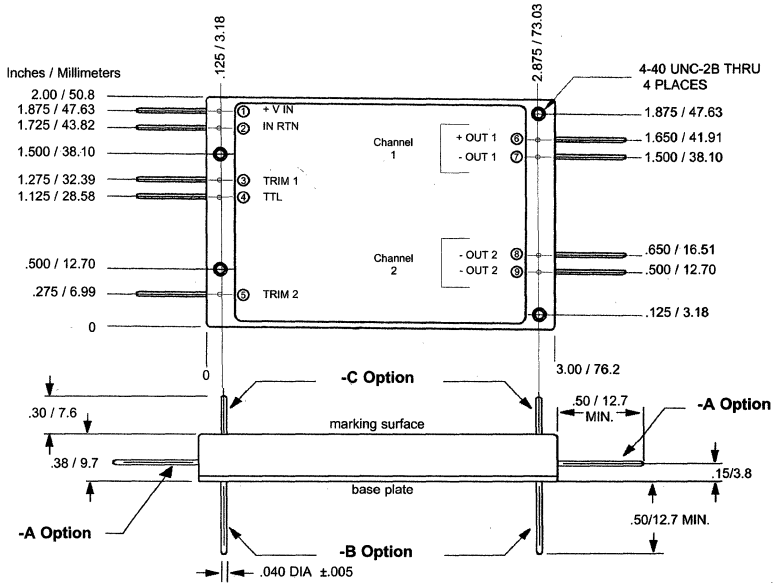
	Min.	Typ.	Max.	Units
Operating				
Industrial Grade	-40		+71	°C
Military Grade	-55		+100	°C
Storage (Ambient)	-55		+125	°C
Over Temperature Shutdown				
Industrial Grade		+75		°C
Military Grade		+105		°C
Thermal Resistance				
Case - Ambient		3		°C/W

Isolation Characteristics

	Min.	Typ.	Max.	Units
Isolation:				
Input to Output	500			Vdc
Output to Base	250			Vdc
Input to Base	250			Vdc
Input to Output Capacitance		0.022		µF
Insulation Resistance				
(@50 Vdc)	50			MOhm

Military Grade - MIL-STD-883 Screening

Case Drawings



Mechanical Characteristics

Weight	3.6	oz.
	100	grams
Size	3.0 x 2.0 x 0.38	inch
	76.2 x 50.8 x 9.7	mm.
Volume	2.28	$inch^3$
	37.4	cm^3

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.40

Material: Pin - Brass (Solder Plating)
Baseplate - Aluminum 5052-H32
Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting: Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (4 places).
D Option: 0.115 DIA thru holes (4 places).

To Order: Model series is followed by desired output voltages and options i.e. NB30DI/15/15-A; two 15Vdc channels with pins out of the side.

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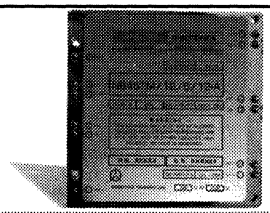
NB45T

Industrial and Military Power Supplies

NB SERIES

High Density DC to DC Converters



Features

- .38 Inch Profile
- Remote Turn On (TTL)
- Output Voltage Trim Pin
- Over Temperature Protection
- MIL-STD-883 Screening (Military Version)
- Output Overvoltage/Overcurrent Protection

Input Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Input Voltage	14	28	40	Vdc
Brown Out (75% of Full Load)		12		Vdc
No Load Power Dissipation		1	2	Watt
Inrush Charge			1	mc
Reflective Ripple Current		22		%
Logic Disable Current (Sink)		100	150	µA
Logic Disable Power In		1	2	W
Input Ripple Rejection (120 Hz)		55		dB
Input Ripple Rejection (800 Hz)		40		dB
Efficiency (FL)	75	82		%
3.3 Vdc Output (FL)	70	76		%
2 Vdc Output (FL)	60	65		%
EMI: Units conform to MIL-STD-461D (on the input leads) with companion filter				
Input Transient : Units conform to MIL-STD-704D for transients up to 50V for 0.1 second				

Output Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Set Point Accuracy			1	% V_{out}
Load Regulation		5	25	mV
Line Regulation		2	10	mV
Ripple P-P (10 MHz)		50	100	mV
Trim Range	100		115	% V_{out}
Overvoltage Protection		125		% V_{out}
Transient Response (Vout 1%) Time/Overshoot				
20-80% Load		350/250		µS/mV
Low Line - High Line		300/300		µS/mV
50-100% Load		250/200		µS/mV
Temperature Drift		0.01	0.02	%/°C
Long Term Drift		0.01	0.02	%/1KHrs
Current Limit	105	125	150	% I_{out}
Short Circuit Current	25		75	% I_{out}
Turn On Time		2		mS
Logic Turn On Time		2		mS

Selection Chart

Nominal Output Voltage	Triple Output; Per Channel Output Current (Amps)
2	3.0
3.3	3.0
5	3.0
5.2	2.9
12	1.25
15	1.0

Temperature Characteristics

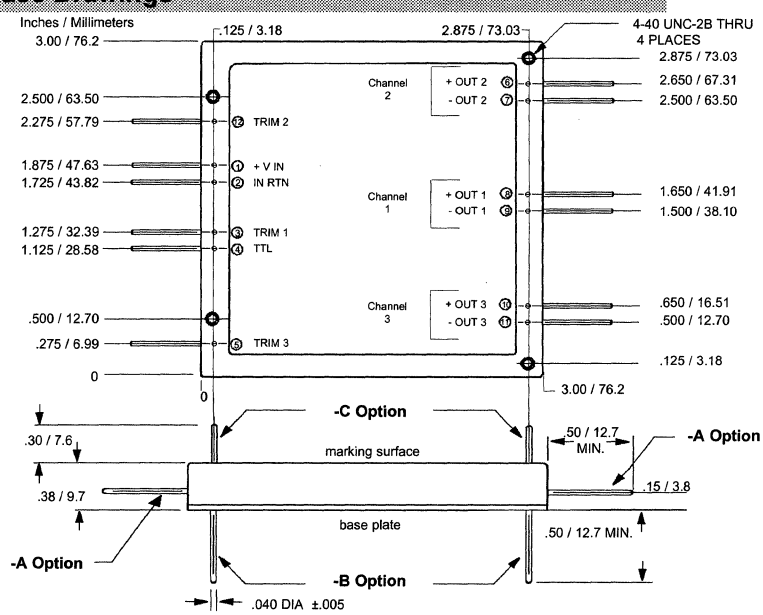
	Min.	Typ.	Max.	Units
Operating				
Industrial Grade	-40		+71	°C
Military Grade	-55		+100	°C
Storage (Ambient)	-55		+125	°C
Over Temperature Shutdown				
Industrial Grade		+75		°C
Military Grade		+105		°C
Thermal Resistance				
Case - Ambient		3		°C/W

Isolation Characteristics

	Min.	Typ.	Max.	Units
Isolation:				
Input to Output	500			Vdc
Output to Base	250			Vdc
Input to Base	250			Vdc
Input to Output Capacitance		0.022		µF
Insulation Resistance				
(@50 Vdc)	50			MOhm

Military Grade - MIL-STD-883 Screening

Case Drawings



Mechanical Characteristics

Weight	5.4	oz.
	150	grams
Size	3.0 x 3.0 x 0.38	inch
	76.2 x 76.2 x 9.7	mm.
Volume	3.42	$inch^3$
	56.1	cm^3

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.40

Material: Pin - Brass (Solder Plating)
Baseplate - Aluminum 5052-H32
Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting: Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (4 places).
D Option: 0.115 DIA thru holes (4 places).

To Order: To order a 45 watt, triple output, 15Vdc, 15Vdc and 5.2 Vdc, industrial grade power supply with pins out of the bottom, the model number would be: NB45TI/15/15/5.2-B. When ordering a triple output unit, the first output voltage ' model number is located on channel 1, the second on c' and the third on channel 3 (see case drawing).

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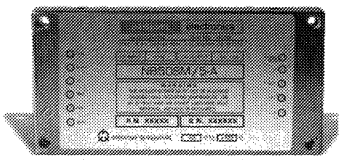
Industrial and Military Power Supplies

NB50S

NB SERIES

High Density DC to DC Converters



Features

- .38 Inch Profile
- Parallelable Operation
- Remote Turn On (TTL)
- Output Voltage Trim Pin
- Over Temperature Protection
- Output Overvoltage/Overcurrent Protection

Input Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Input Voltage	14	28	40	Vdc
Brown Out (75% of Full Load)		12.5		Vdc
No Load Power Dissipation		2	3	Watt
Inrush Charge			2	mc
Reflective Ripple Current		20		%
Logic Disable Current (Sink)		100	150	mA
Logic Disable Power In		1.2	2.5	W
Input Ripple Rejection (120 Hz)		55		dB
Input Ripple Rejection (800 Hz)		40		dB
Efficiency (FL)	73	78-83		%
3.3 Vdc Output (FL)	68	74		%
2 Vdc Output (FL)	62	69		%

EMI: Units conform to MIL-STD-461D (on the input leads) with companion filter

Input Transient : Units conform to MIL-STD-704D for transients up to 50V for 0.1 second

Output Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Set Point Accuracy			1	% V_{out}
Load Regulation		5	25	mV
Line Regulation		5	25	mV
Ripple P-P (10 MHz)		60	150	mV
Trim Range	100		110	% V_{out}
Remote Sense Compensation		0.5		Vdc
Overvoltage Protection(2V, 3.3V)		140		% V_{out}
Overvoltage Protection (5V-28V)		125		% V_{out}
Current Sharing		±10		
Transient Response (Vout 1%) Time/Overshoot				
20-80% Load		300/300		µS/mV
Low Line - High Line		300/400		µS/mV
50-100% Load		250/200		µS/mV
Temperature Drift		0.01	0.02	%/°C
Current Limit	105	125	150	% I_{out}
Short Circuit Current	10		50	% I_{out}
Turn On Time		2.5		mS

Selection Chart

Nominal Output Voltage	Output Current (Amps)	Model Number (Industrial)	Model Number (Military)
2	10	NB50SI/2-A	NB50SM/2-A
3.3	10	NB50SI/3.3-A	NB50SM/3.3-A
5	10	NB50SI/5-A	NB50SM/5-A
5.2	9.6	NB50SI/5.2-A	NB50SM/5.2-A
12	4.2	NB50SI/12-A	NB50SM/12-A
15	3.3	NB50SI/15-A	NB50SM/15-A
24	2.1	NB50SI/24-A	NB50SM/24-A
28	1.8	NB50SI/28-A	NB50SM/28-A

Temperature Characteristics

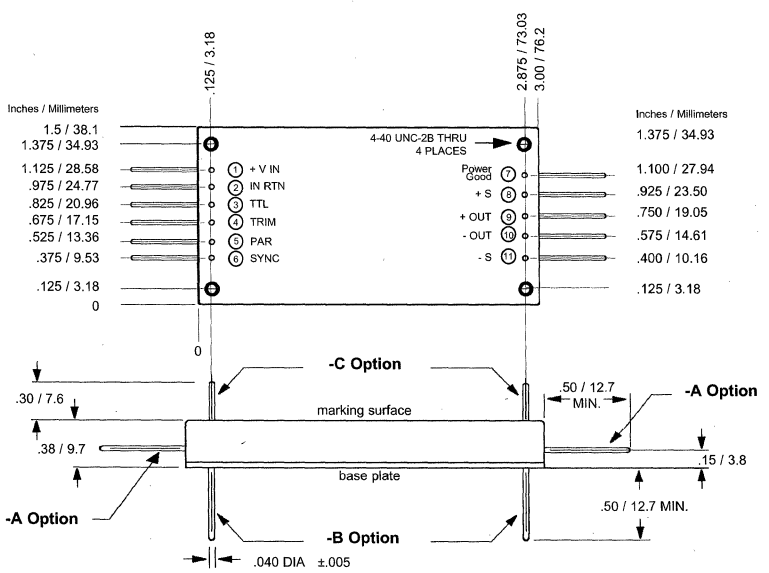
	Min.	Typ.	Max.	Units
Operating				
Industrial Grade	-40		+71	°C
Military Grade	-55		+100	°C
Storage (Ambient)	-55		+125	°C
Over Temperature Shutdown				
Industrial Grade		+75		°C
Military Grade		+105		°C
Thermal Resistance				
Case - Ambient		5		°C/W

Isolation Characteristics

	Min.	Typ.	Max.	Units
Isolation:				
Input to Output	500			Vdc
Output to Base	250			Vdc
Input to Base	250			Vdc
Input to Output Capacitance		0.022		µF
Insulation Resistance				
(@50 Vdc)	50			MOhm

Military Grade - MIL-STD-883 Screening

Case Drawings



Mechanical Characteristics

Weight	3.2	oz.
	90	grams
Size	3.0 x 1.5 x 0.38	inch
	76.2 x 38.1 x 9.7	mm.
Volume	1.71	$inch^3$
	28	cm^3

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.40

Material: Pin - Brass (Solder Plating)
Baseplate - Aluminum 5052-H32
Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting: Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (4 places).
D Option: 0.115 DIA thru holes (4 places).

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NB50T

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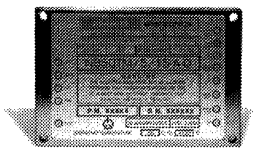
NB SERIES

High Density DC to DC Converters



Features

- .38 Inch Profile
- Remote Turn On (TTL)
- Output Voltage Trim Pin
- Over Temperature Protection
- Built-In Test (Output Power Good)
- Output Overvoltage/Overcurrent Protection

Input Characteristics

	Min.	Typ.	Max.	Units
Input Voltage	14	28	40	Vdc
Brown Out (100% of Full Load)		12.8		Vdc
No Load Power Dissipation		3	5	Watt
Inrush Charge			2	mc
Reflective Ripple Current		15		%
Logic Disable Current (Sink)		100	150	µA
Logic Disable Power In		1.2	2.5	W
Input Ripple Rejection (120 Hz)		40		dB
Input Ripple Rejection (800 Hz)		25		dB
Efficiency (FL)	62	70	75	%

EMI: Units conform to MIL-STD-461D (on the input leads) with companion filter

Selection Chart

Main Output Voltage	Main Output Current	Auxiliary Output Voltage	Auxiliary Output Current	Model Number
5	5.0A	±12	1.04A	NB50TI/5/12-A
5	5.0A	±15	0.83A	NB50TI/5/15-A

Temperature Characteristics

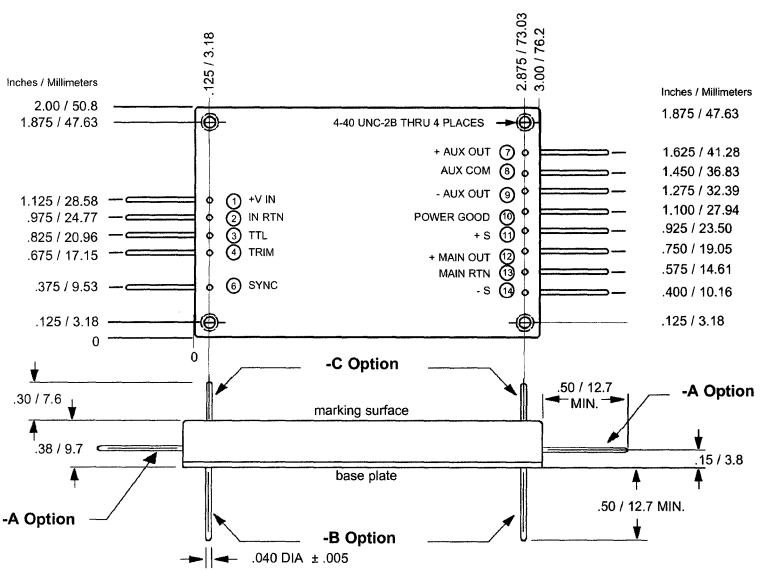
	Min.	Typ.	Max.	Units
Operating				
Industrial Grade	-40		+71	°C
Military Grade	-55		+100	°C
Storage (Ambient)	-55		+125	°C
Over Temperature Shutdown				
Industrial Grade		+75		°C
Military Grade		+105		°C
Thermal Resistance				
Case - Ambient		5		°C/W

Military Grade - MIL-STD-883 Screening

Output Characteristics

	+5V Output Min.	+5V Output Typ.	+5V Output Max.	Auxiliary Outputs Min.	Auxiliary Outputs Typ.	Auxiliary Outputs Max.	Units
Set Point Accuracy		1	2		1		% V_{out}
Load Regulation		0.1	0.5		0.3	0.7	% V_{out}
Line Regulation		0.1	0.5		0.2	0.8	% V_{out}
Ripple P-P (10 MHz)		75	125		35	100	mV
Trim Range	100		110				% V_{out}
Remote Sense Compensation		0.5					% V_{dc}
Overvoltage Protection	120		130				% V_{out}
Transient Response (Vout 1%) Time/Overshoot							
20-80% Load		500/220			200/30		µS/mV
Low Line - High Line		750/250			500/50		µS/mV
50-100% Load		500/200			200/30		µS/mV
Temperature Drift		0.005	0.015		0.01	0.025	%/°C
Long Term Drift		0.01	0.02		0.01	0.02	%/1KHrs
Current Limit	105	125	150	105	125	150	% I_{out}
Short Circuit Current		25	50		50	75	% I_{out}
Turn On Time		1.0			1.0		mS
Logic Turn On Time		1.0			1.0		mS

Case Drawings



Isolation Characteristics

	Min.	Typ.	Max.	Units
Isolation:				
Input to Output	500			Vdc
Output to Base	250			Vdc
Input to Base	250			Vdc
Input to Output Capacitance		0.022		µF
Insulation Resistance				
(@50 Vdc)	50			MOhm

Mechanical Characteristics

Weight	3.2	oz.
	90	grams
Size	3.0 x 2.0 x 0.38	inch
	76.2 x 50.8 x 9.7	mm.
Volume	2.28	$inch^3$
	37.5	cm^3

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.40

Material: Pin - Brass (Solder Plating)
Baseplate - Aluminum 5052-H32
Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting: Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (4 places).
D Option: 0.115 DIA thru holes (4 places).

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MARTEK POWER ABBOTT

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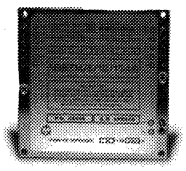
Industrial and **Military** Power Supplies

NB80T

NB SERIES

High Density DC to DC Converters



Features

- .38 Inch Profile
- Synchronization
- Remote Turn On (TTL)
- Output Voltage Trim Pins
- Over Temperature Protection
- Built-In Test (Output Power good)
- Military Grade: Mil-STD-883 Screening
- Output Overvoltage/Overcurrent Protection

Selection Chart

Main Output Voltage	Main Output Current	Per Channel Auxiliary Output Rating Voltage	Auxiliary Output Rating Current
2	10A	2	3.0A
3.3	10A	3.3	3.0A
5	10A	5	3.0A
5.2	9.6A	5.2	2.9A
12	4.2A	12	1.25A
15	3.3A	15	1.0A
24	2.1A		
28	1.8A		

Input Characteristics

	Min.	Typ.	Max.	Units
Input Voltage	14	28	40	Vdc
Brown Out (75% of Full Load)		12		Vdc
No Load Power Dissipation		4	7	Watt
Inrush Charge			4	mc
Logic Disable Current (Sink)		300	450	µA
Logic Disable Power In		3	6.5	W
Input Ripple Rejection (120 Hz)		55		dB
Input Ripple Rejection (800 Hz)		40		dB
Efficiency (FL)	72	82		%
EMI: Units conform to MIL-STD-461D (on the input leads) with companion filter				
Input Transient : Units conform to MIL-STD-704D for transients up to 50V for 0.1 second				

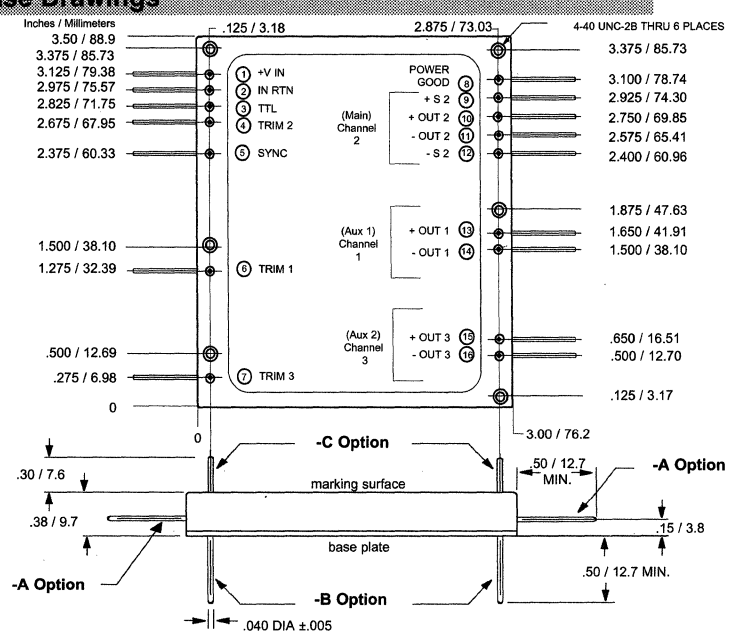
Temperature Characteristics

	Min.	Typ.	Max.	Units
Operating				
Industrial Grade	-40		+71	°C
Military Grade	-55		+100	°C
Storage (Ambient)	-55		+125	°C
Over Temperature Shutdown				
Industrial Grade		+75		°C
Military Grade		+105		°C
Thermal Resistance				
Case - Ambient		2		°C/W

Output Characteristics

	Main Output Min.	Main Output Typ.	Main Output Max.	Auxiliary Outputs Min.	Auxiliary Outputs Typ.	Auxiliary Outputs Max.	Units
Set Point Accuracy			1			1	% V_{out}
Load Regulation		5	25		5	25	mV
Line Regulation		5	25		2	10	mV
Ripple P-P (10 MHz)		60	150		50	100	mV
Trim Range	100		110	100		115	% V_{out}
Remote Sense Compensation		0.5					% V_{dc}
Overvoltage Protection (2V, 3.3V)		140			125		% V_{out}
Overvoltage Protection (5V-28V)		125			125		% V_{out}
Temperature Drift		0.01	0.02		0.01	0.02	%/°C
Long Term Drift		0.01	0.02		0.01	0.02	%/1KHrs
Current Limit	105	125	150	105	125	150	% I_{out}
Short Circuit Current	10		50	25		75	% I_{out}
Turn On Time		2.5			2.5		mS
Logic Turn On Time		2.5			2.5		mS

Case Drawings



Isolation Characteristics

	Min.	Typ.	Max.	Units
Isolation:				
Input to Output	500			Vdc
Output to Base	250			Vdc
Input to Base	250			Vdc
Input to Output Capacitance		0.022		µF
Insulation Resistance				
(@50 Vdc)	50			MOhm

Mechanical Characteristics

Weight	6.8	oz.
	190	grams
Size	3.0 x 3.5 x 0.38	inch
	76.2 x 114.3 x 9.7	mm.
Volume	5.13	$inch^3$
	84.5	cm^3

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.40

Material: Pin - Brass (Solder Plating)
Baseplate - Aluminum 5052-H32
Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting: Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (6 places).
D Option: 0.115 DIA thru holes (6 places).

To Order: To order a 80 watt, triple output, 15Vdc, 15Vdc and 5.2 Vdc, industrial grade power supply with pins out of the bottom, the model number would be: NB80TI/15/15/5.2-B. When ordering a triple output unit, the first output voltage in the model number is located on channel 1, the second on channel 2 and the third on channel 3 (see case drawing).

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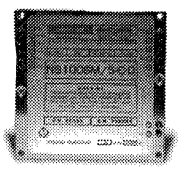
Industrial and Military Power Supplies

NB SERIES
High Density DC to DC Converters

NB100 Single & Dual



Features

- .38 Inch Profile
- Synchronization
- Remote Turn On (TTL)
- Output Voltage Trim Pin
- Single and Dual Outputs
- Over Temperature Protection
- Dual Outputs are Isolated Allowing Any Combination of Output Voltages

Input Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Input Voltage	14	28	40	Vdc
Brown Out (75% of Full Load)		12.5		Vdc
No Load Power Dissipation		2	3	Watt
Inrush Charge			2	mc
Reflective Ripple Current		20		%
Logic Disable Current (Sink)		100	150	µA
Logic Disable Power In		1.2	2.5	W
Input Ripple Rejection (120 Hz)		55		dB
Input Ripple Rejection (800 Hz)		40		dB
Efficiency (FL)	72	78-83		%
3.3 Vdc Output (FL)	69	74		%
2 Vdc Output (FL)	62	69		%

EMI: Units conform to MIL-STD-461D (on the input leads) with companion filter

Input Transient : Units conform to MIL-STD-704D for transients up to 50V for 0.1 second

Output Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Set Point Accuracy			1	% V_{out}
Load Regulation		5	25	mV
Line Regulation		5	25	mV
Ripple P-P (10 MHz)		60	150	mV
Trim Range	100		110	% V_{out}
Remote Sense Compensation		0.5		Vdc
Overvoltage Protection(2V, 3.3V)		140		% V_{out}
Overvoltage Protection (5V-28V)		125		% V_{out}
Current Sharing		±10		% I_{out}
Transient Response (Vout 1%) Time/Overshoot				
20-80% Load		300/300		µS/mV
Low Line - High Line		300/400		µS/mV
50-100% Load		250/300		µS/mV
Temperature Drift		0.01	0.02	%/°C
Current Limit	105	125	150	% I_{out}
Short Circuit Current	10		50	% I_{out}
Turn On Time		2.5		mS

Selection Chart

Nominal Output Voltage	Single Output Current	Dual Per Channel Current
2	20A	10A
3.3	20A	10A
5	20A	10A
5.2	19.2A	9.6A
12	8.3A	4.2A
15	6.7A	3.3A
24	4.2A	2.1A
28	3.6A	1.8A

Temperature Characteristics

	Min.	Typ.	Max.	Units
Operating				
Industrial Grade	-40		+71	°C
Military Grade	-55		+100	°C
Storage (Ambient)	-55		+125	°C
Over Temperature Shutdown				
Industrial Grade		+75		°C
Military Grade		+105		°C
Thermal Resistance				
Case - Ambient		5		°C/W

Isolation Characteristics

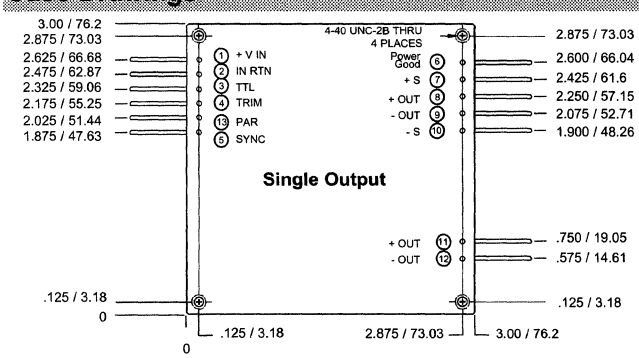
	Min.	Typ.	Max.	Units
Isolation:				
Input to Output	500			Vdc
Output to Base	250			Vdc
Input to Base	250			Vdc
Input to Output Capacitance		0.022		µF
Insulation Resistance				
(@50 Vdc)	50			MOhm

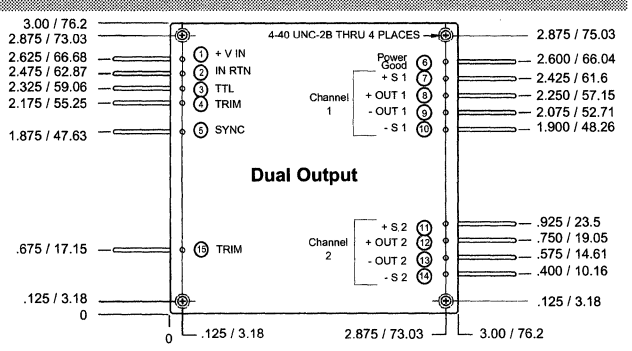
Military Grade - MIL-STD-883 Screening

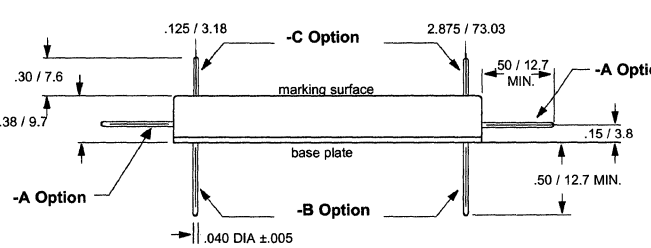
Mechanical Characteristics

Weight	6.4	oz.
	180	grams
Size	3.0 x 3.0 x 0.38	inch
	76.2 x 76.2 x 9.7	mm.
Volume	3.42	$inch^3$
	56.0	cm^3

Case Drawings







Tolerances: inches - x.xx = ±0.03; x.xxx = ±0.015; mm - x.x = ±0.8; x.xx = ±0.40

Material: Pin - Brass (Solder Plating); Baseplate - Aluminum 5052-H32; Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting:
Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (4 places).
D Option: 0.115 DIA thru holes (4 places).

To Order: To order a 100 watt, 15 Vout (single output), industrial grade power supply with the pins out the side, the model number would be: NB100SI/15-A. To order a 100 watt, dual output, 15Vdc and 15Vdc, Military grade power supply with pins out the top, the model number would be: NB100DM/15/15-C.

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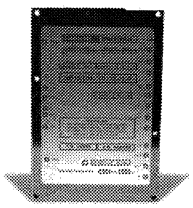
Industrial and Military Power Supplies

NB150 Single & Triple

NB SERIES

High Density DC to DC Converters



Features

- .38 Inch Profile
- Synchronization
- Remote Turn On (TTL)
- Output Voltage Trim Pin
- Single and Triple Outputs
- Over Temperature Protection
- Triple Outputs are Isolated Allowing Any Combination of Output Voltages

Selection Chart

Nominal Output Voltage	Single Output Current	Triple Per Channel Current
2	30A	10A
3.3	30A	10A
5	30A	10A
5.2	28.8A	9.6A
12	12.6A	4.2A
15	10A	3.3A
24	6.3A	2.1A
28	5.4A	1.8A

Input Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Input Voltage	14	28	40	Vdc
Brown Out (75% of Full Load)		12.5		Vdc
No Load Power Dissipation		2	3	Watt
Inrush Charge			2	mc
Reflective Ripple Current		20		%
Logic Disable Current (Sink)		100	150	µA
Logic Disable Power In		1.2	2.5	W
Input Ripple Rejection (120 Hz)		55		dB
Input Ripple Rejection (800 Hz)		40		dB
Efficiency (FL)	72	78-83		%
3.3 Vdc Output (FL)	69	74		%
2 Vdc Output (FL)	62	69		%

EMI: Units conform to MIL-STD-461D (on the input leads) with companion filter

Input Transient : Units conform to MIL-STD-704D for transients up to 50V for 0.1 second

Output Characteristics — Per Channel

	Min.	Typ.	Max.	Units
Set Point Accuracy			1	% V_{out}
Load Regulation		5	25	mV
Line Regulation		5	25	mV
Ripple P-P (10 MHz)		60	150	mV
Trim Range	100		110	% V_{out}
Remote Sense Compensation		0.5		Vdc
Overvoltage Protection (2V, 3.3V)		140		% V_{out}
Overvoltage Protection (5V-28V)		125		% V_{out}
Current Sharing		±10		% I_{out}
Temperature Drift		0.01	0.02	%/°C
Current Limit	105	125	150	% I_{out}
Short Circuit Current	10		50	% I_{out}
Turn On Time		2.5		mS

Temperature Characteristics

	Min.	Typ.	Max.	Units
Operating				
Industrial Grade	-40		+71	°C
Military Grade	-55		+100	°C
Storage (Ambient)	-55		+125	°C

Isolation Characteristics

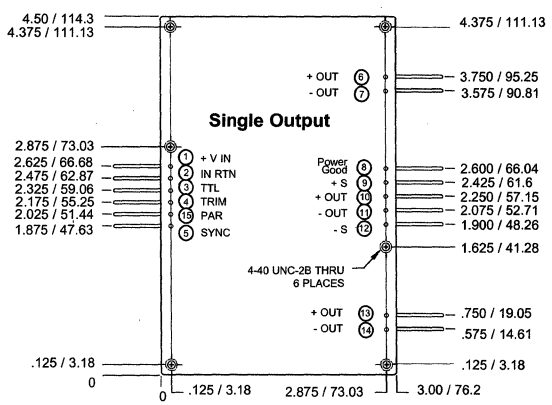
	Min.	Typ.	Max.	Units
Isolation:				
Input to Output	500			Vdc
Output to Base	250			Vdc
Input to Base	250			Vdc
Input to Output Capacitance		0.022		µF
Insulation Resistance (@50 Vdc)	50			MOhm

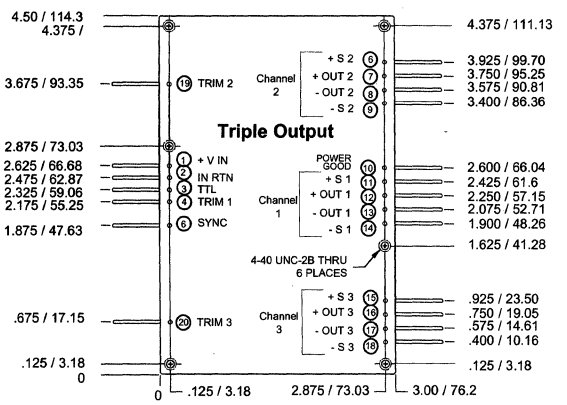
Military Grade - MIL-STD-883 Screening

Mechanical Characteristics

Weight	9.6	oz.
	180	grams
Size	3.0 x 4.5 x 0.38	inch
	114.3 x 76.2 x 9.7	mm.
Volume	5.13	$inch^3$
	84	cm^3

Case Drawings



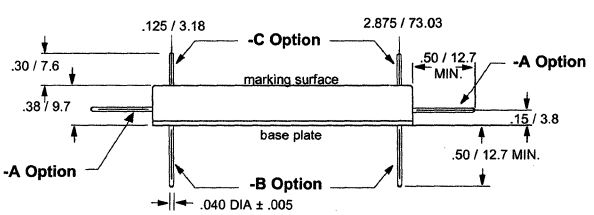


Tolerances: inches - x.xx = ±0.03; x.xxx = ±0.015; mm - x.x = ±0.8; x.xx = ±0.40

Material: Pin - Brass (Solder Plating)
Baseplate - Aluminum 5052-H32
Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting:
Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (6 places).
D Option: 0.115 DIA thru holes (6



To Order: To order a 150 watt, 15 Vout (single output), industrial grade power supply with the pins out the bottom, the model number would be: NB150SI/15-B. To order a 150 watt, Triple output, 15Vdc, 15Vdc and 5.2Vdc, Military grade power supply with pins out the bottom (baseplate), the model number would be: NB150DM/15/15/5.2-B

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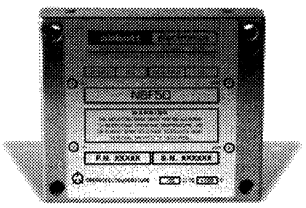
Industrial and Military Power Supplies

NB SERIES
High Density DC to DC Converters

EMI Filter
NBF50



Features

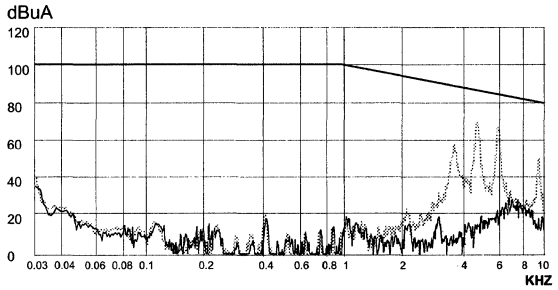
- MIL-STD-461D Compliance CE101 and CE102
- Thermally Non-dissapative device
- Less than 1.0 Volt Drop Across the NBF50
- Does Not Require External Components
- Meets Environmental Requirements of MIL-STD-810E and MIL-STD-901C
- For Use With NB15, NB30, NB45 and NB50 Series DC/DC Converters

Specifications

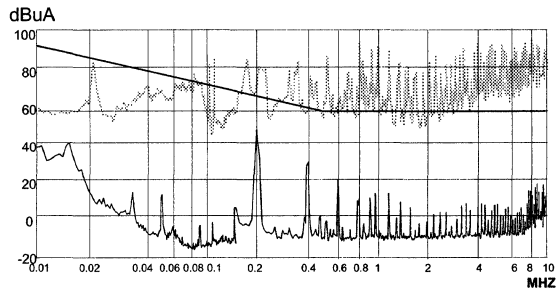
Input Voltage,	15-40	Vdc
Rated Output Current (maximum)	5	A
Isolation (Input/Output to Case)	500	Vdc
Operating Temperature	-55 to +100	°C
Storage Temperature	-55 to +125	°C
Insulation Resistance (measured at 50 Vdc)	50	M Ohm
Weight	1.42	oz.
	40	grams
Size	1.75 x 1.5 x 0.38	inch
	44.5 x 38.1 x 9.7	mm.
Volume	1.00	inch³
	16.5	cm³

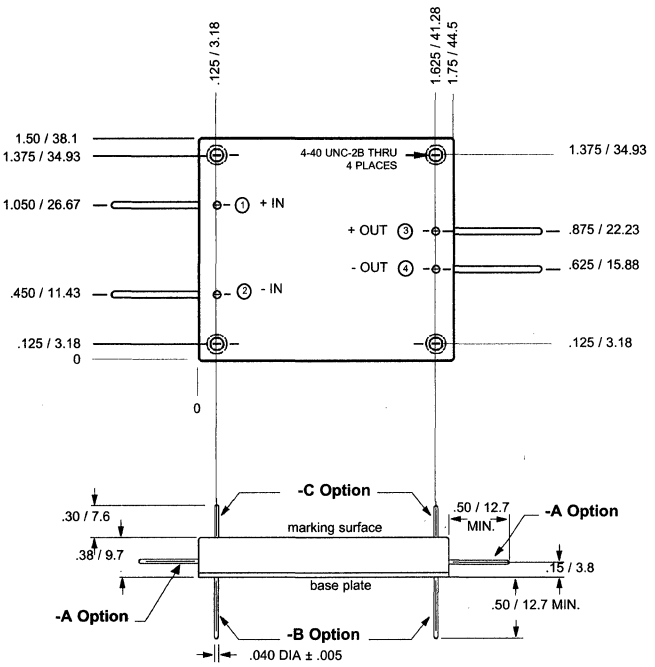
EMI Compliance Graphs

28 V_{in} - 50 Watts
MIL-STD-461D, CE101-4



28 V_{in} - 50 Watts
MIL-STD-461D, CE102





Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.40

Material: Pin - Brass (Solder Plating)
Baseplate - Aluminum 5052-H32
Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting: Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (4 places).
D Option: 0.115 DIA thru holes (4 places).

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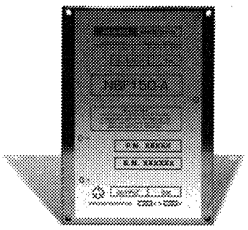
Industrial and Military Power Supplies

EMI Filter NBF150

NB SERIES
High Density DC to DC Converters



Features

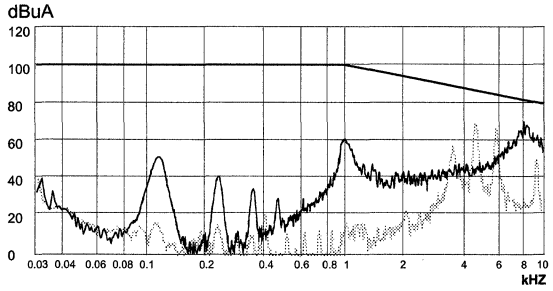
- MIL-STD-461D Compliance CE101 and CE102
- Does Not Require External Components
- Meets Environmental Requirements of MIL-STD-810C and MIL-S-901C
- For Use With NB80, NB100 and NB150 Series DC/DC Converters

Specifications

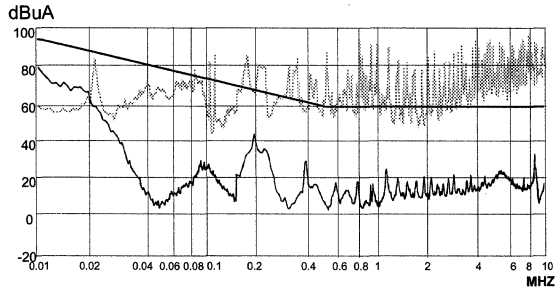
Input Voltage	15-40	Vdc
Rated Output Current (maximum)	15	A
Isolation (Input/Output to Case)	500	Vdc
Operating Temperature	-55 to +100	°C
Storage Temperature	-55 to +125	°C
Insulation Resistance (measured at 50 Vdc)	50	M Ohm
Weight	4.2	oz.
	120	grams
Size	3.0 x 2.0 x 0.38	inch
	76.2 x 50.8 x 9.7	mm.
Volume	2.28	$inch^3$
	37.5	cm^3

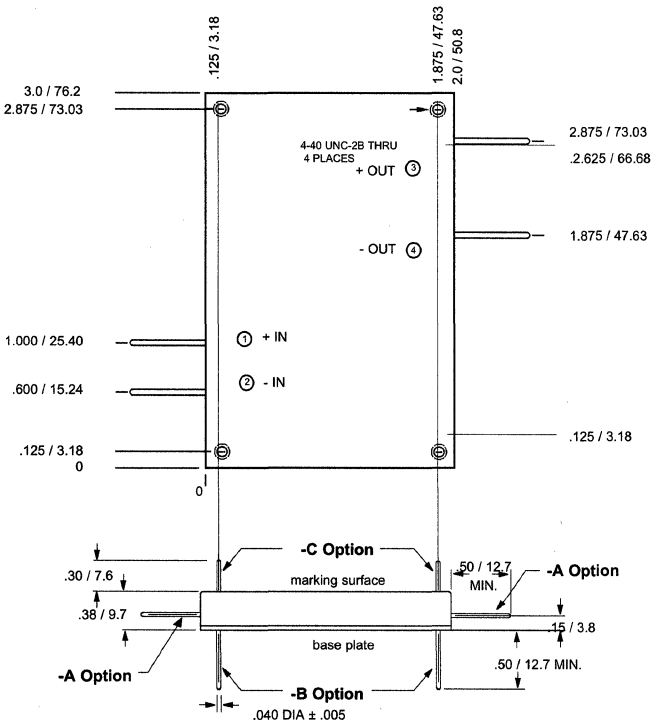
EMI Compliance Graphs

28 V_{in} - 150 Watts
MIL-STD-461D, CE101-4



28 V_{in} - 150 Watts
MIL-STD-461D, CE102





Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.40

Material: Pin - Brass (Solder Plating)
Baseplate - Aluminum 5052-H32
Case - 28 Gauge Steel (cold rolled).

Finish: Nickel Plating

Mounting: Standard: 4-40 inserts are provided in baseplate.
I Option: M2.5 metric inserts (4 places).
D Option: 0.115 DIA thru holes (4 places).

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MARTEK POWER

abbott electronics

Industrial and **Military** Power Supplies

A SERIES
DC to DC Converters

AW Series

Efficiency:
65% minimum. Typically 70-80% (nominal input, full load, room ambient). For 3.3 and 2.0 Vdc output modules efficiency will be 50-60% typical.)

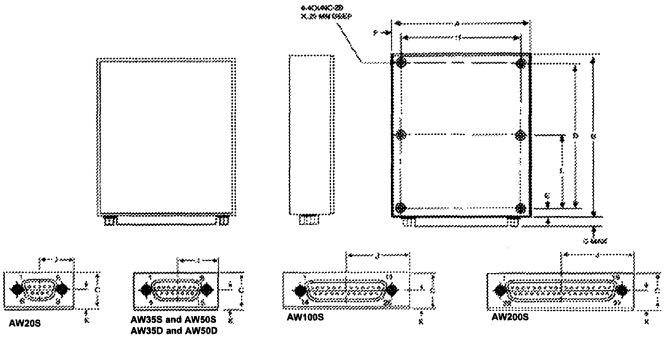
Parallelability:
The 100 watt and 200 watt units allows for multiple unit current sharing without the need for external components, via a single pin connection on each unit.

Temperature Range:
Operating: -55°C to +100°C maximum, at center of the baseplate.
Storage: -55°C to +125°C, ambient.

Environment:
Units met MIL-STD-810D, altitude, shock, acceleration, vibration and MIL-S-901C high-impact shock requirements. For information, please consult factory. Certified test reports available upon request.

Input Range	Power	No.of Output	Output Voltages
90-160 Vdc	20 W	Single	5,5.2,12,15,24,28
	35 W	Single	5,5.2,12,15,24,28
		*Dual	±5, ±12, ±15
	50 W	Single	5,5.2,12,15,24,28
		*Dual	±5, ±12, ±15
	100W	Single	2.0,3.3,5,5.2,12,15,24,28
	200W	Single	2.0,3.3,5,5.2,12,15,24,28

* Maximum output power for the AW Dual ±5 is 21 watts, or 10.5 watts per channel



Model	A	B	C	D	E	F	G	H	J	K	L
AW20S	3.90	3.60	.85	3.600	.20	.20	.25	2.100	1.25	.46	N/A
	63.5	76.2	21.6	86.04	4.6	4.6	6.4	53.34	31.8	11.7	
AW35S	3.90	3.50	.85	3.100	.20	.20	.25	2.600	1.50	.46	N/A
AW35D	76.2	88.9	21.6	78.74	5.1	5.1	6.4	66.04	38.1	11.7	
AW50S	3.25	4.00	.85	3.600	.20	.20	.25	2.850	1.65	.46	N/A
AW50D	82.6	101.6	21.6	91.44	5.1	5.1	6.4	72.39	41.4	11.7	
AW100S	3.75	5.25	.85	4.850	.20	.20	.25	3.350	1.87	.46	2.455
	95.3	133.4	21.6	123.19	5.1	5.1	6.4	85.09	47.5	11.7	62.60
AW200S	4.90	6.50	.85	6.100	.20	.20	.25	4.100	2.25	.46	3.060
	114.30	165.10	21.6	154.94	5.1	5.1	6.4	104.14	57.15	11.7	77.47

AM Series

Efficiency:
65% minimum. Typically 75%. (Full load, room ambient.)

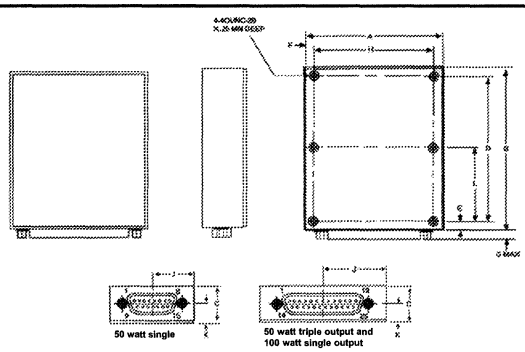
Parallelability:
The 100 watt unit allows for multiple unit current sharing without the need for external components, via a single pin connection on each unit.

Temperature Range:
Operating: -55°C to +100°C maximum, at center of the baseplate.
Storage: -55°C to +125°C, ambient.

Environment:
Units meet MIL-STD-810D, altitude, shock, acceleration, vibration and MIL-S-901C high-impact shock requirements. For information, please consult factory. Certified test reports available upon request.

Remote Sensing:
Compensates for up to 0.5 volt drop in output leads. (Single and main output only). Sense pins must be tied local (at connector) or remote (at load) for proper operation.

Input Range	Power	No.of Output	Output Voltages
100-300 Vdc	50 W	Single	5,5.2,12,15,24,28
		Triple	(±5, ±12) (5, ±15)
200-300 Vdc	100 W	Single	5,5.2,12,15,24,28



Model	A	B	C	D	E	F	G	H	J	K	L
AM50S	3.25	4.25	.85	3.850	.20	.20	.25	2.850	1.63	.46	N/A
	82.6	108.0	21.6	97.79	5.1	5.1	6.4	72.39	41.4	11.7	
AM50T	3.50	4.50	.85	4.100	.20	.20	.25	3.100	1.75	.46	N/A
	88.9	114.3	21.6	104.14	5.1	5.1	6.4	78.74	44.5	11.7	
AM100S	4.25	6.00	.85	5.600	.20	.20	.25	3.850	2.13	.46	2.800
	108.0	152.4	21.6	142.24	5.1	5.1	6.4	97.79	54.0	11.7	71.12

AB Series

Efficiency:
65% minimum. Typically 70-80% (nominal input, full load, room ambient).

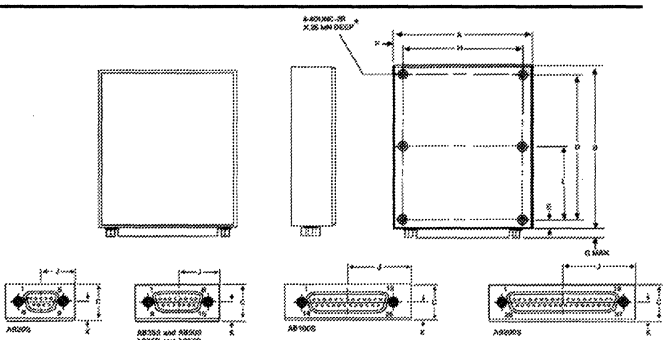
Parallelability:
The 100 watt and 200 watt units allow for multiple unit current sharing without the need for external components, via a single pin connection on each unit.

Temperature Range:
Operating: -55°C to +100°C maximum, at center of the baseplate.
Storage: -55°C to +125°C, ambient.

Environment:
Units meet MIL-STD-810C, altitude, shock, acceleration, vibration and MIL-STD-901C high-impact shock requirements. For information, please consult factory. Certified test reports available upon request.

Input Range	Power	No.of Output	Output Voltages
14-32 Vdc	20 W	Single	5,5.2,12,15,24,28
	35 W	Single	5,5.2,12,15,24,28
		*Dual	±5, ±12, ±15
	50 W	Single	5,5.2,12,15,24,28
		*Dual	±5, ±12, ±15
18-32 Vdc	100W	Single	5,5.2,12,15,24,28
	200W	Single	5,5.2,12,15,24,28

* Maximum output power for the AM Dual ±5 is 21 watts, or 10.5 watts per channel



Model	A	B	C	D	E	F	G	H	J	K	L
AB20S	2.20	2.80	.85	2.450	.18	.18	.25	1.850	1.10	.46	N/A
	55.9	71.1	21.6	62.13	4.6	4.6	6.4	46.99	27.9	11.7	
AB35S	2.50	3.50	.85	3.100	.20	.20	.25	2.100	1.25	.46	N/A
AB35D	63.5	88.9	21.6	78.74	5.1	5.1	6.4	53.34	31.8	11.7	
AB50S	3.00	3.85	.85	3.450	.20	.20	.25	2.600	1.50	.46	N/A
AB50D	76.2	97.8	21.6	87.63	5.1	5.1	6.4	66.04	38.1	11.7	
AB100S	3.50	4.50	.85	4.100	.20	.20	.25	3.100	1.75	.46	N/A
	88.9	114.3	21.6	104.14	5.1	5.1	6.4	78.74	44.5	11.7	
AB200S	4.25	5.50	.85	5.100	.20	.20	.25	3.850	2.13	.46	2.550
	108.0	139.7	21.6	129.54	5.1	5.1	6.4	97.79	54.1	11.7	64.77

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MARTEK POWER ABBOTT

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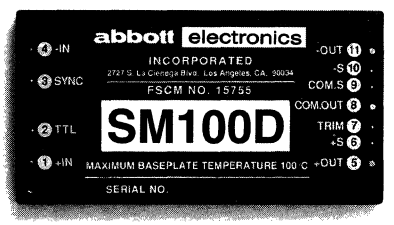
High Density DC / DC Converters

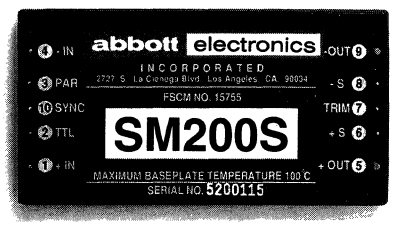
SM

100 watts
Single Output

50 watts
Single Output



100 watts
Single and Dual Output



200 watts
Single and Dual Output

FEATURES

- External components not required for operation
- No Derating from -55 to +100°C
- Parallelable Operation (single pin hook-up)
- Synchronization
- Fixed Frequency Power Conversion
- Trim Pin allows outputs from 1.7 to 55 volts
- MIL-STD-883C Screening Available

FAMILY ADDITIONS

- EMI filter (SMF200) available to meet MIL-STD-461C
- Input Transient Suppression module (SM1275) for conformance to MIL-STD-704A and MIL-STD-1275
- Mounting holes adjusted to meet industry standards (-B Options; available on SM100S and SM200S only)

SELECTION CHART

Output Voltages	2.0	3.3	5.0	5.2	12	15	24	28	48	Model Number
Output Currents (Amps)	10	10	10	9	4.2	3.3	2.1	1.8	1.0	**SMH 50S**
	20	20	20	19	8.3	6.7	4.2	3.6	2.0	**SMH100S**
	20	20	20	19	8.3	6.7	4.2	3.6	2.0	**SM100S**
	40	40	40	38	20	16	11	10	5.0	**SM200S**
			±10		±4.2	±3.3				**SM100D**
			±15		±8.3	±6.7				**SM200D**

HOW TO ORDER

SM H 100 S / 5.2 - A (270)

- SM — Series
- H — Case size; omitted for large case, "H" represents the smaller case
- 100 — Nominal output power
- S — Number of outputs: Single or Dual
- 5.2 — Output voltage
- A — Options
- (270) — Input Voltage (Leave blank for 28 Vdc input)

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High Density DC / DC Converters

SM

INPUT CHARACTERISTICS (28 Vdc)

	SMH50S	SMH100S	SM100S	SM100D	SM200S	SM200D	UNITS
Input Voltage	18 - 36	18 - 36	16 - 36	18 - 36	18 - 36	18 - 36	Vdc
Brown Out (75% Full Load)	17	17	15	17	17	17	Vdc
No Load Power Dissipation	2	2	2	3	2	3	Watt
Inrush Charge	20×10^{-4}	20×10^{-4}	20×10^{-4}	40×10^{-4}	20×10^{-4}	40×10^{-4}	Coulomb
Reflective Ripple Current	15	15	15	15	15	15	%
Logic Disable Current (Sink)	1.0	1.0	1.0	1.0	1.0	1.0	mA
Logic Disable Power In	0.35	0.35	0.35	0.35	0.35	0.35	W
Input Ripple Rejection (120 Hz)	60	60	60	60	60	60	dB
Input Overvoltage (No Damage)	37 - 50	37 - 50	37 - 50	37 - 50	37 - 50	37 - 50	Vdc
Efficiency (TYP.)	75 - 85	75 - 85	75 - 85	70 - 85	75 - 85	70 - 85	%
2 Vdc and 3.3 Vdc Output	60 - 70	60 - 70	60 - 70	60 - 70	60 - 70	60 - 70	%
EMI	Units conform to MIL-STD-461 (on the input leads) with companion filter						

INPUT CHARACTERISTICS (270 Vdc)

	SMH50S	SMH100S	SM100S	SM100D	SM200S	SM200D	UNITS
Input Voltage	200 - 400	200 - 400	175 - 400	200 - 400	200 - 400	200 - 400	Vdc
Brown Out (75% Full Load)	175	175	165	175	175	175	Vdc
No Load Power Dissipation (TYP.)	10	10	10	15	10	15	Watt
Inrush Charge	15×10^{-4}	15×10^{-4}	15×10^{-4}	30×10^{-4}	15×10^{-4}	30×10^{-4}	Coulomb
Reflective Ripple Current	15	15	15	15	15	15	%
Logic Disable Current (Sink)	0.8	0.8	0.8	0.8	0.8	0.8	mA
Logic Disable Power In	3.0	3.0	3.0	3.0	3.0	3.0	W
Input Ripple Rejection (120 Hz)	60	60	60	60	60	60	dB
Input Overvoltage (No Damage)	400 - 500	400 - 500	400 - 500	400 - 500	400 - 500	400 - 500	Vdc
Efficiency (TYP.)	75 - 85	75 - 85	75 - 85	70 - 85	75 - 85	70 - 85	%
2 Vdc and 3.3 Vdc Output	60 - 70	60 - 70	60 - 70	60 - 70	60 - 70	60 - 70	%
EMI	Units conform to MIL-STD-461 (on the input leads) with companion filter						

ISOLATION CHARACTERISTICS

	SMH50S	SMH100S	SM100S	SM100D	SM200S	SM200D	UNITS
Isolation (Input to Output)	1,000	1,000	1,000	1,000	1,000	1,000	Vdc
Isolation (Output to Base)	500	500	500	500	500	500	Vdc
Isolation (Input to Base) (28Vdc only)	500	500	500	500	500	500	Vdc
Isolation (Input to Base) (270Vdc only)	1,000	1,000	1,000	1,000	1,000	1,000	Vdc
Input to Output Capacitance	0.01	0.01	0.01	0.03	0.01	0.03	µF
Insulation Resistance (@ 50 Vdc)	50	50	50	50	50	50	MOhm

OUTPUT CHARACTERISTICS

	SMH50S	SMH100S	SM100S	SM100D	SM200S	SM200D	UNITS
Set Point Accuracy	1	1	1	1	1	1	% V_{out}
Load Regulation	0.02	0.02	0.02	0.02	0.02	0.02	% V_{out}
Line Regulation	0.02	0.02	0.02	0.02	0.02	0.02	% V_{out}
Ripple P-P (25 MHz)	1.0	1.0	1.0	1.0	1.0	1.0	% V_{out}
Trim Range (5.2V or less, min=85%)	60 - 115	60 - 115	60 - 115	60 - 115	60 - 115	60 - 115	% V_{out}
Remote Sense Compensation	0.5	0.5	0.5	0.5	0.5	0.5	Vdc
Overvoltage Protection	125	125	125	125	125	125	% V_{out}
Current Sharing (parelleled units)	N/A	N/A	±10	N/A	±10	N/A	% I_{out}
Transient Response (V_{out} 1%) Time/Overshoot							
20 - 80% Load	200/200	200/200	200/200	200/200	200/200	200/200	µS/mV
Low Line - High Line	200/200	200/200	200/200	200/200	200/200	200/200	µS/mV
50 -100%	200/200	200/200	200/200	200/200	200/200	200/200	µS/mV

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High Density DC / DC Converters

SM

OUTPUT CHARACTERISTICS

	SMH50S	SMH100S	SM100S	SM100D	SM200S	SM200D	UNITS
Temperature Drift	0.01	0.01	0.01	0.01	0.01	0.01	%/°C
Long Term Drift	0.01	0.01	0.01	0.01	0.01	0.01	%/1KHrs
Current Limit	105 - 150	105 - 150	105 - 150	105 - 150	105 - 150	105 - 150	%I_{out}
Short Circuit Current	105 - 200	105 - 200	105 - 200	105 - 160	105 - 160	105 - 160	%I_{out}
Turn On Time	25	25	100	100	100	100	mS
Logic Turn On Time	25	25	100	100	100	100	mS
Tracking Accuracy	N/A	N/A	N/A	0.1	N/A	0.1	%V_{out}

TEMPERATURE CHARACTERISTICS

	SMH50S	SMH100S	SM100S	SM100D	SM200S	SM200D	UNITS
Operating (Baseplate)	-55 to +100	-55 to +100	-55 to +100	-55 to +100	-55 to +100	-55 to +100	°C
Storage (Ambient)	-55 to +125	-55 to +125	-55 to +125	-55 to +125	-55 to +125	-55 to +125	°C
Over Temperature Shutdown	+105	+105	+105	+105	+105	+105	°C
Thermal Resistance Case-Ambient	5	5	5	5	5	5	°C/W

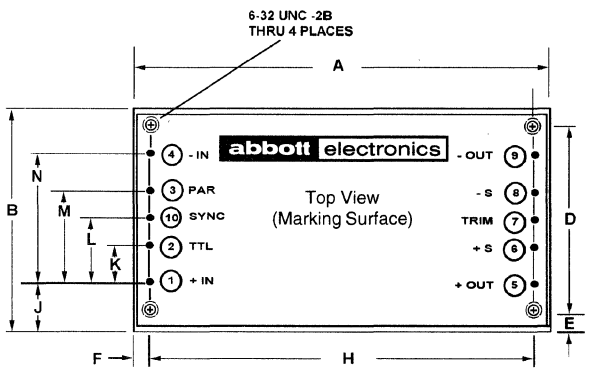
MECHANICAL CHARACTERISTICS

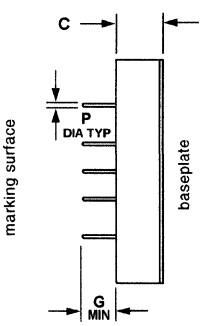
	SMH50S	SMH100S	SM100S	SM100D	SM200S	SM200D	UNITS
Weight	4.5	4.5	8.5	9.3	8.5	9.3	oz.
	130	130	240	260	240	260	grams
Size	2.4 x 2.3 x 0.5	2.4 x 2.3 x 0.5	2.4 x 4.6 x 0.5	2.4 x 4.6 x 0.5	2.4 x 4.6 x 0.5	2.4 x 4.6 x 0.5	inch
	61 x 59 x 13	61 x 59 x 13	61 x 117 x 13	61 x 117 x 13	61 x 117 x 13	61 x 117 x 13	mm.
Volume	2.76	2.76	5.5	5.5	5.5	5.5	$inch^3$
	47	47	93	93	93	93	cm^3

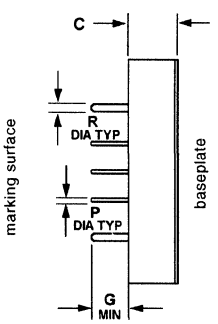
CASE DRAWINGS

SM100S & SM 200S - SINGLE OUTPUT

Standard Pins – Placement: top
Model number written as SM200S/5







Dimensions	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	W	X	Y	Z
inches	4.60	2.40	.50	2.000	.20	.20	.30	4.200	.50	.40	.70	1.00	1.40	.04	.08	.50	.50	3.600	.15	2.100
mm	116.9	61.0	12.7	50.80	5.1	5.1	7.62	106.68	12.7	10.2	17.8	25.4	35.6	1.0	2.0	12.7	12.7	91.44	3.8	53.34

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.4

Material: Baseplate - Aluminum 6061 - T6, Case - Steel
Finish: Nickel Plating
Mounting: 6-32 THD inserts are provided in baseplate
Metric: M3 inserts

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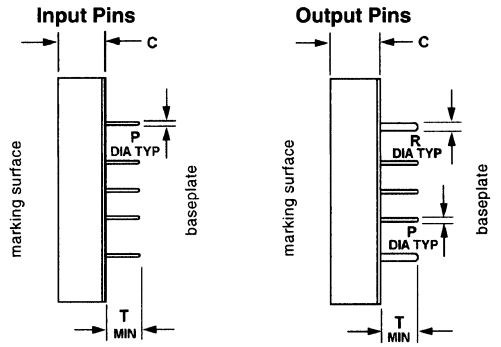
High Density DC / DC Converters

SM

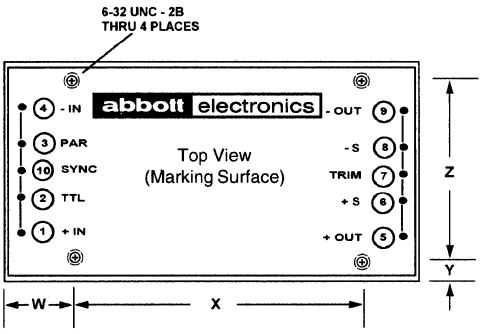
CASE DRAWINGS

SM100S & SM200S - SINGLE OUTPUT (CONT.)

A-Option – Placement: baseplate.
Model number written as SM200S/5-A



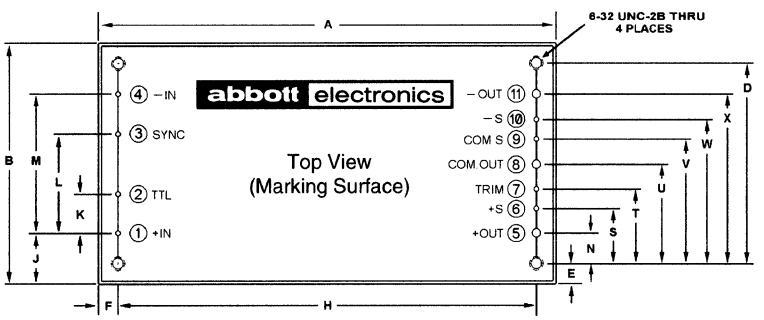
B-Option – Relocating of mounting holes.
Model number written as SM200S/5-B



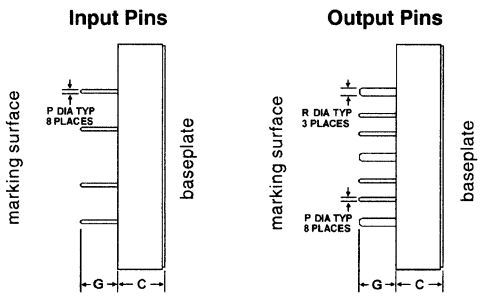
Dimensions																				
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	W	X	Y	Z
inches	4.60	2.40	.50	2.000	.20	.20	.30	4.200	.50	.40	.70	1.00	1.40	.04	.08	.50	.50	3.600	.15	2.100
mm	116.9	61.0	12.7	50.80	5.1	5.1	7.62	106.68	12.7	10.2	17.8	25.4	35.6	1.0	2.0	12.7	12.7	91.44	3.8	53.34

CASE DRAWINGS

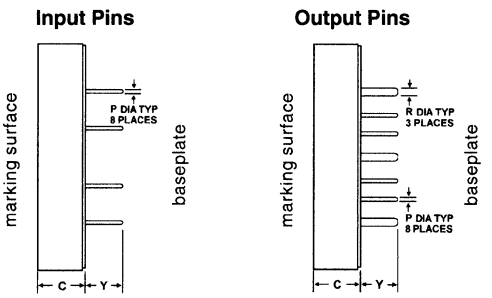
SM100D & SM200D - DUAL OUTPUT



Standard Pins – Placement: top.
Model number written as SM200D/15



A-Option – Placement: baseplate.
Model number written as SM200D/15-A



Dimensions																							
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y
inches	4.60	2.40	.50	2.000	.20	.20	.30	4.200	.50	.40	1.0	1.40	.30	.04	.08	.550	.750	1.00	1.25	1.45	1.70	.50
mm	116.9	61.0	12.7	55.88	5.1	5.1	7.62	106.68	12.7	10.2	25.4	35.56	7.62	1.0	2.0	13.97	19.05	25.4	31.75	36.83	43.2	12.7

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.4

Material: Baseplate - Aluminum 6061 - T6, Case - Steel
Finish: Nickel Plating
Mounting: 6-32 THD inserts are provided in baseplate
Metric: M3 inserts

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MARTEK POWER ABBOTT | abbott electronics

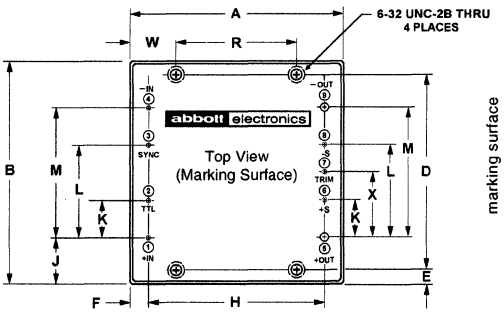
High Density DC / DC Converters **SM**

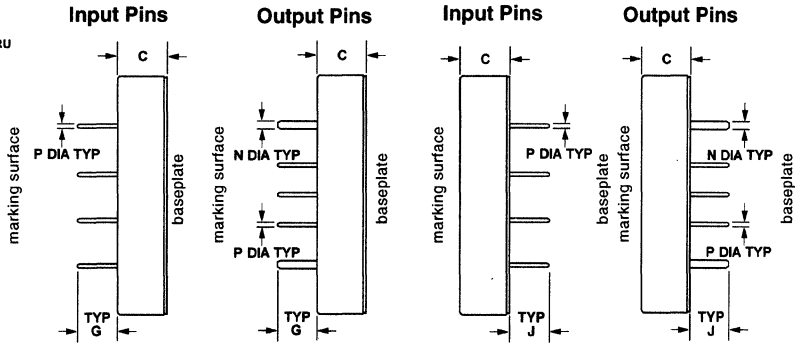
CASE DRAWINGS

SMH50 & SMH100 - SINGLE OUTPUT

Standard Pins – Placement: top.
Model number written as SMH100S/5

A-Option – Placement: baseplate.
Model number written as SMH100S/5-A





Dimensions																		
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	W	X
inches	2.30	2.40	.50	2.100	.15	.20	.30	1.900	.50	.40	1.00	1.40	.08	.040	1.300	.44	.50	.70
mm	58.4	61.0	12.7	53.34	3.8	5.1	7.62	48.26	12.7	10.2	25.4	35.6	2.0	1.0	33.02	11.2	12.7	17.8

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.4

Material: Baseplate - Aluminum 6061 - T6, Case - Steel
Finish: Nickel Plating
Mounting: 6-32 THD inserts are provided in baseplate
Metric: M3 inserts

FAMILY ADDITIONS

SMF EMI FILTER (28 & 270Vdc INPUTS)

FEATURES

- No External Components for Operation
- Compliant to MIL-STD-461 on Input Leads
- Less Than 1.0 Volt Drop (28Vdc Input)
- Less Than 2.0 Volt Drop (270Vdc Input)
- Thermally Non-dissapative Device
- Meets MIL-STD-810E, MIL-S-901C

HOW TO ORDER

SMF . . . . . 28Vdc nominal input

SMF(270) . . . . . 270Vdc nominal input

SPECIFICATIONS

Input Voltage (maximum)	50Vdc (28Vdc input)	500Vdc (270Vdc input)
Rated Output Current	20 Amps (28Vdc input)	2 Amps (270Vdc input)
Operating Temperature Range	-55°C to +100°C (no derating)	
Storage Tempeature Range	-55°C to +125°C	
Insulation Resistance	50 megohms minimum @ 50 Vdc	
Weight	5.0 oz./140 grams	

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High Density DC / DC Converters SM

SM 1275 TRANSIENT SUPPRESSION MODULE

FEATURES

- No External Components for Operation
- Transient Suppression to MIL-STD-704A
- Transient Suppression to MIL-STD-1275A
- Under 1.0 Volt DC Insertion Loss

HOW TO ORDER

SM1275

SPECIFICATIONS

Steady State Input	14 to 40 Vdc
Maximum Output Current	20 Amps
Maximum Output Voltage (Clamp)	50 Vdc
Current Limit	Delayed Latching Type, 20 amps or 300 watt min.
Fuse (recommended)	22 amp Adc, Slow Blow Type
Insertion Loss	1.0 Vdc Max. @ 20 amps and 25°C
Input Surge Limit	100 Vdc, 0.1 sec, 0.5Ω, per MIL-STD-1275A
Input Spike Limits	±250 Vdc, 50 µS, 15mJ, per MIL-STD-1275A
Input Spike Limits	+600 Vdc, 10 µS, 50Ω, per MIL-STD-704A
Reverse Polarity Protection	Shunt Diode, (Input Fuse Required)
No Load Power Dissipation	2.5 watts Max.
Efficiency	90% to 97% from 14 to 36 Input Volts DC
Overvoltage Shutdown (No Damage)	Auto Recovery, 41 Vdc to 100 Vdc for >100ms
Operating Temperature Range	-55°C to +100°C baseplate (no derating)
Storage Temperature Range	-55°C to +125°C
Isolation - Input/Output to Case	500 Vdc
Insulation Resistance	50 megohm minimum @ 50 Vdc
Environmental	MIL-STD-810S and MIL-S-901C
Weight	5.0 oz./140 grams

SMR AC FRONT-END RECTIFIER

FEATURES

- AC Front End for 270 Vdc Input SM Series
- Compatible with all SM Series Accessory Products

HOW TO ORDER

SMR

SPECIFICATIONS

Input Voltage	85 to 130 Vac, 1Ø,47-440 Hz
	170 to 264 Vac,1Ø,47-440 Hz
	85 to 130 Vac, 3Ø, WYE, 47-440 Hz
	170 to 264 Vac, 3Ø, Delta, WYE, 47-440 Hz

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High Density
DC / DC Converters

SM

SPECIFICATIONS (CONT.)

Rated Output Voltage	300 Vdc nominal
Rated Output Current	3.3 amps
Rated Output Power	1kW
Operating Temperature Range	-55°C to +100°C baseplate (no derating)
Storage Temperature Range	-55°C to +125°C
Isolation (Input to Case)	1 KV
Isolation (Output to Case)	1 KV
Weight	5.0 oz./140 grams

SMRA RIPPLE ATTENUATOR MODULE

FEATURES

- Reduce Output Ripple to <20mV p-p
- Compatible with any SM200, SM100 and NB Series Based Products
- Full Attenuation Up to 10A
- No Adjustments Required
- Efficiency 93-99%
- Converter Sense, Trim, Overvoltage and Overcurrent Retained

HOW TO ORDER

SMRA

SPECIFICATIONS

Output Noise and Ripple (Max)	20 mV P-P
Input Voltage Range	2-48 Vdc
Output Voltage Deviation	0.5%
DC Voltage Drop (Max)	0.4 Vdc
Isolation (Input/Output to Baseplate)	500 Vdc
Operating Temperature Range	-55°C to 100°C baseplate (no derating)
Storage Temperature Range	-55°C to +125°C
Size	2.3 x 2.4 x 0.5 inch
Weight	5 ounce

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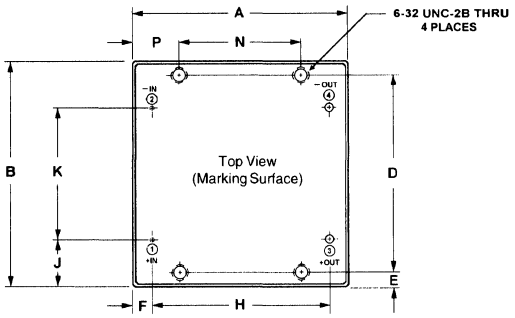
High Density DC / DC Converters

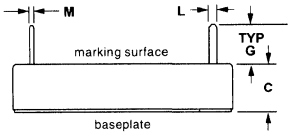
SM

CASE DRAWINGS

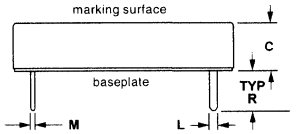
SMF FILTER AND SM1275 TRANSIENT SUPPRESSOR



Standard Pins
Placement: top

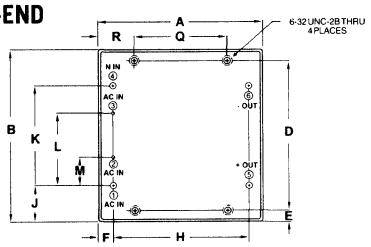


A-Option Pins – Placement: baseplate.
Model number written as SM1275-A

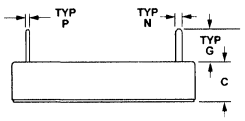


Dimensions															
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R
inches	2.30	2.40	.50	2.100	.15	.20	.30	1.900	.50	1.400	.08	.04	1.300	.50	.50
mm	58.4	61.0	12.7	53.34	3.8	5.1	7.62	48.26	12.7	35.56	2.0	1.0	33.02	12.7	12.7

SMR AC FRONT-END



Standard Pins
Placement: top



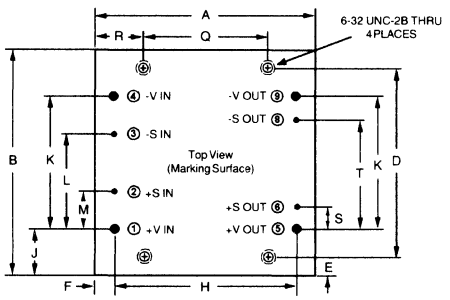
Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.4

Material: Baseplate - Aluminum 6061 - T6, Case - Steel
Finish: Nickel Plating
Mounting: 6-32 THD inserts are provided in baseplate
Metric: M3 inserts

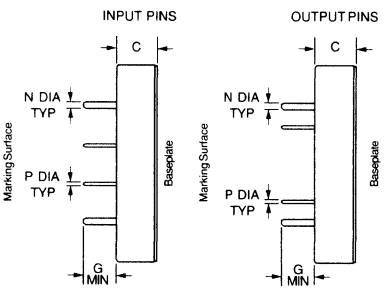
Dimensions																
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
inches	2.30	2.40	.50	2.100	.15	.20	.30	1.900	.50	1.400	1.0	.40	.08	.04	1.300	.50
mm	58.4	61.0	12.7	53.34	3.8	5.1	7.62	48.26	12.7	35.56	25.4	10.2	2.0	1.0	33.02	12.7

SMRA RIPPLE ATTENUATOR MODULE

Standard Pins -- Placement: Top Model number written as SMRA.



Model number written as SMRA



CASE DIMENSIONS

	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
inches	2.30	2.40	.50	2.100	.15	.20	.30	1.900	.50	1.400	1.0	.04	.08	.04	1.300	.50	.25	1.15
mm	58.4	61.0	12.7	53.34	3.8	5.1	7.62	48.26	12.7	35.56	25.4	10.2	2.0	1.0	33.02	12.7	6.36	29.24

Tolerances: inches - x.xx = ±0.03
x.xxx = ±0.015
mm - x.x = ±0.8
x.xx = ±0.4

Material: Baseplate - Aluminum 6061 - T6, Case - Steel
Finish: Nickel Plating
Mounting: 6-32 THD inserts are provided in baseplate
Metric: M3 inserts

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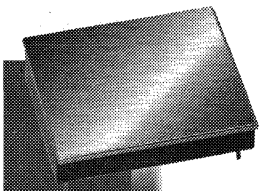
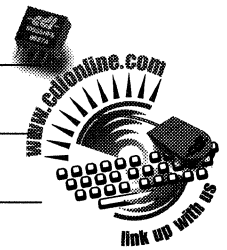


CONVERSION DEVICES, INC.
A Member Of The Martek Power Group

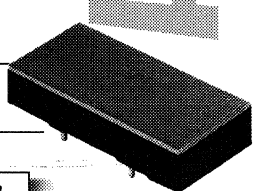
SUPPLYING YOUR DC/DC POWER

SELECTION GUIDE

	Series	Power Rating (W)	# of Outputs	Input Voltage Range	Output Voltage (VDC)	Isolation Voltage	Efficiency	Case Dimensions Inches (mm)
	100FR	1.0	1, 2	±10%	5,12,15, ±12, ±15	500	57	L: 1.27 (32.3) W:0.62 (15.7) H:0.40 (10.2)
	100SHFS	1.0	1	±10%	5, 9, 12, 15	1000	72	L: 0.45 (11.5) W: 0.24 (6.1) H:0.40 (10.2)
	100DHFS	1.0	2	±10%	±5, ±9, ±12, ±15	1000	72	L: 0.77 (19.6) W: 0.24 (6.1) H:0.40 (10.2)
	100VFS	1.0	1, 2	±10%	3.3, 5, 9, 12, 15 ±5, ±12, ±15	3000	71	L: 0.77 (19.6) W: 0.24 (6.1) H:0.40 (10.2)
New	200HFS	2	1,2	±10%	3.3, 5, 9, 12, 15 ±5, ±12, ±15	1000	85	L: 0.77" (19.6) W: 0.30 (7.6) H:0.40 (10.2)
	100VFI	1.5	1, 2	±10%	5, 12, 15, ±12, ±15	8000	75	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	200FR	2.0	1, 2	±10%	5, 12, 15, ±12, ±15	500	57	L: 1.25 (31.7) W:0.80 (20.3) H;0.40 (10.2)
	200HI	2.0	1, 2	±10%	5, 12, 15, ±12, ±15	3000	55	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	200HFR	2.0	1, 2	±10%	5, 12, 15 ±12, ±15	3000	63	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	300FR	3.0	1, 2	±10%	5, 12, 15, ±12, ±15	500	64	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	300HI	3.0	1, 2	±10%	5, 12, 15 ±12, ±15	3000	55	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	300HFR	3.0	1, 2	±10%	5, 12, 15 ±12, ±15	3000	64	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	300UR	3.0	1, 2	10 - 0 18 - 72	5, 12, 15, ±5 ±12, ±15	1400	78	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	300WFR	3.0	1, 2	18 - 36 36 - 72	5, 12, 15, ±5, ±12, ±15	1500	84	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	500	5.0	1, 2	±10%	5, 12, 15 ±5, ±12, ±15	1400	80	L:2.00 (50.8) W:1.00 (25.4) H: 0.35 (8.9)
	500UFR	5.0	1, 2	9 - 36 18 - 72	5, 9, 12, 15 ±5, ±12, ±15	500	75	L:2.00 (50.8) W:2.00 (50.8) H:0.40 (10.2)
	500UR	5.0	1, 2	10 - 40 18 - 72	5, 12, 15, ±5 ±12, ±15	1400	77	L:2.00 (50.8) W:1.00 (25.4) H:0.375 (9.5)
	500URD	5.0	1, 2	10 - 40 18 - 72	5, 12, 15 ±5, ±12, ±15	500	76	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	500WFR	5.0	1, 2	9 - 18 18 - 36 36 - 72	5, 12, 15 ±12, ±15	500	79	L: 1.25 (31.7) W:0.80 (20.3) H:0.40 (10.2)
	700WSR	7.0	1	4.75 to 12	3.3	±1	90	L: 1.25 (31.7) W: 0.80 (20.3) H: 0.40 (10.2)
	700PW	7.0	1, 2	9 - 18 18 - 36 36 - 72	5, 12, 15, ±5, ±12, ±15	1400	82	L:2.00 (50.8) W:1.00 (25.4) H:0.375 (9.5)



ADVANCED IDEAS



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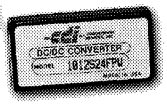

SELECTION GUIDE

TOTAL SOLUTIONS

	Series	Power Rating (W)	# of Outputs	Input Voltage Range	Output Voltage (VDC)	Isolation Voltage	Efficiency	Case Dimensions Inches (mm)
New	1000HN	10.0	1,2	10 - 40 18 - 72	3, 5, 12, 15, ±5, ±12, ±15	1500	87	L:2.00 (50.8) W:1.00 (25.4) H:0.375 (9.5)
	800	8.0	1, 2, 3	9 - 18 18 - 36 36 - 72	5, 12, 15, ±5, ±12, ±15 5/±12, 5/±15	1000	82	L:2.00 (50.8) W:1.00 (25.4) H:0.375 (9.5)
	1000FPW	10.0	1, 2	9 - 18 18 - 36 36 -72	3.3, 5, 12, 15, ±5, ±12, ±15	1500	84	L:2.00 (50.8) W:1.00 (25.4) H:0.40 (10.2)
	1000WFR	10.0	1, 2	9 - 18 18 - 36 36 - 72	5, 9, 12,15, ± 12 , ±15	500	80	L:2.00 (50.8) W:2.00 (50.8) H:0.375 (9.5)
	1500	15.0	1, 2, 3	9 - 18 18 - 36 36 - 72	5,12,15, ±5, ±12, ±15 5/±12, 5/±15	1400	85	L:2.00 (50.8) W:2.00 (50.8) H:0.375 (9.5)
	1500UR	15.0	1, 2	10 - 40 18 - 72	3.3, 5, 12, 15 ±5, ±12, ±15	1400	81	L:2.00 (50.8) W:2.00 (50.8) H:0.375 (9.5)
	1500WFR	15.0	1, 2	18 - 36 36 - 72	5, 12, 15, ±5, ±12, ±15	500	80	L:2.00 (50.8) W:1.00 (25.4) H:0.40 (10.2)
	1600	16.0	1, 2, 3	9 - 18 18 - 36 36 - 72	5, 12, 15, ±5, ±12, ±15 5/±12, 5/±15	1400	85	L:2.00 (50.8) W:2.00 (50.8) H:0.375 (9.5)
	1600XA	16.0	1, 2, 3	9 - 18 18 - 36 36 - 72	3.3, 5, 12, 15 ±5, ±12, ±15, 5/±12, 5/±15	1400	82	L:2.00 (50.8) W:2.00 (50.8) H:0.375 (9.5)
	1800	16.0	1, 2, 3	16 - 50	5, 12, 15,±5, ±12, ±15, 5/±12, 5/±15	500	80	L: 3.00 (76.0) W:2.56 (65.0) H: 0.33 (8.4)
	2100	20.0	1, 2, 3	9 - 18 18 - 36 36 - 72	5, 12, 15, ±5, ±12, ±15 5/±12, 5/±15	1400	85	L:2.00 (50.8) W:2.00 (50.8) H:0.375 (9.5)
	2500RW	25.0	1, 2, 3	45 - 160	3.3, 5, 12, 15, ±12, ±15, 5/±12, 5/±15	2100	80	L:3.00 (76.2) W:2.56 (65.0) H: 0.75 (19.1)
	3000WFR	25 to 30	1, 2, 3	9 - 18 18 - 36 36 - 72	3.3, 5, 12, 15, ±5, ±12, ±15 5/±12, 5/±15	500	85	L:2.00 (50.8) W:2.00 (50.8) H:0.40 (10.2)
	3000LP	30.0	1, 2, 3	9 - 18 18 - 36 36 - 72	5, 12, 15, ±5, ±12, ±15 5/±12, 5/±15	1400	82	L:3.00 (76.2) W:2.56 (65.0) H:0.375 (9.5)
	3000UR	30.0	1, 2, 3	10 - 40 18 - 72	3.3, 5, 12, 15 ±5, ±12, ±15 5/±12, 5/±15	1400	83	L:3.00 (76.2) W:2.56 (65.0) H:0.375 (9.5)
	3000WSR	30.0	1	4.75 - 10 6.00 - 10	3.3, 5	±0.5	96	L:2.00 (50.8) W:2.00 (50.8) H:0.375 (9.5)
New	3000QM	30	1, 2, 3	16 - 50	5, 12, 15, ±12, ±15 5/±12, 5/±15	1000	80	L:3.00 (76.2) W:3.00 (76.0) H:0.50 (12.7)
	3800WSR	38.5	1	4.7 - 5.5	2 to 3.5	N/A	83	L:2.00 (50.8) W:1.50 (38.1) H:0.375 (9.5)
	6000UR	60.0	1, 2, 3	9 - 36 18 - 72	3.3, 5, 12, 15 ±5, ±12, ±15 5/±12, 5/±15	1400	80	L:3.00 (76.2) W:2.56 (65.0) H: 1.65 (41.9)
	6000	60.0	1, 2, 3	9 - 18 18 - 36 36 - 72	5, 12, 15, ±5, ±12, ±15 5/±12, 5/±15	1400	80	L:4.56 (115.8) W:2.56 (65.0) H: 0.75 (19.1)
New	6000HDI	60	1	9 - 18 18 - 36 36 - 72	3.3, 5, 12, 15, 24	1500	90	L: 1.50 (38.1) W:2.00 (50.8) H:0.50 (12.7)
New	7500HDI	75	1	9 - 18 18 - 36 36 - 72	3.3, 5, 12, 15, 24	1500	90	L: 1.50 (38.1) W:2.00 (50.8) L: 0.50 (12.7)

VISA MasterCard

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FULL DATA SHEETS AVAILABLE @ www.cdionline.com

DC-DC Converters

ACON, INC. 22 Bristol Drive, South Easton, MA 02375 • TEL:(508)230-8022 • FAX:(508)230-2371

Please Call **1-800-336-8022** for

Price & Delivery, Technical Information, Special Requirement

Standard Models ...

Series #	Output Power	Number of Output	Output Voltage(s)
C	2-3 Watts	Single	3 to 24 Volts
D	10-15 Watts	Single, Dual & Triple	3 to 24 Volts
E	10-15 Watts	Single, Dual & Triple	3 to 24 Volts
F	15 Watts	Single, Dual & Triple	3 to 24 Volts
FH	15 Watts	Single	48 to 110 Volts
H	30-60 Watts	Single	3 to 24 Volts
G	30 Watts	Single, Dual & Triple	3 to 24 Volts
HX	25-30 Watts	Single, Dual, Triple & Quad.	3 to 24 Volts
J	20-60 Watts	Single, Dual & Triple	3 to 24 Volts
L	25-30 Watts	Single, Dual & Triple	3 to 24 Volts
L	25-30 Watts	Single, Dual & Triple	3 to 24 Volts
N	25-30 Watts	Single, Dual, Triple & Quad	3 to 500 Volts
P	40-60 Watts	Single, Dual, Triple & Quad	3 to 24 Volts
Q	50-60 Watts	Dual & Triple	3 to 24 Volts
R	33-100 Watts	Single, Dual, Triple & Quad	3 to 24 Volts
X	33-100 Watts	Single, Dual, Triple & Quad	3 to 24 Volts

Converter Options ...

Some of the converters we offer have certain options available. These options are different pinouts, remote shut down, heatsink, mounting plate, mounting kits, and terminal strips. Please use the proper suffix listed below and add the suffix to the end of the model number. Please refer to individual data sheets for availablity of options.

OPTION	SUFFIX
different pinout	E
remote shut down	S
heatsink	HS
mounting plate	MP
mounting kit	MK
terminal strips	TS

Numbering System ...

D W 10 T 12 05 - 12

- **D** — CASE CODE
- **W** — Signified Ultra Wide 4 to 1 Input Range.
- **10** — OUTPUT POWER Expressed in watts ie. 3 = 3 watts, 50 = 50 watts.
- **T** — NUMBER OF OUTPUTS Single output - S; Dual outputs - D; Triple outputs - T; Quad outputs - Q; Five outputs - V
- **12** — INPUT VOLTAGE 12 = 9-18V, 24 = 18-36V, 48 = 36-72V, 30 = 10-30V, 60 = 20-60V, W---24 = 10-36V. W---48 = 20-72V.
- **05** — OUTPUT VOLTAGE Expressed as 2 significant digits ie. 05 = 5 volts, 12 = 12 volts. For triple and quad units, it designates 2 outputs, positive and negative.
- **12** — OUTPUT VOLTAGE Expressed as 2 significant digits ie. 05 = 5 volts, 12 = 12 volts. For triple and quad units, it designates 2 outputs, positive and negative.

C & E Single, Dual & Triple (2-15W)

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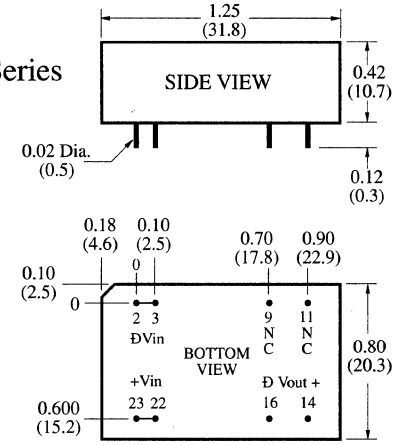
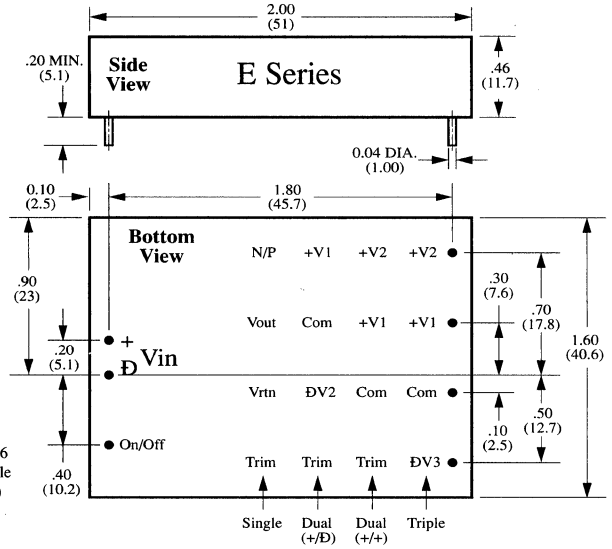
C Series



ALL DIMENSIONS IN INCHES (MM)

Actual Size



File# E149006
(E series single output only)

INPUT SPECIFICATIONS

Input Voltage Range ..... See Table
Input Filter:
Model C ..... Low ESR Capacitor
Model E ..... 10–36 Vin:Þ Filter, 20–75 Vin:LC Filter
Remote On/Off Control (Model E only):
On Control ..... >5Vdc or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection ..... shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS (10% Minimum Load required on All Outputs)

Single Output:
Voltage Accuracy/Load Regulation ..... MinL to FL, ±1% max.
Dual Outputs: (with Balanced Loads)
V1, Main Output ..... MinL to FL, ±1% max.
V2, Auxilary Output ..... MinL to FL, ±5% typ.
Triple Outputs:
V1 ..... MinL to FL, ±1% max.
V2/V3 (with balanced Loads) ..... MinL to FL, ±5% typ.
Output Trim (Model ES & ED only) ..... ±10% max.
Line Regulation (Main Output), LL–HL ..... ±0.5% max.
Load Regulation (Main Output), MinL/FL ..... ±1.0% max.
Short Circuit Protection ..... Indefinite
Transient Response ..... <200µSec.

***Trim** - To adjust output voltage **Up/Dowm** with a resistor connected from trim pin to -V/+V.

Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C, max.
Efficiency ..... C: 73%, E: 80%
Isolation Voltage, I/O ..... 500Vdc, min.
Switching Frequency ..... 200KHz, min.
Operating Ambient Temperature Range (Case Temp. +95° max):
C:Thermal Resistance 20°C/Watt ..... –25°C to +71°C
E:Thermal Resistance 9°C/Watt ..... –25°C to +60°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
Weight ..... C:1 oz. (28 grams),E:2 oz. (57 grams)
Case Material
C: ..... Phenolic
E: ..... Six-sided Metal
(With Non-Conductive Seating Surface)

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 36 Vdc IN	20 - 72 Vdc IN
3.3V	600mA	2	C3S1203	C3S2403	C3S4803	CW3S2403	CW3S4803
5V	600mA	3	C3S1205	C3S2405	C3S4805	CW3S2405	CW3S4805
12V	250mA	3	C3S1212	C3S2412	C3S4812	CW3S2412	CW3S4812
15V	200mA	3	C3S1215	C3S2415	C3S4815	CW3S2415	CW3S4815
24V	125mA	3	C3S1224	C3S2424	C3S4824	CW3S2424	CW3S4824
3.3V	4.0A	13	-	-	-	E15S2403	E15S4803
5V	3.0A	15	-	-	-	E15S2405	E15S4805
12V	1.25A	15	-	-	-	E15S2412	E15S4812
15V	1.0A	15	-	-	-	E15S2415	E15S4815
24V	0.63A	15	-	-	-	E15S2424	E15S4824
±5V	±1.5A	15	-	-	-	E15D2405	E15D4805
+5V, -12V	+2.0A, -.63A	15	-	-	-	E15D2405-12	E15D4805-12
+5V, -24V	+2.0A, -.32A	15	-	-	-	E15D2405-24	E15D4805-24
+5V, +12V	+2.0A, +.63A	15	-	-	-	E15D2405+12	E15D4805+12
+5V, +24V	+2.0A, +.32A	15	-	-	-	E15D2405+24	E15D4805+24
±12V	±0.63A	15	-	-	-	E15D2412	E15D4812
±15V	±0.50A	15	-	-	-	E15D2415	E15D4815
+3.3, ±12V	2.0A, ±.32A	10	-	-	-	E15T2403-12	E15T4803-12
+5, ±12V	2.0A, ±.32A	15	-	-	-	E15T2405-12	E15T4805-12
+3.3, ±15V	2.0A, ±.25A	10	-	-	-	E15T2403-15	E15T4803-15
+5, ±15V	2.0A, ±.25A	15	-	-	-	E15T2405-15	E15T4805-15

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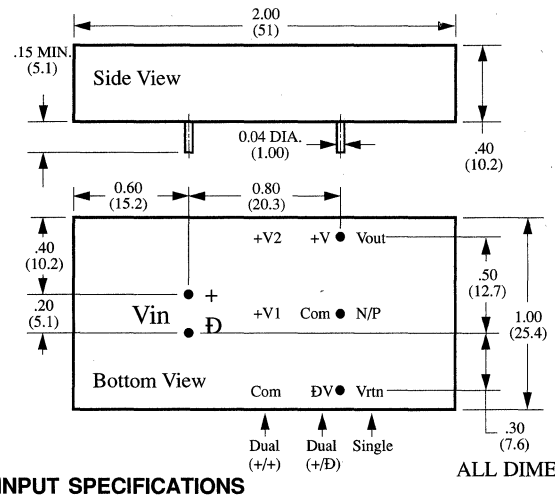
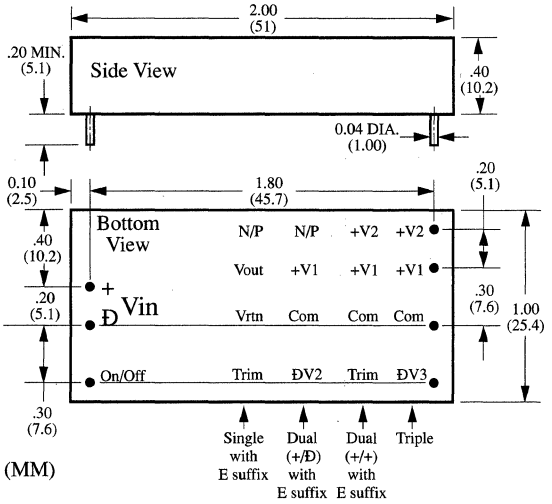
D Single, Dual & Triple (6-15W)



Actual Size



ALL DIMENSIONS IN INCHES (MM)

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Low ESR Capacitor
Remote On/Off Control (E suffix only):
On Control ..... >5Vdc or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection .. shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS (10% Minimum Load required on All Outputs)

Single Output:
Voltage Accuracy/Load Regulation ..... MinL to FL, ±1% max.
Dual Outputs: (with Balanced Loads)
V1, Main Output ..... MinL to FL, ±1% max.
V2, Auxilary Output ..... MinL to FL, ±5% typ.
Triple Outputs:
V1 ..... MinL to FL, ±1% max.
V2/V3 (with balanced Loads) ..... MinL to FL, ±5% typ..
Output Trim (Model ES & ED only) ..... ±10%, max.
Line Regulation (Main Output), LL–HL ..... ±0.5% max.
Load Regulation (Main Output), MinL/FL ..... ±1.0% max.
Short Circuit Protection ..... Indefinite
Transient Response ..... <200µSec.

*Trim - To adjust output voltage **Up/Dowm** with a resistor connected from trim pin to -V/+V.

Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C, max.
Efficiency 80%
Isolation Voltage, I/O ..... 500Vdc, min.
Switching Frequency ..... 200KHz, typ.
Thermal Resistance ..... 10°C/Watt
Operating Ambient Temperature Range (Case Temp. +95°C max):
10 Watts ..... –25°C to +60°C
15 Watts ..... –25°C to +50°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
Weight ..... 2 oz. (56 grams)
Case Material ..... Black Coated Metal
(With Non-Conductive Seating Surface)

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 36 Vdc IN	20 - 72 Vdc IN
3.3V	2.0A	6	D10S1203	D10S2403	D10S4803	DW10S2403	DW10S4803
3.3V	3.0A	10	D15S1203	D15S2403	D15S4803	–	–
5V	2.0A	10	D10S1205	D10S2405	D10S4805	DW10S2405	DW10S4805
5V	3.0A	15	D15S1205	D15S2405	D15S4805	–	–
12V	0.85A	10	D10S1212	D10S2412	D10S4812	DW10S2412	DW10S4812
12V	1.25A	15	D15S1212	D15S2412	D15S4812	–	–
15V	0.65A	10	D10S1215	D10S2415	D10S4815	DW10S2415	DW10S4815
15V	1.0A	15	D15S1215	D15S2415	D15S4815	–	–
24V	0.4A	10	D10S1224	D10S2424	D10S4824	DW10S2424	DW10S4824
24V	0.6A	15	D15S1224	D15S2424	D15S4824	–	–
±5V	±1.0A	10	D10D1205	D10D2405	D10D4805	DW10D2405	DW10D4805
±5V	±1.5A	15	D15D1205	D15D2405	D15D4805	–	–
+5V, -12V	+1.0A, -.42A	10	D10D1205-12	D10D2405-12	D10D4805-12	DW10D2405-12	DW10D4805-12
+5V, -12V	+1.5A, -.63A	15	D15D1205-12	D15D2405-12	D15D4805-12	–	–
+5V, +12V	+1.0A, +.42A	10	D10D1205+12	D10D2405+12	D10D4805+12	DW10D2405+12	DW10D4805+12
+5V, +12V	+1.5A, +.63A	15	D15D1205+12	D15D2405+12	D15D4805+12	–	–
±12V	±0.45A	10	D10D1212	D10D2412	D10D4812	DW10D2412	DW10D4812
±12V	±0.65A	15	D15D1212	D15D2412	D15D4812	–	–
±15V	±0.34A	10	D10D1215	D10D2415	D10D4815	DW10D2415	DW10D4815
±15V	±0.50A	15	D15D1215	D15D2415	D15D4815	–	–
+5, ±12V	+1.0, ±0.21A	10	D10T1205-12	D10T2405-12	D10T4805-12	DW10T2405-12	DW10T4805-12
+5, ±12V	+1.5, ±0.32A	15	D15T1205-12	D15T2405-12	D15T4805-12	–	–
+5, ±15V	+1.0, ±0.17A	10	D10T1205-15	D10T2405-15	D10T4805-15	DW10T2405-15	DW10T4805-15
+5, ±15V	+1.5, ±0.25A	15	D15T1205-15	D15T2405-15	D15T4805-15	–	–

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F Single, Dual & Triple (10-20W)

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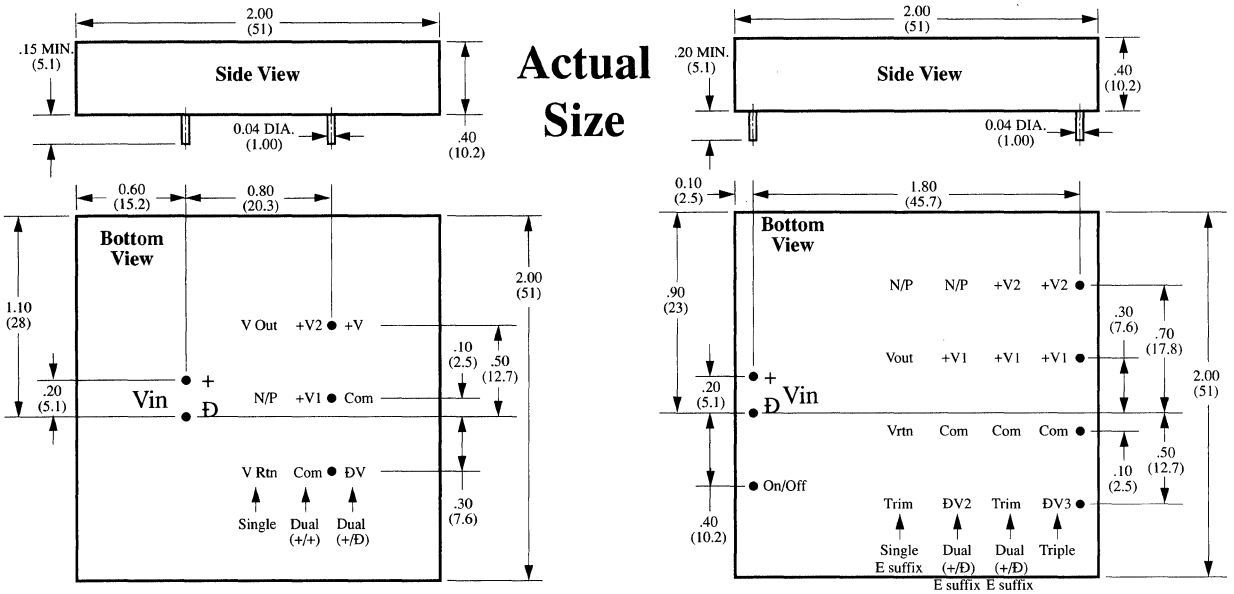

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... LC Filter
Remote On/Off Control:
On Control ..... >5Vdc or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection ..... shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS (10% Minimum Load required on All Outputs)

V1 (Single output or main output) ..... ±1% max.
V2 (Dual Output with Balanced Load) ..... ±2% max.
+V2/–V3 (Triple Output @ Full Load) ..... ±3% max.
Output Trim (FS & FD with E Suffix only) ..... ±10% max.
Line Regulation (Main Output), LL–HL ..... ±0.2% max.
Load Regulation (Main Output), MinL to FL ..... ±1.0% max.
Short Circuit Protection ..... Indefinite
Transient Response ..... <200µSec.
Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

***Trim** - To adjust output voltage **Up/Downm** with a resistor connected from trim pin to -V/+V.

ALL DIMENSIONS IN INCHES (MM)

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C max.
Efficiency ..... 80% typ.
Isolation Voltage, I/O ..... 500Vdc min.
Switching Frequency ..... 200KHz typ.
Thermal Resistance ..... 7.5°C/Watt
Operating Ambient Temperature Range (Case Temp. +95°C max):
15 Watts ..... –25°C to +60°C
20 Watts ..... –25°C to +50°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
Dimensions ..... 2.0" x 2.0" x 0.40"
Weight ..... 2.2 oz. (63 grams)
Case Material ..... Black Coated Metal
(With Non-Conductive Seating Surface)

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 36 Vdc IN	20 - 72 Vdc IN
3.3V	3.0A	10	F15S1203	F15S2403	F15S4803	FW15S2403	FW15S4803
3.3V	4.0A	20	F20S1203	F20S2403	F20S4803	–	–
5V	3.0A	15	F15S1205	F15S2405	F15S4805	FW15S2405	FW15S4805
5V	4.0A	20	F20S1205	F20S2405	F20S4805	–	–
12V	1.25A	15	F15S1212	F15S2412	F15S4812	FW15S2412	FW15S4812
12V	1.67A	20	F20S1212	F20S2412	F20S4812	–	–
15V	1.00A	15	F15S1215	F15S2415	F15S4815	FW15S2415	FW15S4815
15V	1.34A	20	F20S1215	F20S2415	F20S4815	–	–
24V	0.65A	15	F15S1224	F15S2424	F15S4824	FW15S2424	FW15S4824
24V	0.85A	20	F20S1224	F20S2424	F20S4824	–	–
±5V	±1.5A	15	F15D1205	F15D2405	F15D4805	FW15D2405	FW15D4805
±5V	±2.0A	20	F20D1205	F20D2405	F20D4805	–	–
+5V, -12V	+1.5A, -.63A	15	F15D1205-12	F15D2405-12	F15D4805-12	FW15D2405-12	FW15D4805-12
+5V, -24V	+1.5A, -.32A	15	F15D1205-24	F15D2405-24	F15D4805-24	FW15D2405-24	FW15D4805-24
+5V, +12V	+1.5A, +.63A	15	F15D1205+12	F15D2405+12	F15D4805+12	FW15D2405+12	FW15D4805+12
+5V, +24V	+1.5A, +.32A	15	F15D1205+24	F15D2405+24	F15D4805+24	FW15D2405+24	FW15D4805+24
±12V	±0.65A	15	F15D1212	F15D2412	F15D4812	FW15D2412	FW15D4812
±12V	±0.83A	20	F20D1212	F20D2412	F20D4812	–	–
±15V	±0.50A	15	F15D1215	F15D2415	F15D4815	FW15D2415	FW15D4815
±15V	±0.67A	20	F20D1215	F20D2415	F20D4815	–	–
+5, ±12V	+1.5, ±0.32A	15	F15T1205-12	F15T2405-12	F15T4805-12	FW15T2405-12	FW15T4805-12
+5, ±12V	+2.0, ±0.42A	20	F20T1205-12	F20T2405-12	F20T4805-12	–	–
+5, ±15V	+1.5, ±0.25A	15	F15T1205-15	F15T2405-15	F15T4805-15	FW15T2405-15	FW15T4805-15
+5, ±15V	+2.0, ±0.34A	20	F20T1205-15	F20T2405-15	F20T4805-15	–	–

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FH Single (15W) 48-110Vout H Single (30-60W)

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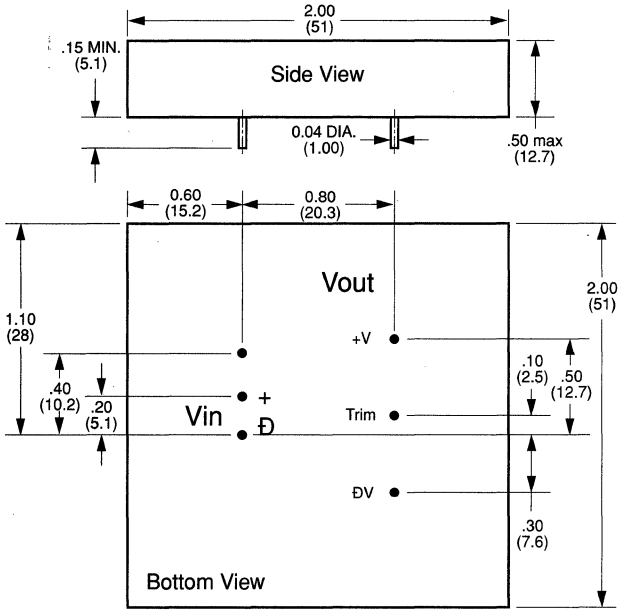

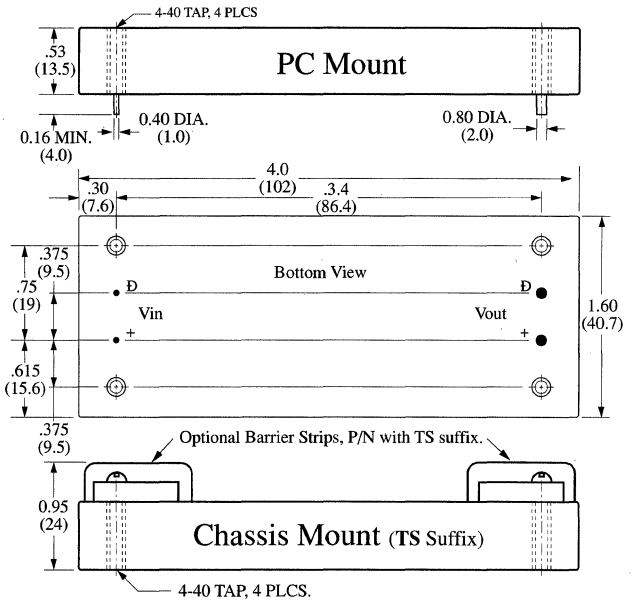

*Trim - To adjust output voltage Up/Dowm with a resistor connected from trim pin to -V/+V.

ALL DIMENSIONS IN INCHES (MM)

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Low ESR Capacitor
Remote On/Off Control:
On Control ..... - 1.8Vdc or Open Circuit
Off Control ..... 470Ký Resistor to +Vin
Reverse Voltage Protection ..... shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS (10% Minimum Load required)

Voltage Accuracy ..... ±1%, max.
Output Trim ..... ±10%, max.
Output Overvoltage Clamp ..... 130% Vout
Line Regulation, LL to HL ..... ±0.2% max.
Load Regulation, MinL to FL ..... ±1.0% max.
Short Circuit Protection ..... Short Term
Ripple ..... 0.5% Vout
Noise, 20MHz BW ..... 75mVp-p or 1% Vout

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C, max.
Efficiency 80%
Isolation Voltage, I/O ..... 500Vdc, min.
Switching Frequency ..... 200KHz, typ.
Thermal Resistance, FH ..... 7.5°C/Watt Dissipate
Thermal Resistance, H ..... 6.0°C/Watt Dissipate
Operating Case Temperature ..... –25°C to 90°C, max.
Storage Temperature Range ..... –55°C to +105°C
Cooling ..... Free-Air Convection
Humidity ..... 20% to 95% R.H. (non-condensing)
Dimensions, FH ..... 2.0" x 2.0" x 0.50"
Dimensions, H PC Mount ..... 1.6" x 4.0" x 0.53"
Dimensions, H Chassis Mount ..... 1.6" x 4.0" x 0.95"
Weight ..... 2.2 oz. (63 grams)
Case Material ..... Black Coated Metal
(With Non-Conductive Seating Surface)

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER		
			10 - 15 Vdc IN	20 - 30 Vdc IN	40 - 60 Vdc IN
48V	320mA	15	FH15S1248	FH15S2448	FH15S4848
110V	130mA	15	F15S12110	FH15S24110	FH15S48110

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 36 Vdc IN	20 - 72 Vdc IN
3.3V	6A	20	H30S1203	H30S2403	H30S4803	HW30S2403	HW30S4803
3.3V	10A	33	H50S1203	H50S2403	H50S4803	-	-
5V	6A	30	H30S1205	H30S2405	H30S4805	HW30S2405	HW30S4805
5V	10A	50	H50S1205	H50S2405	H50S4805	-	-
9V	3.3A	30	H30S1209	H30S2409	H30S4809	HW30S2409	HW30S4809
9V	6.7A	60	H60S1209	H60S2409	H60S4809	-	-
12V	2.5A	30	H30S1212	H30S2412	H30S4812	HW30S2412	HW30S4812
12V	5A	60	H60S1212	H60S2412	H60S4812	-	-
15V	2A	30	H30S1215	H30S2415	H30S4815	HW30S2415	HW30S4815
15V	4A	60	H60S1215	H60S2415	H60S4815	-	-
24V	1.25A	30	H30S1224	H30S2424	H30S4824	HW30S2424	HW30S4824
24V	2.5A	60	H60S1224	H60S2424	H60S4824	-	-

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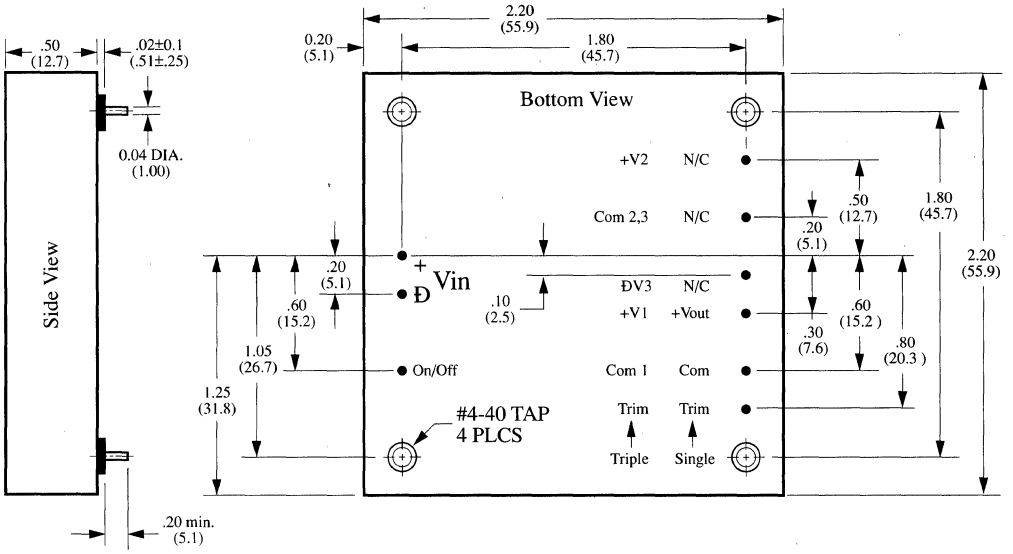
G Single, Dual & Triple (30W)



INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Þ(PI) Filter
No External Filter Capacitor Required for Normal Operation
Remote On/Off Control:
On Control ..... >5Vdc or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection ..... shunt Diode
External Fuse Required

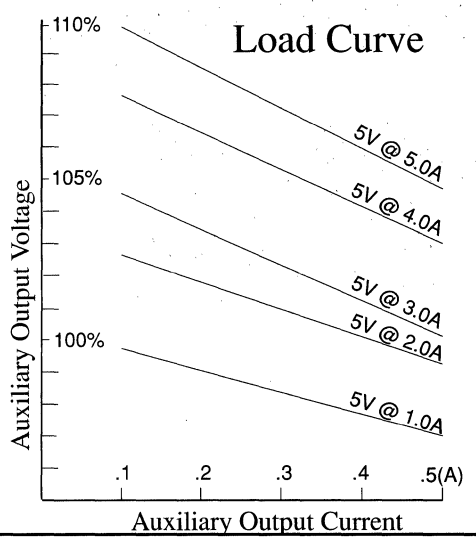
OUTPUT SPECIFICATIONS (10% Minimum Load required on All Outputs)

V1 (Single output or main output) ..... ±1% max.
+V2/–V3 (Auxiliary outputs) ..... Please see **Load Cure**
Output Trim ..... ±10% max.
Line Regulation (Single or Main Output), LL to HL ..... ±0.2% max.
Load Regulation (Single or Main Output), MinL to FL ... ±1.0% max.
Short Circuit Protection ..... Continuous with automatic recovery
Overvoltage Protection (Main Output):
5V 6.2V
12V 15V
15V 18V
Transient Response (Main Output) ..... < 200µSec.
Ripple ..... 5V: 30mVp-p; ±12/±15V: 80mVp-p
Noise, 20MHz BW ..... 5V: 75mVp-p; ±12/±15V: 120mVp-p

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C max.
Efficiency ..... 80% typ.
Isolation Voltage, I/O ..... 500VAC, 710Vdc min.
Switching Frequency ..... 300KHz typ.
Thermal Resistance ..... 7.0°C/Watt
Operating Case Temperature Ranges ..... -40°C to +95°C
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
Dimensions ..... 2.2" x 2.2" x 0.50"
Weight ..... 3 oz. (86 grams)
Case Material ..... Black Coated Metal

*Trim - To adjust output voltage **Up/Dowm** with a resistor connected from trim pin to -V/+V.



OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 30 Vdc IN	20 - 60 Vdc IN
3.3V	6.0A	20	G30S1203	G30S2403	G30S4803	G30S3003	G30S6003
5V	6.0A	30	G30S1205	G30S2405	G30S4805	G30S3005	G30S6005
12V	2.5A	30	G30S1212	G30S2412	G30S4812	G30S3012	G30S6012
15V	2.0A	30	G30S1215	G30S2415	G30S4815	G30S3015	G30S6015
24V	1.25A	30	G30S1224	G30S2424	G30S4824	G30S3024	G30S6024
5, 12V	5.0, 1.0A	30	G30D1205-12	G30D2405-12	G30D4805-12	G30D3005-12	G30D6005-12
5, 15V	5.0, 1.0A	30	G30D1205-15	G30D2405-15	G30D4805-15	G30D3005-15	G30D6005-15
5, ±12V	5.0, ±0.50A	30	G30T1205-12	G30T2405-12	G30T4805-12	G30T3005-12	G30T6005-12
5, ±15V	5.0, ±0.50A	30	G30T1205-15	G30T2405-15	G30T4805-15	G30T3005-15	G30T6005-15

HX Single, Dual & Triple (30W)

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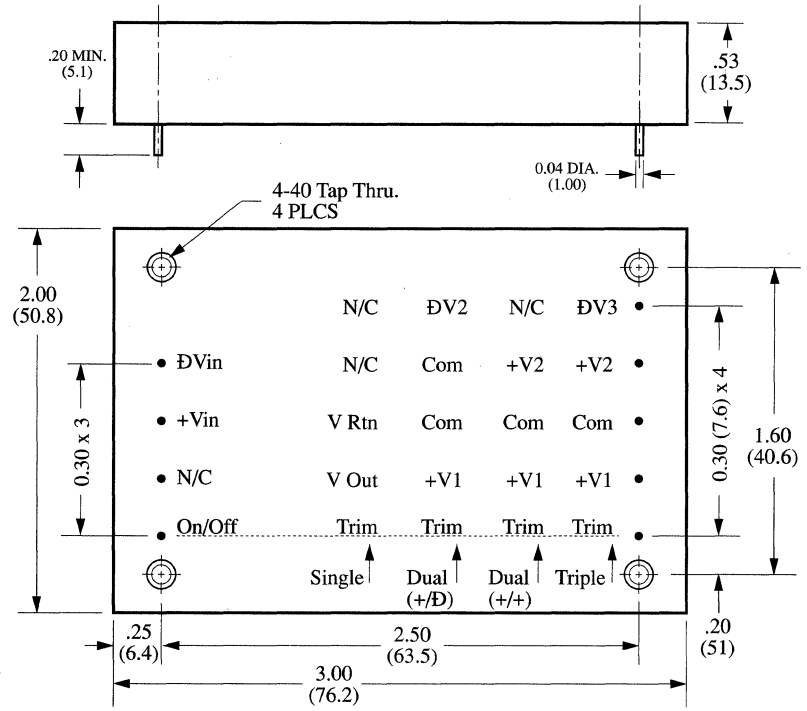

ALL DIMENSIONS IN INCHES (MM)

***Trim** - To adjust output voltage **Up/Dowm** with a resistor connected from trim pin to -V/+V.

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Low ESR Capacitor
Reverse Voltage Protection ..... shunt Diode
External Fuse Required

OUTPUT SPECIFICATIONS (10% Minimum Load required on All Outputs)

Voltage Accuracy (Single or Main Output) ..... ±1% max.
Line Regulation (Single or Main Output), LL–HL ..... ±0.2% max.
Load Regulation (Single or Main Output), MinL/FL ..... ±1.0% max.
Short Circuit Protection ..... Indefinite
Transient Response (50% Load change) ..... < 500µSec.
Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C max.
Efficiency ..... 80% typ.
Isolation Voltage, I/O ..... 500Vdc min.
Switching Frequency ..... 200KHz typ.
Thermal Resistance ..... 6.5°C/Watt
Operating Case Temperature Range ..... –40°C to +95°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
Dimensions ..... 2.0" x 3.0" x 0.53"
Weight ..... 3 oz. (80 grams)
Case Material ..... Aluminum
Seating Surface (PC Mount) ..... Non-Conductive

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 36 Vdc IN	20 - 72 Vdc IN
3.3V	6A	20	HX30S1203	HX30S2403	HX30S4803	HXW30S2403	HXW30S4803
5V	6A	30	HX30S1205	HX30S2405	HX30S4805	HXW30S2405	HXW30S4805
12V	2.5A	30	HX30S1212	HX30S2412	HX30S4812	HXW30S2412	HXW30S4812
15V	2.0A	30	HX30S1215	HX30S2415	HX30S4815	HXW30S2415	HXW30S4815
24V	1.25A	30	HX30S1224	HX30S2424	HX30S4824	HXW30S2424	HXW30S4824
±5V	±2.5A	25	HX25D1205	HX25D2405	HX25D4805	HXW25D2405	HXW25D4805
+5, -12V	+4, -1A	30	HX30D1205-12	HX30D2405-12	HX30D4805-12	HXW30D2405-12	HXW30D4805-12
+5, -24V	+4, -1A	30	HX30D1205-24	HX30D2405-24	HX30D4805-24	HXW30D2405-24	HXW30D4805-24
+5, +12V	+4, +1A	30	L30D1205+12	HX30D2405+12	HX30D4805+12	HXW30D2405+12	HXW30D4805+12
+5, +24V	+4, +0.5A	30	HX30D1205+24	HX30D2405+24	HX30D4805+24	HXW30D2405+24	HXW30D4805+24
±12V	±1.25A	30	HX30D1212	HX30D2412	HX30D4812	HXW30D2412	HXW30D4812
±15V	±1.0A	30	HX30D1215	HX30D2415	HX30D4815	HXW30D2415	HXW30D4815
+5, ±12V	+4.0, ±0.50A	30	HX30T1205-12	HX30T2405-12	HX30T4805-12	HXW30T2405-12	HXW30T4805-12
+5, ±15V	+4.0, ±0.50A	30	HX30T1205-15	HX30T2405-15	HX30T4805-15	HXW30T2405-15	HXW30T4805-15

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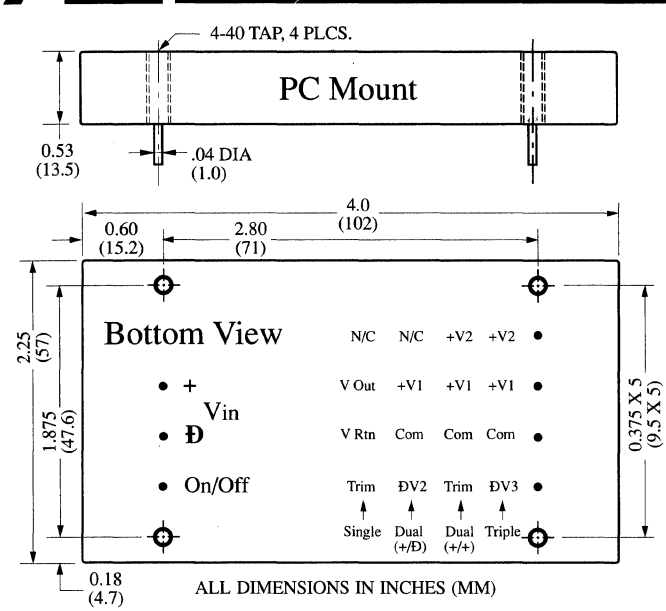
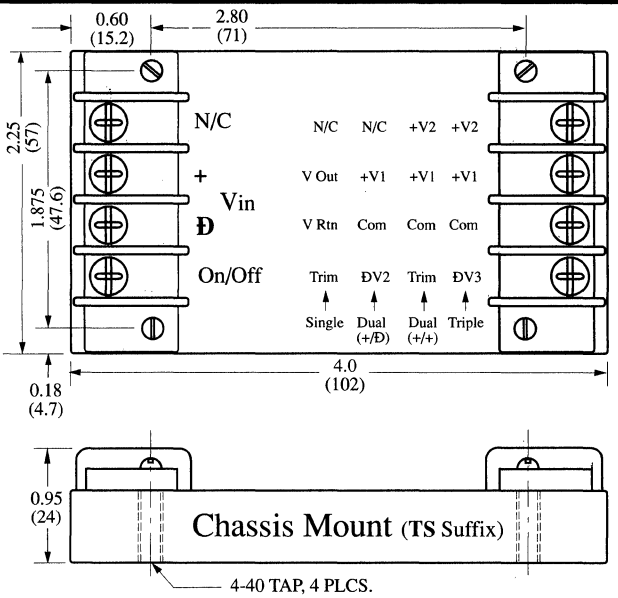
J Single, Dual & Triple (20-60W)





INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Low ESR Capacitor
Remote On/Off Control:
On Control ..... > 5Vdc or Open Circuit
Off Control ..... < 1.8V or Jumper to –Vin
Reverse Voltage Protection ..... shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS

Single Output:
Voltage Accuracy/Load Regulation ..... NL to FL, ±1% max.
Dual Outputs: (Two independent control loops)
V1 ..... NL to FL, ±1% max.
V2 ..... NL to FL, ±1% max.
Triple Outputs: (Two independent control loops)
V1 ..... NL to FL, ±1% max.
V2/V3 (with balanced Loads) ..... NL to FL, ±1% max.
Line Regulation (Single or Main Output), LL–HL ..... ±0.2% max.
Load Regulation (Balanced Required on Triple output V2-3) ..... ±1.0% max.
Short Circuit Protection ..... Indefinite
Transient Response ..... <500µSec.

***Trim** - To adjust output voltage **Up/Dowm** with a resistor connected from trim pin to -V/+V.

Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C max.
Efficiency ..... 80% typ.
Isolation Voltage, I/O ..... 500Vdc min.
Switching Frequency ..... 200KHz typ.
Thermal Resistance ..... 5.0°C/Watt Dissipated
Operating Case Temperature ..... -40°C to +90°C
Over Temperature Shut-Down ..... +95°C, ±5°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
Dimensions (PC board Mount) ..... 2.25" x 4.0" x 0.53"
Weight (PC Mount) ..... 4 oz. (110 grams)
Case Material ..... Aluminum
Seating Surface (PC Mount) ..... Non-Conductive

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 30 Vdc IN	20 - 60 Vdc IN
3.3V	6A	20	J30S1203	J30S2403	J30S4803	J30S3003	J30S6003
3.3V	10A	33	J50S1203	J50S2403	J50S4803	-	-
5V	6A	30	J30S1205	J30S2405	J30S4805	J30S3005	J30S6005
5V	10A	50	J50S1205	J50S2405	J50S4805	-	-
12V	2.5A	30	J30S1212	J30S2412	J30S4812	J30S3012	J30S6012
12V	5A	60	J60S1212	J60S2412	J600S4812	–	–
15V	2A	30	J30S1215	J30S2415	J30S4815	J30S3015	J30S6015
15V	4A	60	J60S1215	J60S2415	J60S4815	-	-
24V	1.25A	30	J30S1224	J30S2424	J30S4824	J30S3024	J30S6024
24V	2.5A	60	J60S1224	J60S2424	J60S4824	-	-
+5, +12V	+4, +0.5A	30	J30D1205+12	J30D2405+12	J30D4805+12	J30D3005+12	J30D6005+12
+5, +12V	+8, +1.0A	60	J60D1205+12	J60D2405+12	J60D4805+12	-	-
+5, +24V	+4, +0.5A	30	J30D1205+24	J30D2405+24	J30D4805+24	J30D3005+24	J30D6005+24
+5, +24V	+8, +1.0A	60	J60D1205+24	J60D2405+24	J60D4805+24	-	-
+5, ±12V	+4, ±0.5A	30	J30T1205-12	J30T2405-12	J30T4805-12	J30T3005-12	J30T6005-12
+5, ±12V	+8, ±1.0A	60	J60T1205-12	J60T2405-12	J60T4805-12	-	-
+5, ±15V	+4, ±0.5A	30	J30T1205-15	J30T2405-15	J30T4805-15	J30T3005-15	J30T6005-15
+5, ±15V	+8, ±1.0A	60	J60T1205-15	J60T2405-15	J60T4805-15	-	-

L Single, Dual & Triple (17-30W)

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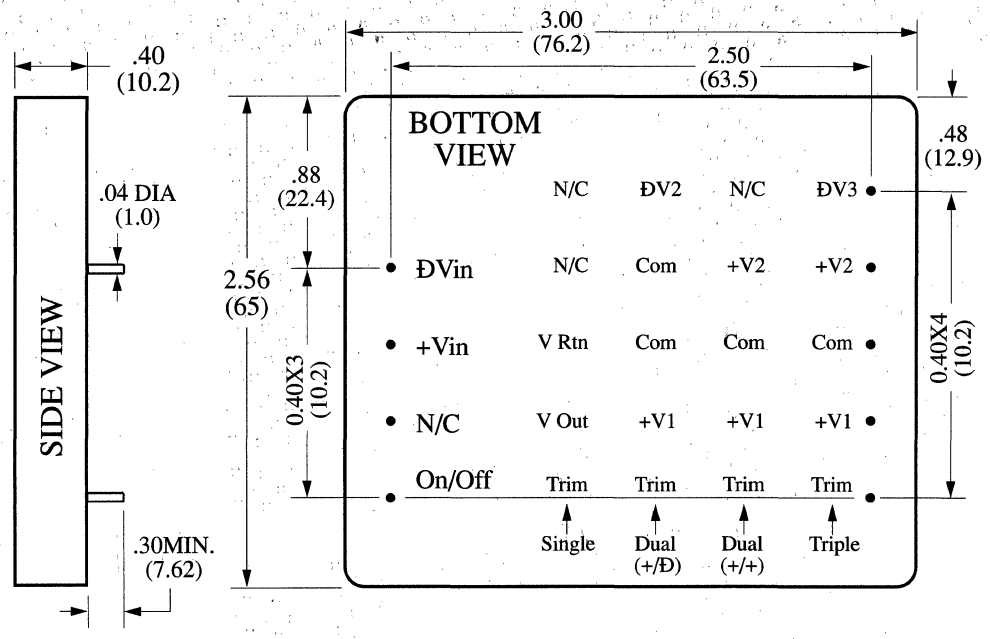
Actual Size



ALL DIMENSIONS IN INCHES (MM)

***Trim** - To adjust output voltage **Up/Dowm** with a resistor connected from trim pin to -V/+V.

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Þ (PI) Filter
Remote On/Off Control:
On Control ..... >5Vdc or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection .. shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS (10% Minimum Load required on All Outputs)

V1 (Single output or main output) ..... ±1%, max.
V2 (Dual output with Balance Load) ..... ±2%, max.
+V2/–V3 (Triple output, all outputs @ Full Load) ..... ±5%, max.
Output Trim ..... ±10%, max.
Line Regulation (Single or Main Output), LL–HL ..... ±0.2% max.
Load Regulation (Single or Main Output), MinL to FL ... ±1.0% max.
Short Circuit Protection ..... Indefinite
Transient Response ..... <200µSec.
Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C, max.
Efficiency ..... 80% typ.
Isolation Voltage, I/O ..... 500Vdc, min.
Thermal Resistance ..... 5.5°C/Watt
Operating Case Temperature Range ..... –25°C to +95°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
(For sealed case water washable unit please add suffix "Z")
Dimensions ..... 2.56" x 3.0" x 0.4"
Weight ..... 4 oz. (105 grams)
Case Material ..... Black Coated Metal
(With Non-Conductive Seating Surface)

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 36 Vdc IN	20 - 72 Vdc IN
3.3V	5A	17	L25S1203	L25S2403	L25S4803	LW25S2403	LW25S4803
5V	5A	25	L25S1205	L25S2405	L25S4805	LW25S2405	LW25S4805
12V	2.5A	30	L30S1212	L30S2412	L30S4812	LW30S2412	LW30S4812
15V	2.0A	30	L30S1215	L30S2415	L30S4815	LW30S2415	LW30S4815
24V	1.25A	30	L30S1224	L30S2424	L30S4824	LW30S2424	LW30S4824
±5V	±2.5A	25	L25D1205	L25D2405	L25D4805	LW25D2405	LW25D4805
+5, –12V	+4, –1A	30	L30D1205-12	L30D2405-12	L30D4805-12	LW30D2405-12	LW30D4805-12
+5, –24V	+4, –1A	30	L30D1205-24	L30D2405-24	L30D4805-24	LW30D2405-24	LW30D4805-24
+5, +12V	+4, +1A	30	L30D1205+12	L30D2405+12	L30D4805+12	LW30D2405+12	LW30D4805+12
+5, +24V	+4, +0.5A	30	L30D1205+24	L30D2405+24	L30D4805+24	LW30D2405+24	LW30D4805+24
±12V	±1.25A	30	L30D1212	L30D2412	L30D4812	LW30D2412	LW30D4812
±15V	±1.0A	30	L30D1215	L30D2415	L30D4815	LW30D2415	LW30D4815
+5, ±12V	+4.0, ±0.50A	30	L30T1205-12	L30T2405-12	L30T4805-12	LW30T2405-12	LW30T4805-12
+5, ±15V	+4.0, ±0.50A	30	L30T1205-15	L30T2405-15	L30T4805-15	LW30T2405-15	LW30T4805-15

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M Single , Dual & Triple (25-40W)

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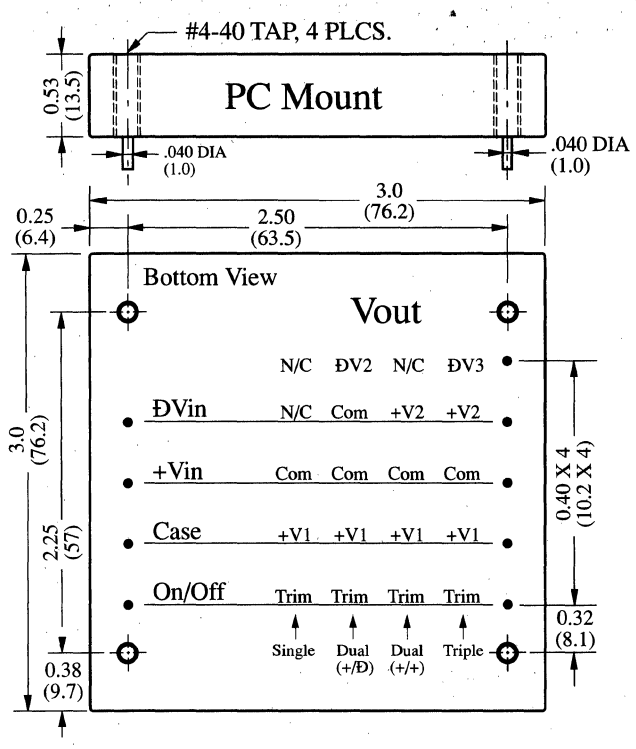

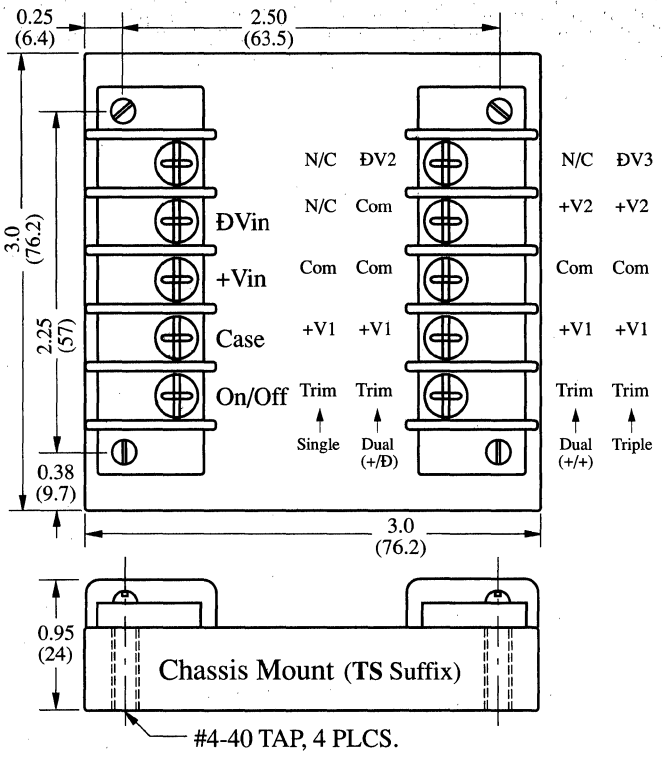

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Low ESR Capacitors
Remote On/Off Control:
On Control ..... >5Vdc or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection .. shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS (10% Minimum Load required on All Outputs)

V1 (Single output or main output) ..... ±1% max.
V2 (Dual output with Balance Load) ..... ±2% max.
+V2/–V3 (Triple output, all outputs @ Full Load) ..... ±5% max.
Output Trim ..... ±10% max.
Line Regulation (Single or Main Output), LL to HL ..... ±0.2% max.
Load Regulation (Single or Main Output), MinL to FL ... ±1.0% max.
Short Circuit Protection ..... Pulse by Pulse Current Limit
Transient Response ..... <200µSec.
Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

***Trim** - To adjust output voltage **Up/Downm** with a resistor connected from trim pin to -V/+V.

ALL DIMENSIONS IN INCHES (MM)

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C max.
Efficiency ..... 80% typ.
Isolation Voltage, I/O ..... 500Vdc, min.
Thermal Resistance ..... 5.5°C/Watt
Operating Case Temperature Range ..... –25°C to +95°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
(For sealed case water washable unit please add suffix "Z")
Dimensions ..... 2.56" x 3.0" x 0.4"
Weight ..... 4 oz. (105 grams)
Case Material ..... Black Coated Metal
(With Non-Conductive Seating Surface)

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 36 Vdc IN	20 - 72 Vdc IN
3.3V	5A	17	M25S1203	M25S2403	M25S4803	MW25S2403	MW25S4803
5V	5A	25	M25S1205	M25S2405	M25S4805	MW25S2405	MW25S4805
12V	2.5A	30	M30S1212	M30S2412	M30S4812	MW30S2412	MW30S4812
15V	2.0A	30	M30S1215	M30S2415	M30S4815	MW30S2415	MW30S4815
24V	1.25A	30	M30S1224	M30S2424	M30S4824	MW30S2424	MW30S4824
±5V	±2.5A	25	M25D1205	M25D2405	M25D4805	MW25D2405	MW25D4805
+5, –12V	+4, –1A	30	M30D1205-12	M30D2405-12	M30D4805-12	MW30D2405-12	MW30D4805-12
+5, –24V	+4, –1A	30	M30D1205-24	M30D2405-24	M30D4805-24	MW30D2405-24	MW30D4805-24
+5, +12V	+4, +1A	30	M30D1205+12	M30D2405+12	M30D4805+12	MW30D2405+12	MW30D4805+12
+5, +24V	+4, +0.5A	30	M30D1205+24	M30D2405+24	M30D4805+24	MW30D2405+24	MW30D4805+24
±12V	±1.25A	30	M30D1212	M30D2412	M30D4812	MW30D2412	MW30D4812
±15V	±1.0A	30	M30D1215	M30D2415	M30D4815	MW30D2415	MW30D4815
+5, ±12V	+4.0, ±0.50A	30	M30T1205-12	M30T2405-12	M30T4805-12	MW30T2405-12	MW30T4805-12
+5, ±15V	+4.0, ±0.50A	30	M30T1205-15	M30T2405-15	M30T4805-15	MW30T2405-15	MW30T4805-15

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N Single, Dual, Triple & Quad (17-30W)

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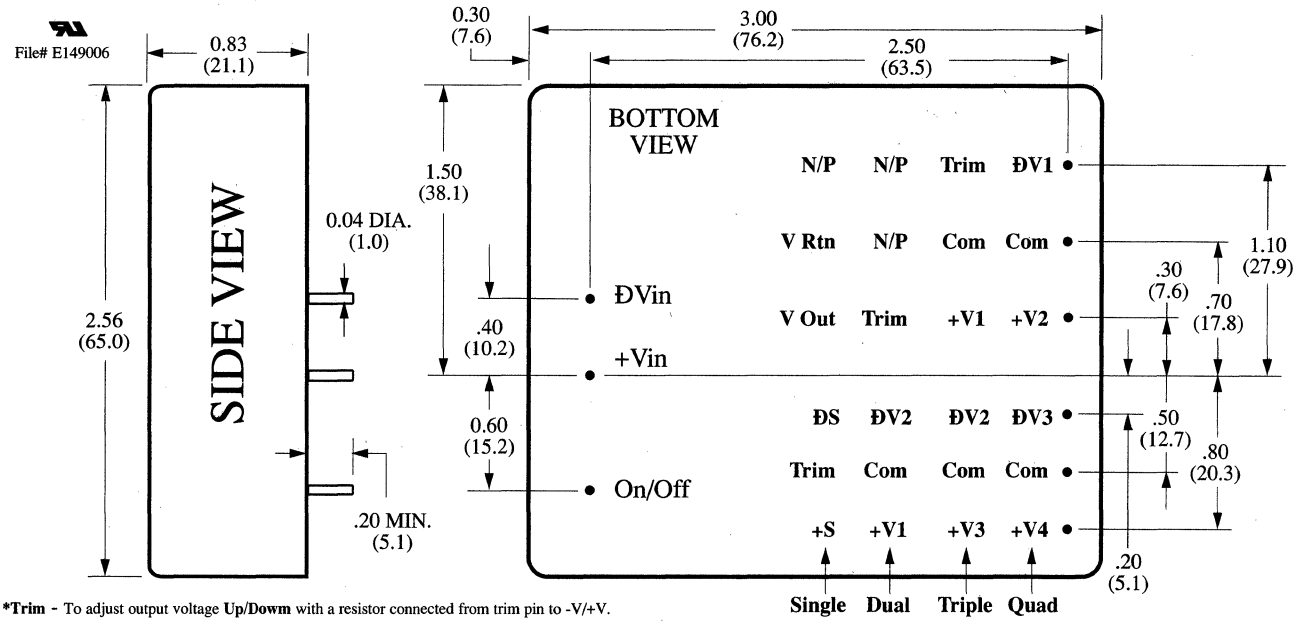

***Trim** - To adjust output voltage **Up/Dowm** with a resistor connected from trim pin to -V/+V.

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Þ (PI) Filter
Remote On/Off Control:
On Control ..... >5Vdc or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection ..... shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS (10% Minimum Load required on All Outputs)

V1 (Single output or main output) ..... ±1% max.
V2 (Dual output, all outputs @ full load) ..... ±2% max.
+V2/–V3 (Triple output, all outputs @ full load) ..... ±5% max.
Output Trim ..... ±10% max.
Line Regulation (Single or Main Output), LL–HL ..... ±0.2% max.
Load Regulation (Single or Main Output), MinL to FL ..... ±1.0% max.
Short Circuit Protection ..... Current Limit
Transient Response ..... < 500µSec.
Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C max.
Efficiency ..... 80% typ.
Isolation Voltage, I/O ..... 500Vdc min.
Thermal Resistance ..... 5°C/Watt
Operating Case Temperature Range ..... –25°C to +85°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
For sealed case water washable unit please add suffix "Z" to the P/N.
Dimensions ..... 2.56" x 3.0" x 0.83"
Weight ..... 4 oz. (105 grams)
Case Material ..... Black Coated Metal
(With Non-Conductive Seating Surface)

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 36 Vdc IN	20 - 72 Vdc IN
3.3V	5.0A	17	N25S1203	N25S2403	N25S4803	NW25S2403	NW25S4803
5V	4.0A	20	N20S1205	N20S2405	N20S4805	NW20S2405	NW20S4805
5V	5.0A	25	N25S1205	N25S2405	N25S4805	NW25S2405	NW25S4805
12V	1.7A	20	N20S1212	N20S2412	N20S4812	NW20S2412	NW20S4812
12V	2.5A	30	N30S1212	N30S2412	N30S4812	NW30S2412	NW30S4812
15V	1.4A	20	N20S1215	N20S2415	N20S4815	NW20S2415	NW20S4815
15V	2.0A	30	N30S1215	N30S2415	N30S4815	NW30S2415	NW30S4815
24V	1.2A	30	N30S1224	N30S2424	N30S4824	NW30S2424	NW30S4824
±5V	±2A	20	N20D1205	N20D2405	N20D4805	NW20D2405	NW20D4805
±5V	±3.0A	30	N30D1205	N30D2405	N30D4805	NW30D2405	NW30D4805
+5V, -12V	+3A, -1A	30	N30D1205-12	N30D2405-12	N30D4805-12	NW30D2405-12	NW30D4805-12
+5V, -24V	+3A, -0.5A	30	N30D1205-24	N30D2405-24	N30D4805-24	NW30D2405-24	NW30D4805-24
+5V, +12V	+3A, +1A	30	N30D1205+12	N30D2405+12	N30D4805+12	NW30D2405+12	NW30D4805+12
+5V, +24V	+3A, +0.5A	30	N30D1205+24	N30D2405+24	N30D4805+24	NW30D2405+24	NW30D4805+24
±12V	±0.8A	20	N20D1212	N20D2412	N20D4812	NW20D2412	NW20D4812
±12V	±1.25A	30	N30D1212	N30D2412	N30D4812	NW30D2412	NW30D4812
±15V	±0.7A	20	N20D1215	N20D2415	N20D4815	NW20D2415	NW20D4815
±15V	±1.0A	30	N30D1215	N30D2415	N30D4815	NW30D2415	NW30D4815
+5, ±12V	+2.5, ±0.33A	20	N20T1205-12	N20T2405-12	N20T4805-12	NW20T2405-12	NW20T4805-12
+5, ±12V	+3.0, ±0.42A	25	N25T1205-12	N25T2405-12	N25T4805-12	NW25T2405-12	NW25T4805-12
+5, ±15V	+2.5, ±0.25A	20	N20T1205-15	N20T2405-15	N20T4805-15	NW20T2405-15	NW20T4805-15
+5, ±15V	+2.5, ±0.34A	25	N25T1205-15	N25T2405-15	N25T4805-15	NW25T2405-15	NW25T4805-15
±5, ±12V	+3/–0.5,±0.5A	25	N25Q1205-12	N25Q2405-12	N25Q4805-12	–	–
±5, ±15V	+3/–0.5,±0.5A	25	N25Q1205-15	N25Q2405-15	N25Q4805-15	–	–

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P Single, Dual, Triple & Quad (27-60W)

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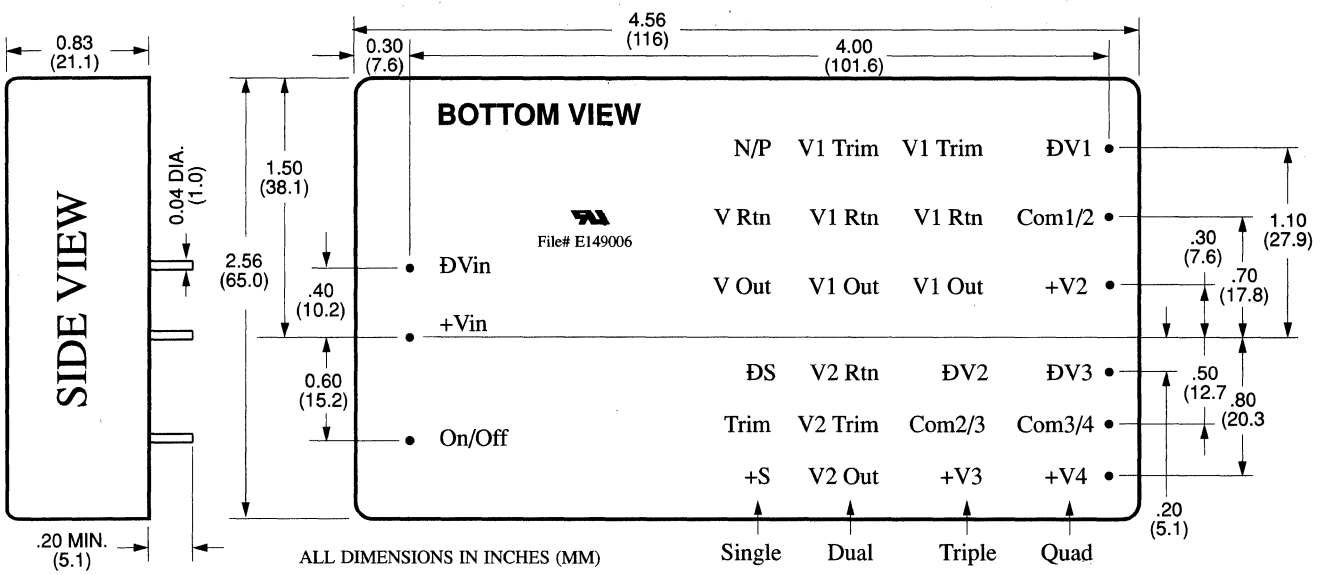

INPUT SPECIFICATIONS

Input Filter ..... Þ(PI) Filter
Remote On/Off Control:
On Control ..... TTL High or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection ..... shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS

Single Output:
Voltage Accuracy/Load Regulation ..... NL to FL, ±1% max.
Dual Outputs: (Unit has two independent control loops)
V1 ..... NL to FL, ±1% max.
V2 ..... NL to FL, ±1% max.
Triple Outputs: (Unit has two independent control loops)
V1 ..... NL to FL, ±1% max.
V2/V3 (with balanced Loads) ..... NL to FL, ±1% max.
*V3 with series pass regulator ..... NL to FL, ±4% max.
Quad Outputs: (Unit has two independent control loops)
V1 (series pass regulator regulated) ..... NL to FL, ±4% max.
V2 ..... NL to FL, ±1% max.
V3/V4 (with balanced Loads) ..... NL to FL, ±1% max.
Output Trim ..... ±10%, max.
Line Regulation, LL–HL ..... ±0.2%

***Trim** - To adjust output voltage **Up/Downm** with a resistor connected from trim pin to -V/+V. Sense Leads (+S/–S) Compensate Output Line Drop, Connect to +V/–V Respectively If Not Used.

Load Regulation, NL/FL ..... ±1.0%
Short Circuit Protection ..... Current Limit
Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C, max.
Efficiency 80%
Isolation Voltage, I/O ..... 500Vdc, min.
Switching Frequency ..... 100KHz, typ.
Thermal Resistance ..... 4°C/Watt
Operating Case Temperature Range ..... –25°C to +85°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
Dimensions ..... 2.56" x 4.56" x 0.83"
Weight ..... 10 oz. (283 grams)
Case Material ..... Black Coated Metal
(With Non-Conductive Seating Surface)

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 72 Vdc IN	10 - 30 Vdc IN	20 - 60 Vdc IN
3.3V	8.0A	27	P40S1203	P40S2403	P40S4803	P40S3003	P40S6003
5V	8.0A	40	P40S1205	P40S2405	P40S4805	P40S3005	P40S6005
12V	3.4A	40	P40S1212	P40S2412	P40S4812	P40S3012	P40S6012
15V	2.7A	40	P40S1215	P40S2415	P40S4815	P40S3015	P40S6015
24V	1.7A	40	P40S1224	P40S2424	P40S4824	P40S3024	P40S6024
5V, 3.3V	4A, 4A	34	P40D1205-03	P40D2405-03	P40D4805-03	P40D3005-03	P40D6005-03
5V, 5V	4A, 4A	40	P40D1205-05	P40D2405-05	P40D4805-05	P40D3005-05	P40D6005-05
5V, 12V	4A, 1.7A	40	P40D1205-12	P40D2405-12	P40D4805-12	P40D3005-12	P40D6005-12
5V, 12V	6A, 2.5A	60	P60D1205-12	P60D2405-12	P60D4805-12	P60D3005-12	P60D6005-12
12V, 12V	1.7A, 1.7A	40	P40D1212-12	P40D2412-12	P40D4812-12	P40D3012-12	P40D6012-12
15V, 15V	1.4A, 1.4A	40	P40D1215-15	P40D2415-15	P40D4815-15	P40D3015-15	P40D6015-15
5V, ±12V	4.0A, ±1.0A	40	P40T1205-12	P40T2405-12	P40T4805-12	P40T3005-12	P40T6005-12
5V, +12V/-5V*	4.0A, +1.5/-0.5A	40	P40T1205R12/5	P40T2405R12/5	P40T4805R12/5	P40T3005R12/5	P40T6005R12/5
5V, +12V/-12V*	4.0A, +1.5/-0.5A	40	P40T1205R12	P40T2405R12	P40T4805R12	P40T3005R12	P40T6005R12
5V, ±12V	6.0A, ±1.25A	60	P60T1205-12	P60T2405-12	P60T4805-12	P60T3005-12	P60T6005-12
5V, +12V/-5V*	6.0A, +2.5/-0.5A	40	P60T1205R12/5	P60T2405R12/5	P60T4805R12/5	P60T3005R12/5	P60T6005R12/5
5V, +12V/-12V*	6.0A, +2.5/-0.5A	40	P60T1205R12	P60T2405R12	P60T4805R12	P60T3005R12	P60T6005R12
5V, ±15V	4.0A, ±1.0A	40	P40T1205-15	P40T2405-15	P40T4805-15	P40T3005-15	P40T6005-15
5V, ±15V	6.0A, ±1.0A	60	P60T1205-15	P60T2405-15	P60T4805-15	P60T3005-15	P60T6005-15
12V, ±5V	2.0A, ±2.0A	40	P40T1212-05	P40T2412-05	P40T4812-05	P40T3012-05	P40T6012-05
±5V, ±12V	+4/–0.5A, ±1.0A	40	P40Q1205-12	P40Q2405-12	P40Q4805-12	P40Q3005-12	P40Q6005-12
±5V, ±15V	+4/–0.5A, ±1.0A	40	P40Q1205-15	P40Q2405-15	P40Q4805-15	P40Q3005-15	P40Q6005-15

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Q Dual & Triple (50-120W)

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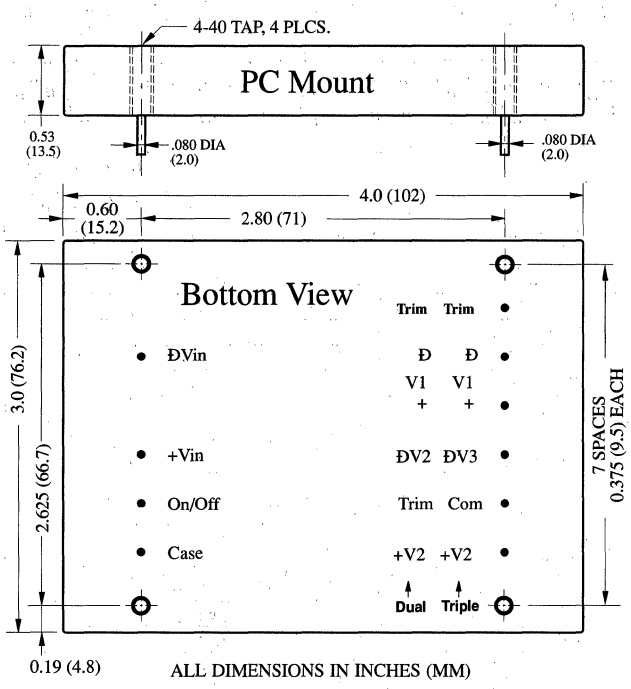

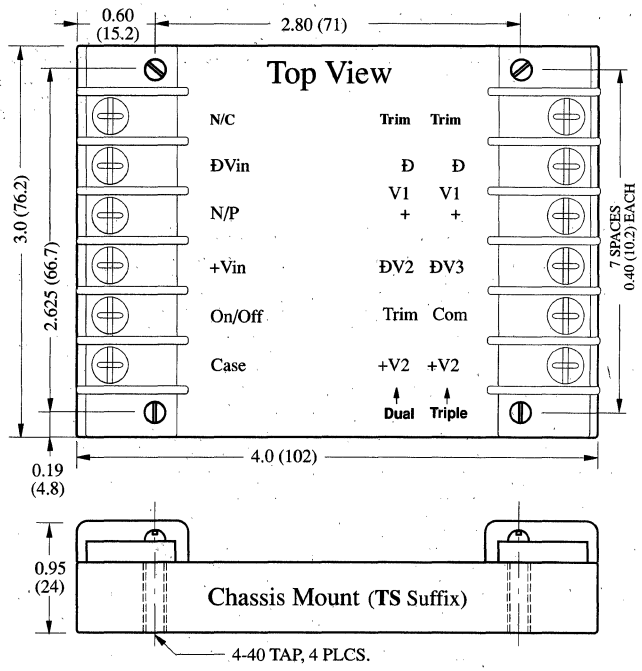

***Trim** - To adjust output voltage **Up/Dowm** with a resistor connected from trim pin to -V/+V.m.

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Low ESR Capacitors
Remote On/Off Control:
On Control ..... TTL High or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection ..... shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS

Dual Outputs: (Two independent control loops)
V1 ..... NL to FL, ±1% max.
V2 ..... NL to FL, ±1% max.
Triple Outputs: (Two independent control loops)
V1 ..... NL to FL, ±1% max.
V2/V3 (with balanced Loads) ..... NL to FL, ±1% max.
Output Trim ..... ±10%, max.
Line Regulation, LL–HL ..... ±0.2%
Load Regulation, NL/FL ..... ±1.0%
Short Circuit Protection ..... Current Limit
Transient Response (With 50% Load Change) ..... <500µSec.
Ripple, 5/12/15/24V 35/60/80150mVp-p
Noise, 20MHz BW ..... 1% or 75mVp-p

GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C, max.
Efficiency 80%
Isolation Voltage, I/O ..... 500Vdc, min.
EMI/RFI ..... Six-Sided Shielding
Isolation Voltage: V1 to V2; V1 to V2/V3 ..... 500Vdc, min.
Switching Frequency ..... 200KHz, typ.
Thermal Resistance ..... 3.5°C/Watt
Operating Case Temperature Range ..... –40°C to +90°C
Over Temperature Shut-Down ..... +95°C, ±5
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
For sealed case water washable unit please add suffix "Z" to the P/N.
Dimensions (PC board mount) ..... 3.0" x 4.0" x 0.53"
Weight ..... 10 oz. (283 grams)
Case Material ..... Aluminum
Seating Surface (PC Mount) ..... Non-Conductive

OUTPUT VOLTAGE	OUTPUT CURRENT		WATT	MODEL NUMBER				
V1, V2/V3	V1,	V2/V3		9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 75 Vdc IN	10 - 30 Vdc IN	20 - 60 Vdc IN
5V, 12V	5A,	2.5A	55	Q55D1205-12	Q55D2405-12	Q55D4805-12	Q55D3005-12	Q55D6005-12
5V, 24V	5A,	1.25A	55	Q55D1205-24	Q55D2405-24	Q55D4805-24	Q55D3005-24	Q55D6005-24
12V, 12V	2.5A,	2.5A	60	Q60D1212-12	Q60D2412-12	Q60D4812-12	Q60D3012-12	Q60D6012-12
15V, 15V	2A,	2A	60	Q60D1215-15	Q60D2415-15	Q60D4815-15	Q60D3015-15	Q60D6015-15
5V, ±12V	5A,	±1.25A	55	Q55T1205-12	Q55T2405-12	Q55T4805-12	Q55T3005-12	Q55T6005-12
*5V,+12V/-12V	5A,+2A/-0.5A		55	Q55T1205R12	Q55T2405R12	Q55T4805R12	Q55T3005R12	Q55T6005R12
5V, ±15V	5A,	±1A	55	Q55T1205-15	Q55T2405-15	Q55T4805-15	Q55T3005-15	Q55T6005-15

*5V & +12V are regulated, –12V is semi-regulated.

R Single, Dual, Triple & Quad (33-150W)

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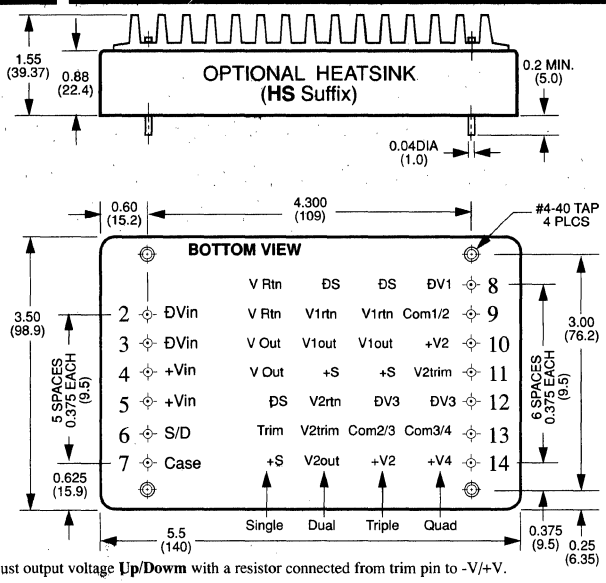
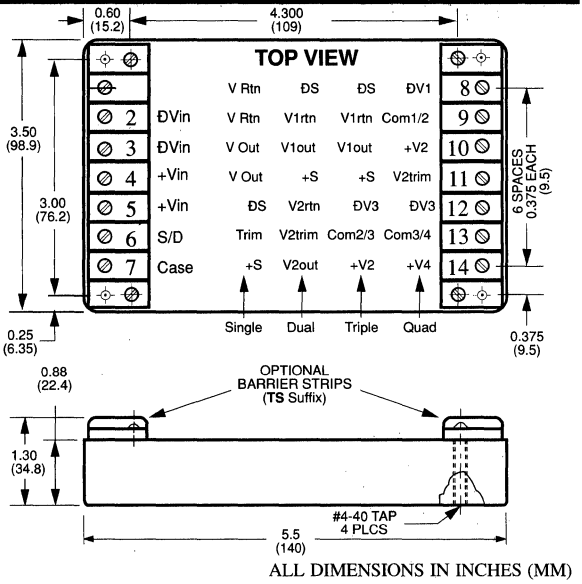




ALL DIMENSIONS IN INCHES (MM)

***Trim** - To adjust output voltage **Up/Down** with a resistor connected from trim pin to -V/+V.
Sense Leads (+S/–S) Compensate Output Line Drop, Connect to +V/–V Respectively If Not Used.

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Þ(PI) Filter
Remote On/Off Control:
On Control ..... TTL High or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection ..... shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS

Single Output:
Voltage Accuracy/Load Regulation ..... NL to FL, ±1% max.
Dual Outputs: (Unit has two independent control loops)
V1 ..... NL to FL, ±1% max.
V2 ..... NL to FL, ±1% max.
Triple Outputs: (Unit has two independent control loops)
V1 ..... NL to FL, ±1% max.
V2/V3 (with balanced Loads) ..... NL to FL, ±1% max.
*V3 with series pass regulator ..... NL to FL, ±4% max.
Quad Outputs: (Unit has two independent control loops)
V1 (series pass regulator regulated) ..... NL to FL, ±4% max.
V2 ..... NL to FL, ±1% max.
V3/V4 (with balanced Loads) ..... NL to FL, ±1% max.
Output Trim ..... ±10%, max.
Line Regulation (LL–HL), Load Regulation (NL/FL) ..... ±0.2, ±1.0%

GENERAL SPECIFICATIONS

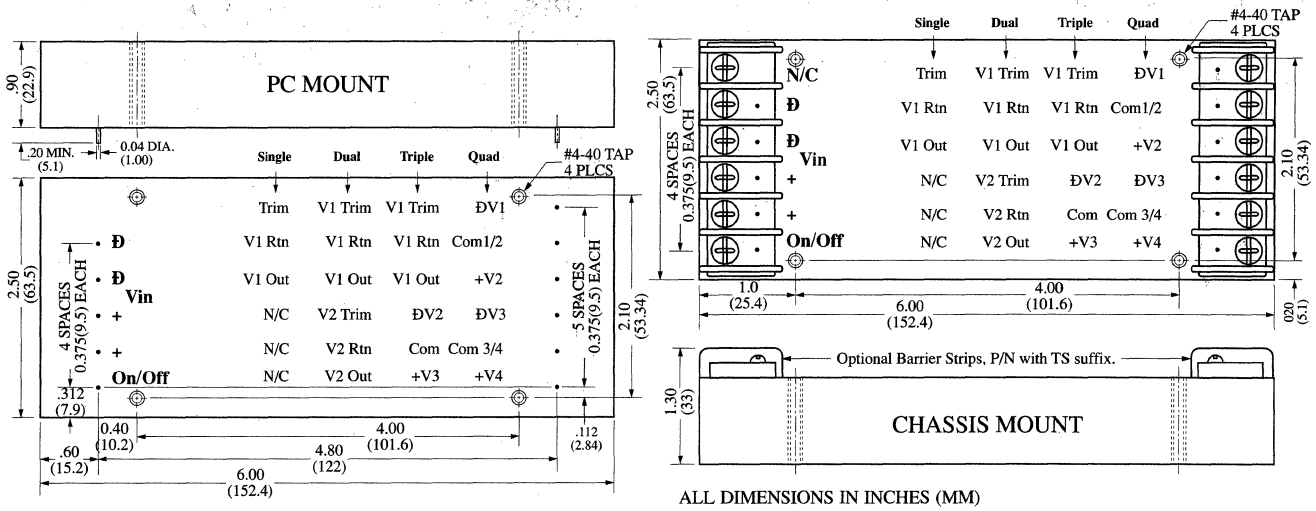
Temperature Coefficient ..... ±0.02%/°C, max.
Efficiency 80%
Isolation Voltage: Input/Output ..... 500Vdc, min.
Isolation Voltage: Com1/Com2, ±V1/Com2, ±V1/±V2 ..... 500Vdc, min.
Switching Frequency ..... 100KHz, typ.
Thermal Resistance ..... 2.2°C/Watt
Operating Case Temperature Range ..... –25°C to +85°C
Storage Temperature Range ..... –55°C to +105°C
Dimensions ..... 3.5" x 5.5" x 0.90"
Weight ..... 16 oz. (454 grams)
Case Material ..... Black Coated Metal

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 75 Vdc IN	10 - 30 Vdc IN	20 - 60 Vdc IN
3.3V	10.0A	33	R50S1203	R50S2403	R50S4803	R50S3003	R50S6003
3.3V	20.0A	66	R100S1203	R100S2403	R100S4803	-	-
5V	10.0A	50	R50S1205	R50S2405	R50S4805	R50S3005	R50S6005
5V	20.0A	100	R100S1205	R100S2405	R100S4805	-	-
12V	5.0A	60	R60S1212	R60S2412	R60S4812	R60S3012	R60S6012
12V	8.0A	100	R100S1212	R100S2412	R100S4812	-	-
15V	4.0A	60	R60S1215	R60S2415	R60S4815	R60S3015	R60S6015
15V	7.0A	100	R100S1215	R100S2415	R100S4815	-	-
24V	2.5A	60	R60S1224	R60S2424	R60S4824	R60S3024	R60S6024
24V	4.0A	100	R100S1224	R100S2424	R100S4824	-	-
5V, 12V	5.0A, 2.5A	55	R55D1205-12	R55D2405-12	R55D4805-12	R55D3005-12	R55D6005-12
5V, 12V	10.0A, 4.0A	100	R100D1205-12	R100D2405-12	R100D4805-12	-	-
12V, 12V	2.5A, 2.5A	60	R60D1212-12	R60D2412-12	R60D4812-12	R60D3012-12	R60D6012-12
15V, 15V	2.0A, 2.0A	60	R60D1215-15	R60D2415-15	R60D4815-15	R60D3015-15	R60D6015-15
5V, ±12V	5.0A, ±1.25A	55	R55T1205-12	R55T2405-12	R55T4805-12	R55T3005-12	R55T6005-12
5V, ±12V	10.0A, ±2.0A	100	R100T1205-12	R100T2405-12	R100T4805-12	-	-
5V, +12V/-5V*	5.0A, +2.0A/-0.5A	55	R55T1205R12/5	R55T2405R12/5	R55T4805R12/5	R55T3005R12/5	R55T6005R12/5
5V, +12V/-5V*	10A, +4.0A/-0.5A	100	R100T1205R12/5	R100T2405R12/5	R100T4805R12/5	-	-
5V, +12V/-12V*	5.0A, +2.0A/-0.5A	55	R55T1205R12	R55T2405R12	R55T4805R12	R55T3005R12	R55T6005R12
5V, +12V/-12V*	10A, +4.0A/-0.5A	100	R100T1205R12	R100T2405R12	R100T4805R12	-	-
5V, ±15V	5.0A, ±1.0A	55	R55T1205-15	R55T2405-15	R55T4805-15	R55T3005-15	R55T6005-15
5V, ±15V	10.0A, ±1.6A	100	R100T1205-15	R100T2405-15	R100T4805-15	-	-
12V, ±5V	2.5A, ±2.5A	55	R55T1212-05	R55T2412-05	R55T4812-05	R55T3012-05	R55T6012-05
12V, ±5V	5.0A, ±4.0A	100	R100T1212-05	R100T2412-05	R100T4812-05	-	-
±5V, ±12V	+5/–0.5A, ±1.25A	60	R60Q1205-12	R60Q2405-12	R60Q4805-12	R60Q3005-12	R60Q6005-12
±5V, ±15V	+5/–0.5A, ±1.00A	60	R60Q1205-15	R60Q2405-15	R60Q4805-15	R60Q3005-15	R60Q6005-15

Toll Free: 1-800-336-8022 • **Web Site:** www.acondc-dc.com • **E-Mail:** Sales@acondc-dc.com

X Single, Dual, Triple & Quad (33-110W)

ACON, INC. 22 Bristol Drive, South Easton, MA 02375 • TEL:(508)230-8022 • FAX:(508)230-2371



ALL DIMENSIONS IN INCHES (MM)

***Trim** - To adjust output voltage **Up/Dowm** with a resistor connected from trim pin to -V/+V.

INPUT SPECIFICATIONS

Input Voltage ..... See Table
Input Filter ..... Þ(PI) Filter
Remote On/Off Control:
On Control ..... TTL High or Open Circuit
Off Control ..... <1.8V or Jumper to –Vin
Reverse Voltage Protection ..... shunt Diode, External Fuse Required

OUTPUT SPECIFICATIONS

Single Output:
Voltage Accuracy/Load Regulation ..... NL to FL, ±1% max.
Dual Outputs: (Two independent control loops)
V1 ..... NL to FL, ±1% max.
V2 ..... NL to FL, ±1% max.
Triple Outputs: (Two independent control loops)
V1 ..... NL to FL, ±1% max.
V2/V3 (with balanced Loads) ..... NL to FL, ±1% max.
*V3 with series pass regulator ..... NL to FL, ±4% max.
Quad Outputs: (Two independent control loops)
V1 (series pass regulator regulated) ..... NL to FL, ±4% max.
V2 ..... NL to FL, ±1% max.
V3/V4 (with balanced Loads) ..... NL to FL, ±1% max.
Output Trim ..... ±10%, max.
Line Regulation, LL–HL ..... ±0.2%
Load Regulation, NL/FL ..... ±1.0%

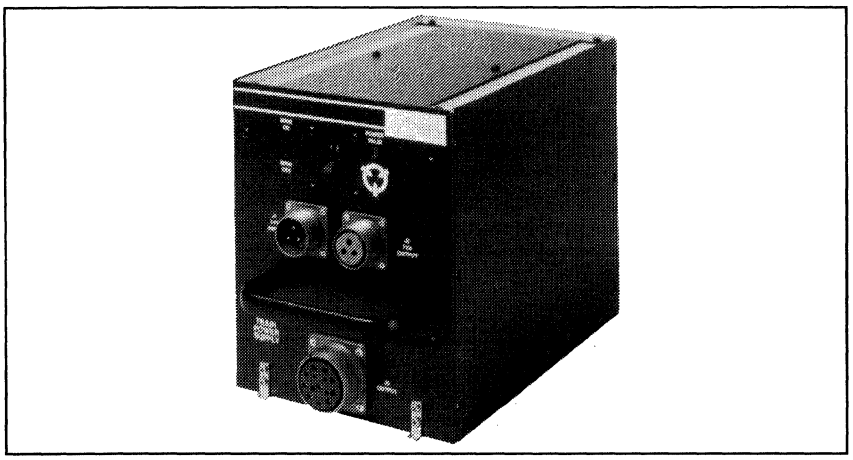
GENERAL SPECIFICATIONS

Temperature Coefficient ..... ±0.02%/°C, max.
Efficiency 80%
Isolation Voltage: Input/Output ..... 500Vdc, min.
Isolation Voltage: Com1/Com2, ±V1/Com2, ±V1/±V2 ..... 500Vdc, min.
Switching Frequency ..... 100KHz, typ.
Thermal Resistance ..... 2.7°C/Watt
Operating Case Temperature Range ..... –25°C to +85°C
Cooling ..... Free-Air Convection
Storage Temperature Range ..... –55°C to +105°C
Humidity ..... 20% to 95% R.H. (non-condensing)
Dimensions ..... 2.5" x 6.0" x 0.90"
Weight ..... 16 oz. (454 grams)
Case Material ..... Black Coated Metal
(PC Board Mount Unit With Non-Conductive Seating Surface)

OUTPUT VOLTAGE	OUTPUT CURRENT	WATT	MODEL NUMBER				
			9 - 18 Vdc IN	18 - 36 Vdc IN	36 - 75 Vdc IN	10 - 30 Vdc IN	20 - 60 Vdc IN
3.3V	10.0A	33	X50S1203	X50S2403	X50S4803	X50S3003	X50S6003
5V	10.0A	50	X50S1205	XR50S2405	X50S4805	X50S3005	X50S6005
12V	5.0A	60	X60S1212	X60S2412	X60S4812	X60S3012	X60S6012
15V	4.0A	60	X60S1215	X60S2415	X60S4815	X60S3015	X60S6015
24V	2.5A	60	X60S1224	X60S2424	X60S4824	X60S3024	X60S6024
5V, 12V	5.0A, 2.5A	55	X55D1205-12	X55D2405-12	X55D4805-12	X55D3005-12	X55D6005-12
5V, 12V	10.0A, 4.0A	100	X100D1205-12	X100D2405-12	X100D4805-12	-	-
5V, 24V	5.0A, 1.3A	55	X55D1205-12	X55D2405-12	X55D4805-12	X55D3005-12	X55D6005-12
5V, 24V	10.0A, 2.5A	100	X100D1205-12	X100D2405-12	X100D4805-12	-	-
12V, 12V	2.5A, 2.5A	60	X60D1212-12	X60D2412-12	X60D4812-12	X60D3012-12	X60D6012-12
15V, 15V	2.0A, 2.0A	60	X60D1215-15	X60D2415-15	X60D4815-15	X60D3015-15	X60D6015-15
5V, ±12V	5.0A, ±1.25A	55	X55T1205-12	X55T2405-12	X55T4805-12	X55T3005-12	X55T6005-12
5V, ±12V	10.0A, ±2.0A	100	X100T1205-12	X100T2405-12	X100T4805-12	-	-
5V, +12/-5V*	5.0A, +2/-0.5A	55	X55T1205R12/5	X55T2405R12/5	X55T4805R12/5	X55T3005R12/5	X55T6005R12/5
5V, +12/-5V*	10.0A, +4/-0.5A	100	X100T1205R12/5	X100T2405R12/5	X100T4805R12/5	-	-
5V, +12/-12V*	5.0A, +2/-0.5A	55	X55T1205R12	X55T2405R12	X55T4805R12	X55T3005R12	X55T6005R12
5V, +12/-12V*	10.0A, +4/-0.5A	100	X100T1205R12	X100T2405R12	X100T4805R12	-	-
5V, ±15V	5.0A, ±1.0A	55	X55T1205-15	X55T2405-15	X55T4805-15	X55T3005-15	X55T6005-15
5V, ±15V	10.0A, ±1.6A	100	X100T1205-15	X100T2405-15	X100T4805-15	-	-
5V, +24/-12V*	10.0A,+2/-0.5A	100	X100T1205R24	R100T2405R24	X100T4805R24	-	-
12V, +5V/-5V	2.5A, +4/-0.5A	55	X55T1212R05	X55T2412R05	X55T4812R05	X55T3012R05	X55T6012R05
12V, +5V/-5V	5.0A, +6/-0.5A	100	X100T1212R05	X100T2412R05	X100T4812R05	-	-
±5V, ±12V	+5/-0.5A, ±1.25A	60	X60Q1205-12	X60Q2405-12	X60Q4805-12	X60Q3005-12	X60Q6005-12
±5V, ±15V	+5/-0.5A, ±1.00A	60	X60Q1205-15	X60Q2405-15	X60Q4805-15	X60Q3005-15	X60Q6005-15

Advanced Conversion Products

DC-DC Converters
for Locomotives



- 18V to 155V DC Input Range
- Operation to +70°C
- Multi-Output Design
- 15Gs Shock Immunity
- 2Gs 10Hz - 1kHz Vibration
- Convection Cooled
- DO160C Compliant

Advanced Conversion Products manufactures special converters for a broad line of industrial applications including Transit and Railway. Our TR Series converters are used on locomotive cabs and used at trackside applications. They provide critical power for cab signal radio transceivers, control and safety systems.

Immune to shock and vibration, the robust TR Series train power supplies are compliant with DO160C specifications and exceed the requirements of many Military environmental specifications.

Incorporating the latest switch mode power conversion topologies, these units deliver precision regulated DC outputs from a wide ranging DC input source over a wide temperature range.

Our custom engineering resources can provide units with a range of input and output capabilities including DC to AC Inverters for transit, light rail and other electric vehicles.

SPECIFICATIONS

INPUT
48 VDC Nominal (start-up)
18 VDC to 155VDC (operation)
Circuit Breaker Protected

OUTPUT
74VDC@8A
+8VDC@6A
+15VDC@3A
-15VDC@1A
+15VDC@16A (Optional)

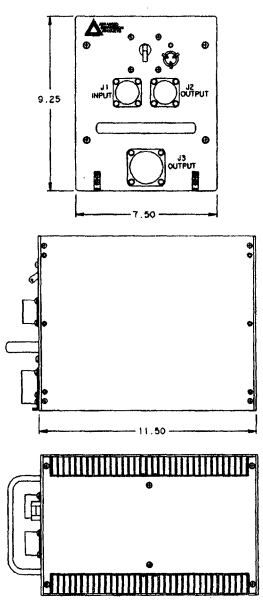
PROTECTION
Undervoltage
Overvoltage
Overtemperature
Output fully isolated

INDICATORS & CONTROLS
Power Valid
Outputs Nominal
Remote Run (enable)
Summary Fault

OUTPUT
Cooling Forced Air
(25cfm external fan)
Operating Temp: -20°C to +70°C
Humidity: 0 to 100%
Shock: 6Gs 11msec half sine pulses
Vibration: DO160C para 8.5.1
EMI: DO160C Cat.Z

OPTIONAL FEATURES
Load Shed Signal: (above 95VDC or below 48VDC Inputs
Auto Load Shed: ≥95 or >48VDC

DIMENSIONS



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Phone: 973-267-1900
www.transdev.com
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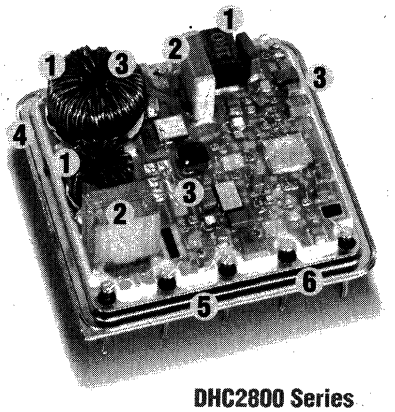
Applications 101: DC/DC Converters

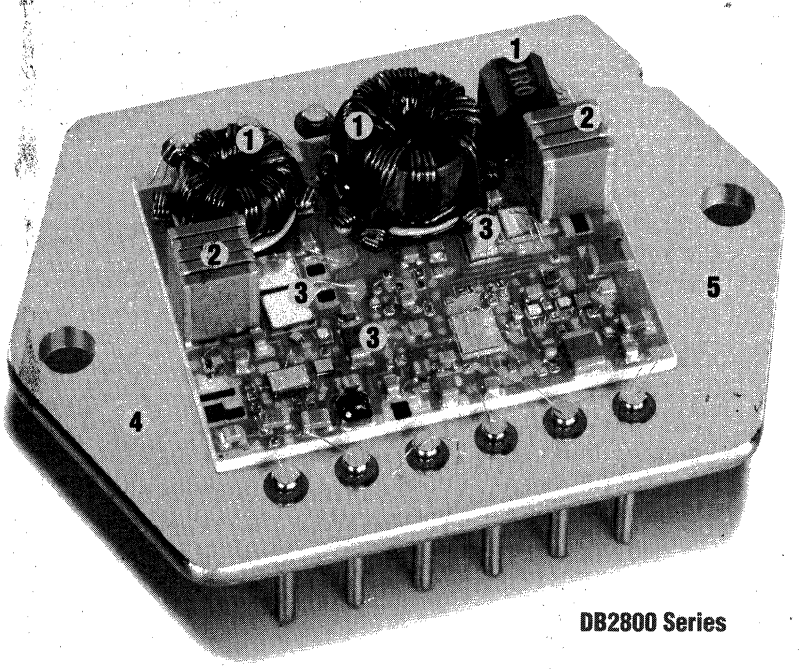
APEX MICROTECHNOLOGY

High-Rel, Hybrid DC/DC Converters With Apex's Lifetime Warranty



DHC2800 Series

1. SURFACE MOUNT MAGNETICS
2. 100% CERAMIC CAPACITORS
3. REFLOW SOLDERED COMPONENTS
4. WELDED PACKAGE HERMETICALLY SEALED
5. LOW THERMAL RESISTANCE, CERAMIC ON SOLID STEEL
6. INDUSTRY STANDARD PACKAGE



DB2800 Series

PUT OUR CONVERTERS TO THE TEST

We know our customers really put our converters to the test. That's why Apex's **DHC2800** and **DB2800** Series DC/DC Converters utilize all ceramic capa-citors, surface mount magnetics and ultrasonically bonded wires to provide hybrid reliability across the full military temperature range and to 5,000 g of acceleration. The built-in ruggedness of Apex DC/DC Converters allows Apex to offer the only lifetime product warranty in the industry.

ISO9001 Certified

Highlights

- Commercial grade parts designed for military ruggedness
- Withstands 5,000 g acceleration
- 100% ceramic capacitors offer higher reliability
- –55°C to +125°C full power operation
- Fault tolerant
- Full short circuit protection
- Fully isolated
- Output voltage adjustment standard
- Remote shutdown provides on/off capabilities

DHC2800 Series

- DHC2803S—Industry's first 3V at 2A model
- DHC2805S—5V single output
- Up to 6W output, 17W/in^3 power density
- Input meets MIL-STD-704A/D requirements (80V transient)
- 11V to 50V input, exceeds industry standard
- 1" x 1" footprint, pin compatible, industry standard package

DB2800 Series

- DB2803S—3V Single Output
- DB2805S—5V Single Output
- DB2812S—12V Single Output
- DB2815S—15V Single Output
- Up to 22.5W output
- 16V to 40V input
- Input meets MIL-STD-704D requirements (80V transient survival)

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Phone:
1-800-862-1023

Toll-free technical assistance:
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"Power Supplies for the New Millennium"

PM Series - Single/Dual Output
DC-DC CONVERTERS
.75 - 20 Watts

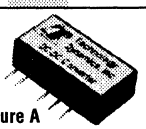
Figure A

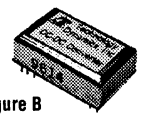
Figure B

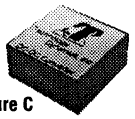
Figure C

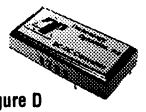
Figure D

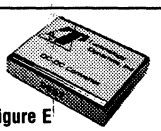
Figure E

MODEL NUMBER	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	SIZE
(.75 WATTS)				
TDUP75-05S05	4.5 - 5.5 VDC	5 VDC	150 mA	.77" x .40" x .24" Figure A
TDUP75-12S05	10.8 - 13.2 VDC	5 VDC	150 mA	
TDUP75-24S12	21.6 - 26.4 VDC	12 VDC	62 mA	
TDUP75-05D12	4.5 - 5.5 VDC	±12 VDC	±30 mA	
TDUP75-12D12	10.8 - 13.2 VDC	±12 VDC	±30 mA	
TDUP75-05D15	4.5 - 5.5 VDC	±15 VDC	±25 mA	
(1.5 WATTS)				
TDR1P5-05S05	4.5 - 5.5 VDC	5 VDC	300 mA	1.25" x .80" x .40" Figure B
TDR1P5-12S05	10.8 - 13.2 VDC	5 VDC	300 mA	
TDR1P5-05S15	4.5 - 5.5 VDC	15 VDC	100 mA	
TDR1P5-12D15	10.8 - 13.2 VDC	±15 VDC	±50 mA	
(3 WATTS)				
TFKC03-12S05	9-18 VDC	5 VDC	500 mA	1.25" x .80" x .40" Figure B
TFKC03-24S05	18-36 VDC	5 VDC	500 mA	
TFKC03-48S05	36-72 VDC	5 VDC	500 mA	
TFKC03-12S12	9-18 VDC	12 VDC	250 mA	
TFKC03-24D05	18-36 VDC	±5 VDC	±250 mA	
TFKC03-24D12	18-36 VDC	±12 VDC	±125 mA	
TFKC03-24D15	18-36 VDC	±15 VDC	±100 mA	
TFKC03-48D15	36-72 VDC	±15 VDC	±100 mA	
(3 WATTS)				
TMKC03-24S05	18-36 VDC	5 VDC	500 mA	1.25" x .80" x .40" Figure B
TMKC03-48S05	36-72 VDC	5 VDC	500 mA	
TMKC03-24S12	18-36 VDC	12 VDC	250 mA	
TMKC03-24S15	18-36 VDC	15 VDC	200 mA	
TMKC03-24D05	18-36 VDC	±5 VDC	±250 mA	
TMKC03-12D12	9-18 VDC	±12 VDC	±125 mA	
TMKC03-24D15	18-36 VDC	±15 VDC	±100 mA	
TMKC03-24DS15	18-36 VDC	±15 VDC	±100 mA	
(3 WATTS)				
TFKH03-48D	20-72 VDC	±5 VDC	±300 mA	1.3" x 1.3" x .60" Figure C
TFKH03-120D05	90-140 VDC	±5 VDC	±300 mA	
TFKH03-48D12	20-72 VDC	±12 VDC	±125 mA	
TFKH03-48D15	20-72 VDC	±15 VDC	±100 mA	
TFKH03-120D15	90-140 VDC	±15 VDC	±100 mA	
TFKH03-24D15	18-36 VDC	±15 VDC	±100 mA	
(5 WATTS)				
TFKC05-12S05	9-18 VDC	5 VDC	1000 mA	1.25" x .80" x .40" Figure B
TFKC05-48S05	36-72 VDC	5 VDC	1000 mA	
TFKC05-12D12	9-18 VDC	±12 VDC	±230 mA	
TFKC05-24D12	18-36 VDC	±12 VDC	±230 mA	
TFKC05-48D12	36-72 VDC	±12 VDC	±230 mA	
TFKC05-12D15	9-18 VDC	±15 VDC	±190 mA	
TFKC05-24D15	18-36 VDC	±15 VDC	±190 mA	
TFKC05-48D15	36-72 VDC	±15 VDC	±190 mA	
(5 WATTS)				
TFDC05-12S05	9-18 VDC	5 VDC	1000 mA	2.0" x 1.0" x .375" Figure D
TFDC05-24S05	18-36 VDC	5 VDC	1000 mA	
TFDC05-48S05	36-72 VDC	5 VDC	1000 mA	
TFDC05-12S12	9-18 VDC	12 VDC	470 mA	
TFDC05-24S12	18-36 VDC	12 VDC	470 mA	
TFDC05-12S15	9-18 VDC	15 VDC	400 mA	
TFDC05-24D12	18-36 VDC	±12 VDC	±230 mA	
(10 WATTS)				
TFDC10-24S05	18-36 VDC	5 VDC	2000 mA	2.0" x 1.0" x .375" Figure D
TFDC10-48S05	36-72 VDC	5 VDC	2000 mA	
TFDC10-24S12	18-36 VDC	12 VDC	830 mA	
TFDC10-48S12	36-72 VDC	12 VDC	830 mA	
TFDC10-24S15	18-36 VDC	15 VDC	670 mA	
TFDC10-48S15	36-72 VDC	15 VDC	670 mA	
TFDC10-48D05	36-72 VDC	±5 VDC	±1000 mA	
TFDC10-24D12	18-36 VDC	±12 VDC	±416 mA	
TFDC10-48D12	36-72 VDC	±12 VDC	±416 mA	
(15 WATTS)				
TFDC15-48S05	20-72 VDC	5 VDC	3000 mA	2.0" x 1.6" x .40" Figure E
TFDC15-48S12	20-72 VDC	12 VDC	1250 mA	
TFDC15-48D12	20-72 VDC	±12 VDC	±625 mA	
TFDC15-48D15	20-72 VDC	±15 VDC	±500 mA	
(20 WATTS)				
TFDC20-12S05	9-18 VDC	5 VDC	4000 mA	2.0" x 1.6" x .40" Figure E
TFDC20-24S05	18-36 VDC	5 VDC	4000 mA	
TFDC20-48S05	36-72 VDC	5 VDC	4000 mA	
TFDC20-12S12	9-18 VDC	12 VDC	1670 mA	
TFDC20-48S12	36-72 VDC	12 VDC	1670 mA	
TFDC20-12D12	9-18 VDC	±12 VDC	±835 mA	

NOTES: For complete specification and pin out information contact the factory. Large quantity custom configuration avaialble, contact the factory.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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Fax on Demand: 1-800-548-2183

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APPLIED POWER CONVERSION
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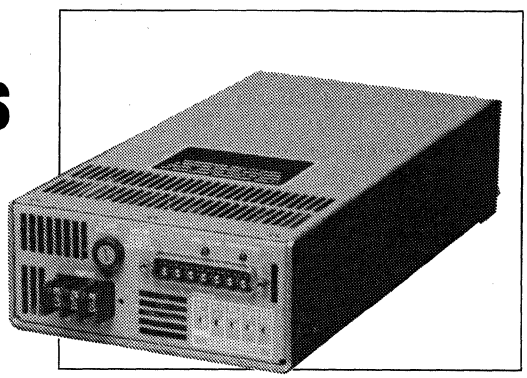
"Power Supplies for the New Millennium"

LTBDC Series
One to Four Outputs
DC to DC CONVERTERS
150-600 WATTS



APPLICATIONS

The LTBDC family of power supplies was designed to satisfy a market for low cost, high reliability applications.

The LTBDC is especially suitable for critical systems in remote locations, severe environment and redundant operation. This versatile design is loaded with options, making it particularly suitable to telecommunications applications.

SPECIFICATIONS

ELECTRICAL

Input: 22-32 VDC or 42-56 VDC
Regulation: Line + .3%
Load + 2%
Ripple: 1% peak to peak, not to exceed 100mV
Efficiency: 80% typical single output units
70% typical multiple output units
Protections: OV, OL & OT

ENVIRONMENTAL & MECHANICAL

Operating Temperature: 0°C to +65°C standard
-30°C to +75°C optional
Storage Temperature: -30°C to +85°C
Cooling: Internal ball bearing DC fan and/or conduction to base plate
Weight: 6 lbs. (2.7 kg) max
Size: 2.56"(H) x 6.0"(W) x 11.50"(L)
2.56"(H) x 5.50"(W) x 11.50"(L) (Optional)

AVAILABLE OPTIONS

- Redundant Operation (N+1) Configuration
- Wide Temp. Operation (-30°C to +75°C)
- Forced Current Sharing
- Ruggedized for Severe Environment
- **(TBDC Series) Size: 3.0" x 5.5" x 10.0"**
Note: Specification same as LTBDC series

MODEL SELECTION

Table (1) LTBDC: Single Output Models

OUTPUT	MAX LOAD	MODEL NO.
5	60	LTBDC-5-60
12	40	LTBDC-12-40
24	24	LTBDC-24-24
28	20	LTBDC-28-20
48	12	LTBDC-48-12

Option Designations	Suffix Code
REDUNDANT OPERATION	-ORD
WIDE TEMP OPERATION	-WTO
FORCED CURRENT SHARING	-FCS
RUGGEDIZED/MILITARIZED	-MIL

LTBDC Multiple Output Selection Guide

- Select first, second, third or fourth output from the tables below.
- Second and third output must be equal in voltage and share common ground.
- Output four is floating and may be used as positive or negative.

Example: P/N LTBDC 5-60 A2B2C1-Suffix
+5V 50A, -12V 3A, +12V 4A, +5V 2A

Input Voltage		
INPUT	RANGE	PREFIX CODE
28V	22-32V	P
48V	42-56V	Q
Other	Consult Factory	X

MULTIPLE OUTPUT

OUTPUT #1 (V1)			OUTPUT #2 (-V2)	CODE	OUTPUT #3 (+V3)	CODE	OUTPUT #4 (V4)	CODE
VDC	MAX AMP	MODEL	VDC @ MAX AMP		VDC @ MAX AMP		VDC @ MAX AMP	
5	60	LTBDC-5-60	-5V @ 3A	A1	+5V @ 6A*	B1	5V @ 2A	C1
12	40	LTBDC-12-40	-12V @ 3A	A2	+12V @ 4A	B2	12V @ 2A	C2
24	24	LTBDC-24-24	-15V @ 3A	A3	+15V @ 4A	B3	15V @ 2A	C3
28	20	LTBDC-28-20	-24V @ 3A	A4	+24V @ 2A	B4	24V @ 2A	C4
48	12	LTBDC-48-12					48V @ 1A	C5

NOTE: Other voltages and currents available, contact the factory. Maximum total output power cannot exceed 600 watts. Maximum current per output cannot be exceeded.
*This output can be optionally increased to 10 Amps. *SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE*

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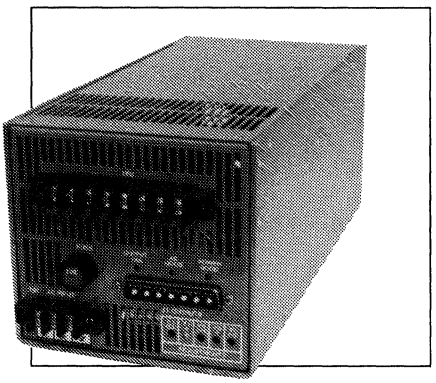
Fax on Demand: 1-800-548-2183
UL REGISTERED FIRM **ISO 9002 A5269**

APPLIED POWER CONVERSION
a division of
TECHNOLOGY DYNAMICS INC.
100 School Street, Bergenfield, NJ 07621
Phone (201) 385-0500 FAX (201) 385-0702

APPLIED POWER CONVERSION
a division of
TECHNOLOGY DYNAMICS INC.
"Power Supplies for the New Millennium"

TDLDC Series
One to Six Outputs
DC to DC CONVERTERS
600-1000 WATTS - 5" x 5.5" x 11.5"



APPLICATIONS

The TDLDC family of units was designed to satisfy a market for low cost, high reliability applications.

The TDLDC is especially suitable for critical systems in remote locations, severe environment and redundant operation. This versatile design is loaded with options, making it particularly suitable to telecommunications applications.

SPECIFICATIONS

ELECTRICAL

Input: 22-32 VDC or 42-56 VDC
Regulation: Line + .3%
Load + 2%
Ripple: 25mV peak to peak
Efficiency: 80% single output units
70% multiple output units
Protections: OV, OL & OT

ENVIRONMENTAL & MECHANICAL

Operating Temperature: 0°C to +65°C standard
-30°C to +75°C optional
Storage Temperature: -30°C to +85°C
Cooling: Internal ball bearing DC fan and/or conduction to base plate
Weight: 6.6 lbs. (3.0 kg) max
Size: 5.50"(W) x 5.00"(H) x 11.50"(L)

AVAILABLE OPTIONS

- Redundant Operation (N+1) Configuration
- Wide Temp. Operation (-30°C to +75°C)
- Forced Current Sharing
- Ruggedized for Severe Environment
- Hot Pluggable in 5.25" High Rack

MODEL SELECTION

Single/Main Output

OUTPUT	MAX LOAD	MODEL NO.
5	60	TDLDC-5-60
12	50	TDLDC-12-50
24	42	TDLDC-24-42
28	36	TDLDC-28-36
48	22	TDLDC-48-22

Option Designations	Suffix Code
REDUNDANT OPERATION	-ORD
WIDE TEMP OPERATION	-WTO
AUTO LINE SELECT	-ALS
FORCED CURRENT SHARING	-FCS
RUGGEDIZED/MILITARIZED	-MIL

TDLDC Series: Multiple Output Selection Guide

- Select main output from table above.
- Select second, third, fourth, fifth or sixth output from the tables below.
- Second and third output must be equal in voltage and share common ground.
- Outputs four, five and six are floating and may be used as positive or negative.

Example: P/N TDLDC5-60 A2B2C1-D1E2-Suffix
+5V 60A, -12V 3A, +12V 7A, +5V 3A, 5V 10A, 12V 8A

Input Voltage

INPUT	RANGE	PREFIX CODE
28V	22-32V	P
48V	42-56V	Q
Other	Consult Factory	X

MULTIPLE OUTPUT

OUTPUT #2 (-V2) VDC @ MAX AMP	CODE	OUTPUT #3 (+V3) VDC @ MAX AMP	CODE	OUTPUT #4 (V4) VDC @ MAX AMP	CODE	OUTPUT #5 (V5) VDC @ MAX AMP	CODE	OUTPUT #6 (V6) VDC @ MAX AMP	CODE
-5V @ 3A	A1	+5V @ 5A	B1	5V @ 3A	C1	5V @ 10A	D1	5V @ 10A	E1
-12V @ 3A	A2	+12V @ 7A	B2	12V @ 3A	C2	12V @ 8A	D2	12V @ 8A	E2
-15V @ 3A	A3	+15V @ 6A	B3	15V @ 3A	C3	15V @ 7A	D3	15V @ 7A	E3
-24V @ 3A	A4	+24V @ 3A	B4	24V @ 2A	C4	24V @ 4.5A	D4	24V @ 4.5A	E4

NOTE: Other voltages and currents available, contact the factory. Maximum total output power cannot exceed 1000 watts. Maximum current per output cannot be exceeded.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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ISO 9002
A5269

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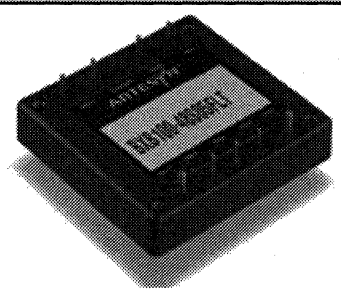
Expect More From Artesyn Technologies

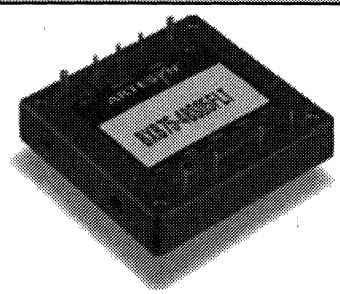
Artesyn Technologies is a newly formed company that combines the vast resources of Computer Products, Zytec, Elba of Germany and KRP of Holland. Artesyn Technologies has eleven dedicated design centers that span three continents in six countries. Our range of power products with AC or DC input include open frame, enclosed and encapsulated supplies with output power levels from 0.5 to 4,000 Watts. Artesyn Technologies' focus is on providing the lowest total cost of ownership through quality manufacturing, reliable product design, superior technical support and on-time delivery.

BXB Series



[2 YEAR WARRANTY]

CE (LVD)



BXB150 - 100 to 150 Watt - Wide Input - Single Output

- Industry standard footprint
- High power density (54.8W/in^3)
- MTBF > 1 million hours
- High efficiency up to 88%
- Input voltage to ETS300-132-2
- Adjustable output voltage
- Fixed frequency (500kHz)
- No minimum load required
- Separate case ground pin
- Undervoltage lockout (UVLO)
- UL, CSA and VDE approvals

NEW

The BXB150 Series are high power density DC/DC converters packaged in the industry standard footprint (2.40" x 2.28" x 0.50") to give designers optimum choices when specifying for both new and replacement designs. Suitable for a wide range of applications in nearly any industry, the BXB150 was particularly designed with Communication and Distributed Power applications in mind. Aluminum baseplate technology with four threaded M3 inserts makes heatsink attachment and optimum thermal management easy. The BXB150 series are approved to IEC950 by UL, CSA and VDE.

OUTPUT POWER (MAX.)	INPUT VOLTAGE	OVP	OUTPUT VOLTAGE	OUTPUT CURRENT (MIN.)	OUTPUT CURRENT (MAX.)	EFFICIENCY (TYPICAL)	REGULATION LINE	REGULATION LOAD	MODEL NUMBER (1)
100W	36-75VDC	4.3VDC	3.3V	0A	30A	82%	±0.05%	±0.1%	BXB150-48S3V3FLT
150W	36-75VDC	6.5VDC	5V	0A	30A	85%	±0.05%	±0.1%	BXB150-48S05FLT
150W	36-75VDC	14.5VDC	12V	0A	12.5A	87%	±0.05%	±0.1%	BXB150-48S12FLT
150W	36-75VDC	17.5VDC	15V	0A	10A	88%	±0.05%	±0.1%	BXB150-48S15FLT

(1)Active high remote on/off option is available (standard product is active low), designate with the suffix "FHT' e.g. BXB150-48S05FHT. Consult factory for details and options.

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BXB75 - 75 Watt - Wide Input - Dual Output

- 5V/3.3V flexible dual output unit
- No minimum load required
- 15A maximum per channel
- Industry standard footprint
- MTBF > 2 million hours (Bellcore 332)
- High efficiency up to 82%
- Input voltage to ETS300-132-2
- Adjustable ouput voltage
- 2:1 input range
- Undervoltage lockout (UVLO)
- UL, CSA and VDE approvals

NEW

The BXB75 Dual is a high power density DC/DC converter packaged in the industry standard footprint (2.40" x 2.28" x 0.50"). With no minimum load requirements, either output can supply its maximum current, or both channels can support any combination of loading to a total of 75W of output power. Suitable for a wide range of applications in nearly any industry, the BXB75was particularly designed with Communication and Distributed Power applications in mind. Aluminum baseplate technology with four threaded inserts makes heatsink attachment and optimum thermal management easy. The BXB75 Dual series is approved to IEC950 by UL, CSA and VDE.

OUTPUT POWER (MAX.)	INPUT VOLTAGE	OVP	OUTPUT VOLTAGE	OUTPUT CURRENT (MIN.)	OUTPUT CURRENT (MAX.)	EFFICIENCY (TYPICAL)	REGULATION LINE	REGULATION LOAD	MODEL NUMBER (1)
75W	36-75VDC	6.0V/4.0V	5V/3.3V	0A	15A	82%	±0.25%	±0.5%	BXB75-48D05-3V3FL

(1)Active high remote on/off option is available (standard product is active low), designate with the suffix "FH' e.g. BXB75-48D05-3V3FH.

BXB50 - 33-50 Watt - Wide Input - Single Output

- Industry standard footprint
- MTBF > 1 million hours
- High efficiency up to 88%
- Input voltage to ETS300-132-2
- Adjustable output voltage
- No minimum load required
- Separate case ground pin
- 2:1 input range for battery powered applications
- Undervoltage lockout (UVLO)
- UL, CSA and VDE approvals

OUTPUT POWER (MAX.)	INPUT VOLTAGE	OVP	OUTPUT VOLTAGE	OUTPUT CURRENT (MIN.)	OUTPUT CURRENT (MAX.)	EFFICIENCY (TYPICAL)	REGULATION LINE	REGULATION LOAD	MODEL NUMBER (1)
33W	18-36VDC	4.3VDC	3.3V	0A	10A	77%	±0.05%	±0.10%	BXB50-24S3V3FLT
50W	18-36VDC	6.5VDC	5V	0A	10A	82%	±0.05%	±0.10%	BXB50-24S05FLT
50W	18-36VDC	14.5VDC	12V	0A	4.16A	85%	±0.05%	±0.10%	BXB50-24S12FLT
50W	18-36VDC	17.5VDC	15V	0A	3.33A	84%	±0.05%	±0.10%	BXB50-24S15FLT
33W	36-75VDC	4.3VDC	3.3V	0A	10A	82%	±0.05%	±0.10%	BXB50-48S3V3FLT
50W	36-75VDC	6.5VDC	5V	0A	10A	84%	±0.05%	±0.10%	BXB50-48S05FLT
50W	36-75VDC	14.5VDC	12V	0A	4.16A	86%	±0.05%	±0.10%	BXB50-48S12FLT
50W	36-75VDC	17.5VDC	15V	0A	3.33A	88%	±0.05%	±0.10%	BXB50-48S15FLT

(1)Active high remote on/off option is available (standard product is active low), designate with the suffix "FHT' e.g. BXB50-48S05FHT. Consult factory for details and options.

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BXB75 - 50-75 Watt - Wide Input - Single Output

- Industry standard footprint
- MTBF > 1 million hours
- High efficiency up to 88%
- Input voltage to ETS300-132-2
- Adjustable output voltage
- No minimum load required
- Separate case ground pin
- 2:1 input range for battery powered applications
- Undervoltage lockout (UVLO)
- UL, CSA and VDE approvals

OUTPUT POWER (MAX.)	INPUT VOLTAGE	OVP	OUTPUT VOLTAGE	OUTPUT CURRENT (MIN.)	OUTPUT CURRENT (MAX.)	EFFICIENCY (TYPICAL)	REGULATION LINE	REGULATION LOAD	MODEL NUMBER (1)
50W	18-36VDC	4.3VDC	3.3V	0A	15A	78%	±0.05%	±0.10%	BXB75-24S3V3FLT
75W	18-36VDC	6.5VDC	5V	0A	15A	82%	±0.05%	±0.10%	BXB75-24S05FLT
75W	18-36VDC	14.5VDC	12V	0A	6.25A	85%	±0.05%	±0.10%	BXB75-24S12FLT
75W	18-36VDC	17.5VDC	15V	0A	5.0A	84%	±0.05%	±0.10%	BXB75-24S15FLT
50W	36-75VDC	4.3VDC	3.3V	0A	15A	82%	±0.05%	±0.10%	BXB75-48S3V3FLT
75W	36-75VDC	6.5VDC	5V	0A	15A	85%	±0.05%	± 0.10%	BXB75-48S05FLT
75W	36-75VDC	14.5VDC	12V	0A	6.25A	87%	±0.05%	±0.10%	BXB75-48S12FLT
75W	36-75VDC	17.5VDC	15V	0A	5.0A	88%	±0.05%	±0.10%	BXB75-48S15FLT

(1)Active high remote on/off option is available (standard product is active low), designate with the suffix "FHT' e.g. BXB75-48S05FHT. Consult factory for details and options.

BXB100 - 66-100 Watt - Wide Input - Single Output

- Industry standard footprint
- High power density (36.5W/in^3)
- MTBF > 1 million hours
- High efficiency up to 88%
- Input voltage to ETS300-132-2
- Adjustable output voltage
- No minimum load required
- Separate case ground pin
- Undervoltage lockout (UVLO)
- UL, CSA and VDE approvals

OUTPUT POWER (MAX.)	INPUT VOLTAGE	OVP	OUTPUT VOLTAGE	OUTPUT CURRENT (MIN.)	OUTPUT CURRENT (MAX.)	EFFICIENCY (TYPICAL)	REGULATION LINE	REGULATION LOAD	MODEL NUMBER (1)
66W	18-36VDC	4.3VDC	3.3V	0A	20A	79%	± 0.05%	±0.10%	BXB100-24S3V3FLT
100W	18-36VDC	6.5VDC	5V	0A	20A	82%	±0.05%	±0.10%	BXB100-24S05FLT
100W	18-36VDC	14.5VDC	12V	0A	8.33A	84%	±0.05%	± 0.10%	BXB100-24S12FLT
100W	18-36VDC	17.5VDC	15V	0A	6.67A	84%	±0.05%	±0.10%	BXB100-24S15FLT
66W	36-75VDC	4.3VDC	3.3V	0A	20A	80%	± 0.05%	±0.10%	BXB100-48S3V3FLT
100W	36-75VDC	6.5VDC	5V	0A	20A	85%	±0.05%	±0.10%	BXB100-48S05FLT
100W	36-75VDC	14.5VDC	12V	0A	8.33A	88%	±0.05%	± 0.10%	BXB100-48S12FLT
100W	36-75VDC	17.5VDC	15V	0A	6.67A	88%	±0.05%	±0.10%	BXB100-48S15FLT

(1)Active high remote on/off option is available (standard product is active low), designate with the suffix "FHT' e.g. BXB100-48S05FHT. Consult factory for details and options.

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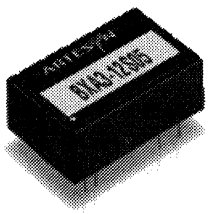
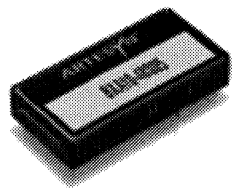
BXA Series



BXA3

- 3 Watts in DIL Package
- Pin compatible with DR series
- 21 models including 3.3VDC output
- Wide input ranges 9-18V, 18-36V, 36-75V



BXA 10

- 1 x 2 x 0.395 inch package with stand-offs
- 13.3 Watts/in³ power density

- EN55022 conducted emissions level A
- Indefinite short circuit protection
- Operating temperature range - 25°C to +105°C
- Input voltage range to ETS300-132-2
- UL, VDE and CSA safety approvals

- CISPR22 and EN55022 conducted emission level A
- UL, CSA and VDE approvals (48V input only)
- Indefinite short circuit protection
- Optional remote ON/OFF

[2 YEAR WARRANTY]

CE (LVD) (48V Models only)

BXA3 - 3 Watt - Wide Input - Single and Dual Outputs

INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT (MAX.)	INPUT CURRENT (MAX.)	EFFICIENCY (TYPICAL)	REGULATION LINE	REGULATION LOAD	MODEL NUMBER
9-18VDC	3.3V	600mA	245mA	68%	±2.5%	±2.5%	BXA3-12S3V3
9-18VDC	5.0A	500mA	285mA	74%	±2.5%	±2.5%	BXA3-12S05
9-18VDC	12.0V	250mA	335mA	75%	±2.5%	±2.5%	BXA3-12S12
9-18VDC	15.0V	200mA	335mA	75%	±2.5%	±2.5%	BXA3-12S15
9-18VDC	±5.0V	±250mA	285mA	75%	±2.5%	±2.5%	BXA3-12D05
9-18VDC	±12.0V	±125mA	335mA	75%	±2.5%	±2.5%	BXA3-12D12
9-18VDC	±15.0V	±100mA	335mA	75%	±2.5%	±2.5%	BXA3-12D15
18-36VDC	3.3V	600mA	122mA	68%	±2.5%	±2.5%	BXA3-24S3V3
18-36VDC	5.0V	500mA	140mA	76%	±2.5%	±2.5%	BXA3-24S05
18-36VDC	12.0V	250mA	165mA	76%	±2.5%	±2.5%	BXA3-24S12
18-36VDC	15.0V	200mA	165mA	76%	±2.5%	±2.5%	BXA3-24S15
18-36VDC	±5.0V	±250mA	140mA	76%	±2.5%	±2.5%	BXA3-24D05
18-36VDC	±12.0V	±125mA	165mA	76%	±2.5%	±2.5%	BXA3-24D12
18-36VDC	±15.0V	±100mA	165mA	76%	±2.5%	±2.5%	BXA3-24D15
36-75VDC	3.3V	600mA	61mA	68%	±2.5%	±2.5%	BXA3-48S3V3
36-75VDC	5.0V	500mA	69mA	76%	±2.5%	±2.5%	BXA3-48S05
36-75VDC	12.0V	250mA	83mA	76%	±2.5%	±2.5%	BXA3-48S12
36-75VDC	15.0V	200mA	83mA	76%	±2.5%	±2.5%	BXA3-48S15
36-75VDC	±5.0V	±250mA	83mA	76%	±2.5%	±2.5%	BXA3-48D05
36-75VDC	±12.0V	±125mA	83mA	76%	±2.5%	±2.5%	BXA3-48D12
36-75VDC	±15.0V	±100mA	83mA	76%	±2.5%	±2.5%	BXA3-48D15

BXA10 - 8 to 10 Watt - Wide Input - Single and Dual Outputs

INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT (MAX)	INPUT CURRENT (MAX.)	EFFICIENCY (TYPICAL)	OVP	REGULATION LINE	REGULATION LOAD	MODEL NUMBER
9-18VDC	3.3V	2.4A	0.88A	76%	3.9VDC	±0.2%	±0.5%	BXA10-12S3V3
9-18VDC	5.0V	2.0A	1.1A	80%	6.2VDC	±0.2%	±0.5%	BXA10-12S05
9-18VDC	12.0V	0.83A	1.05A	82%	15VDC	±0.2%	±0.5%	BXA10-12S12
9-18VDC	15.0V	0.67A	1.05A	83%	18VDC	±0.2%	±0.5%	BXA10-12S15
9-18VDC	±5.0V	±1.0A	1.1A	80%	12VDC	±0.2%	±0.5%	BXA10-12D05
9-18VDC	±12.0V	±0.416A	1.05A	82%	30VDC	±0.2%	±0.5%	BXA10-12D12
9-18VDC	±15.0V	±0.333A	1.05A	83%	36VDC	±0.2%	±0.5%	BXA10-12D15
18-36VDC	12.0V	0.83A	0.51A	83%	15VDC	±0.2%	±0.5%	BXA10-24S12
18-36VDC	15.0V	0.67A	0.51A	84%	18VDC	±0.2%	±0.5%	BXA10-24S15
18-36VDC	3.3V	2.4A	0.22A	78%	3.9VDC	±0.2%	±0.5%	BXA10-48S3V3
18-36VDC	5.0V	2.0A	0.26A	82%	6.8VDC	±0.2%	±0.5%	BXA10-48S05
18-75VDC	12.0V	0.83A	0.25A	82%	15VDC	±0.2%	±0.5%	BXA10-48S12W
36-75VDC	12.0V	0.83A	0.25A	85%	15VDC	±0.2%	±0.5%	BXA10-48S12
36-75VDC	15.0V	0.67A	0.25A	85%	18VDC	±0.2%	±0.5%	BXA10-48S15
18-75VDC	±5.0V	±1.0A	0.26A	82%	12VDC	±0.2%	±0.5%	BXA10-48D05
18-75VDC	±12.0V	±0.416A	0.25A	85%	30VDC	±0.2%	±0.5%	BXA10-48D12
18-75VDC	±15.0V	±0.333A	0.25A	85%	36VDC	±0.2%	±0.5%	BXA10-48D15

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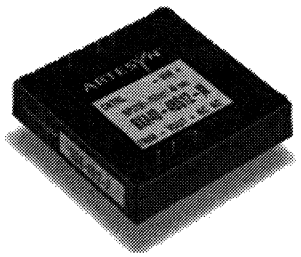
BXA40



- Single and triple output units
- Pin-compatible with NFC40 Series
- Meets telecom power supply interface standard ETS300-132-2
- EN60950, CSA C22.2 No. 950 and UL1950 safety approvals
- EN61000-4-2, -3, -4, -5, -6 immunity compliant
- Fixed frequency operation at 350kHz typ.
- MTBF in excess of 500,000 hours
- Basic insulation system with 1500V isolation
- Remote sense on low voltage logic outputs
- Output voltage trim

BXA40 - 40 Watt - Wide Input - Single Output

INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT(MAX.)	INPUT CURRENT (1)	EFFICIENCY (TYPICAL)	REGULATION LINE (2)	REGULATION LOAD (3)	MODEL NUMBER (4)
18-36VDC	3.3V	7A	70mA	75%	0.3%	1.0%	BXA40-24S3V3-S
18-36VDC	5.0V	8A	40mA	81%	0.3%	1.0%	BXA40-24S05
18-36VDC	12.0V	3.3A	60mA	85%	0.3%	1.0%	BXA40-24S12
18-36VDC	15.0V	2.67A	50mA	85%	0.3%	1.0%	BXA40-24S15
36-75VDC	2.9V	6.9A	40mA	77%	0.3%	1.0%	BXA40-48S2V9-S
36-75VDC	3.3V	7.0A	40mA	75%	0.3%	1.0%	BXA40-48S3V3-S
36-75VDC	5V	8.0A	30mA	82%	0.3%	1.0%	BXA40-48S05
36-75VDC	12V	3.3A	30mA	87%	0.3%	1.0%	BXA40-48S12
36-75VDC	15V	2.67A	30mA	87%	0.3%	1.0%	BXA40-48S15

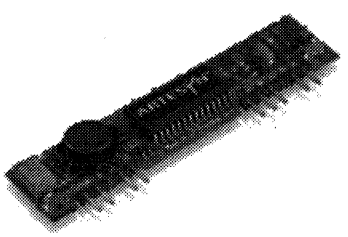
(1) Nominal line, at no load. (2) Low line to high line at full load. (3) Full load to no-load at nominal line (4) To order units with metric threaded inserts (M3) please add the suffix '-M" to the model number. These inserts are used for bolting the unit to a PCB and/or fixing heatsinks.

BXA40 - 40 Watt - Wide Input - Triple Output

INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT(MAX.)	INPUT CURRENT (1)	EFFICIENCY (TYPICAL)	MODEL NUMBER (2)
18-36VDC	5V/±12V	6A/±0.4A	50mA	83%	BXA40-24T05-12
18-36VDC	5V/±15V	6A/±0.4A	50mA	83%	BXA40-24T05-15
36-75VDC	5V/±12V	6A/±0.4A	30mA	83%	BXA40-48T05-12
36-75VDC	5V/±15V	6A/±0.4A	30mA	83%	BXA40-48T05-15

(1) Nominal line, at no load. (2) To order units with metric threaded inserts (M3) please add the suffix '-M" to the model number. These inserts are used for bolting the unit to a PCB and/or fixing heatsinks.

SIP20 - 20 Watt DC/DC Converter



- Industry standard footprint
- High power density (60W/in^3)
- MTBF >9.6 million hours (Bellcore 332)
- High efficiency 90%-95%
- Adjustable output voltage
- Fixed frequency (500kHz)
- Remote ON/OFF
- Undervoltage lockout (UVLO)
- Remote sense option

OUTPUT POWER (MAX.)	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT (MIN.)	OUTPUT CURRENT (MAX.)	EFFICIENCY TYPICAL	REGULATION LINE	REGULATION LOAD	MODEL NUMBER (1)
20W	4.5-5.5VDC	3.3V	0A	6A	90%	±0.3%	±0.3%	SIP20-05S3V3
9W	4.5-5.5VDC	1.5V	0A	6A	75%	±0.3%	±0.3%	SIP20-05S1V5

(1) Combined option with remote sense and input filter capacitor. Removes need for external capacitance required for operation Single line sense; 0.5VDC compensation. Designate with suffix 'RF' e.g. SIP20-05S3V3RF.

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
A/D acrylonitrile butadiene-styrene
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AFC audio frequency control
AFT automatic filter test
ALGOL algorithmic language
AM a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
ASIC application specific IC
ATE automatic test equipment
ATG automatic test generation
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility syste

C
CAD computer-aided design
CAE computer-aided engineering
CAM computer-aided manufacture
CAMAC computer-automated measurement and control
CAPP computer-aided process planning
CAT computer-aided test
CATV cable television or community antenna television
CCC (leaded) ceramic chip carriers
CCD computer-controlled display
CERMET ceramic metal element
CIE computer-integrated engineering
CIM computer-integrated manufacturing
CLCC ceramic leadless chip carriers
CMOS complementary metal-oxide semiconductor
Comm. communications
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DBMS data base management system
DC direct current
DFT design for testability
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DRAM dynamic RAM
DTL diode transistor logic

E
EDA electronic design automation
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EIA Electronic Industries Association
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM erasable programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide FET
CMIP commn management information protocol
GPIB general purpose interface bus
GPS global positioning system

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement, and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IAB Internet Activities Board
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared
ISDN integrated services digital network
ISO International Standards Organization

J
JEDEC Joint Electronic Device Engineering Council
JFET junction FET
JMOS junction MOS

K
kHz kilohertz (10^3 hertz)
KSR keyboard send /receive

L
LAN local area network
LC (filters) inductance/capacitance
LCC leaded chip carrier
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
µF microfarad
MHz megahertz
MIC microwave IC
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor FET
MOSIGT metal oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM national instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator
OSI open systems interconnection

P
PAL programmable array logic
PC printed circuit
PCB printed circuit board
PCM pulse code modulation
PCS plastic clad silica
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLCC plastic leaded chip carrier
PLL phased lock loop
PPI plan position indicator
PROM programmable ROM
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon-controlled switch
SDA source & detector assemblies
SGMP simple gateway monitoring protocol
SIDAC bidirectional voltage-triggered switch
SIMM single in-line memory module
SIP single in-line package
SMD surface mount device
SMT surface mount technology
SNMP simpole network management protocol
SO small outline
SOIC small outline IC
SOT small outline transistor
SSI small scale integration
SSR solid-state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCE thermal coefficient of expansion
TXCO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAN value-added network
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency (30 kHz to 300 MHz)
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

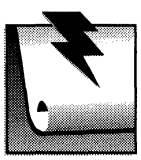
Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

ASTEC

DC/DC Converters 1-500W Power Modules

- **AMPSS® Micro Regulators Series 1-50 watts**
- **AMPSS® Power Modules 50-500 watts**
- **Power Factor Correction**
- **Module 1200 watts**
- **Heatsinks and accessories**



PowerFAX
760-930-0881

For the complete product specifications, please call PowerFAX. Thanks to Astec's PowerFAX automated fax retrieval system, you can instantly receive data sheets and application notes, around the clock.

- *Make note of the document number of the product for which you are requesting information. These numbers are listed by each product.*
- *Call 1-760-930-0881 using touchtone phone.*
- *The PowerFAX system will provide you with voice prompts for entering the document number and fax number.*
- *Within a few minutes, your fax machine will begin printing the product information you requested.*

Internet
http://www.astec.com

Astec's entire product catalog, application notes, product specifications, drawings and pin assignments are available in Adobe® Acrobat® format. The entire contents are searchable, and can be downloaded for future use.

Local Support

Our regional sales offices are ready to provide expert local applications and sales support. In addition, Astec utilizes an extensive network of manufacturers representatives and distributors to bring our products to you. Please see our listings for the offices nearest you.

Factory Support

For order placement and delivery status, call Inside Sales at:
760-930-4600
For returns or repairs, please call Product Support Group at:
760-930-4600
For Technical Support on DC/DC Products, please call:
West *760-930-4781*
East *781-238-8810*

Astec America, Inc., 6339 Paseo del Lago, Carlsbad, California 92009

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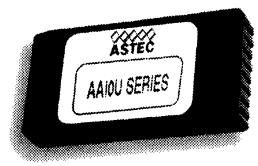
ASTEC

1-50W Low Power DC/DC Converters

Model Series	Max Power	Input Range	Output 1	Output 2	Output 3	Dimensions (inches)	Doc. No.
AA05A	5W	4.5-5.25 VDC or 9-36 VDC or 20-72 VDC	5V @ 0.75A 12V @ 0.375A 15V @ 0.30A 12V @ 0.185A 15V @ 0.150A	– – – -12V @ 0.185A -15V @ 0.15A	– – – – –	0.4x2.0x1.0	1332
AA10B	10W	9-36 VDC or 18-75 VDC or 36-75 VDC	3.3V @ 2.42A 5V @ 2A 12V @ 0.83A 15V @ 0.67A 12V @ 0.375A 15V @ 0.30A	– – – – -12V @ 0.375 -15V @ 0.30A	– – – – – –	0.4x2.0x1.0	1333
AA10U	10W	9-36 VDC or 18-75 VDC	5V @ 2A 12V @ .83A 15V @ .67A 5V @ .75A 12V @ .375A 15V @ .30A	– – – -5V @ .75 -12V @ .375 -15V @ .30	– – – – – –	0.4x2.0x1.0	1350
AA15A	15W	9-36 VDC or 20-72 VDC	5V @ 3A 12V @ 1.25A 15V @ 1A 12V @ 0.625A 15V @ 0.5A 5V @ 1.5A 5V @ 1.5A	– – – -12V @ 0.625A -15V @ 0.5A 12V @ 0.31A 15V @ 0.25A	– – – – – -12V @ 0.31A -15V @ 0.25A	0.4x2.0x2.0	1334
AA20B	20W	9-36 VDC or 18-72 VDC or 36-72 VDC	3.3V @ 4.5A 5V @ 4A 12V @ 1.67A 15V @ 1.3A 12V @ 0.84A 15V @ 0.667A	– – – – -12V @ 0.84A -15V @ 0.667A	– – – –	0.4x2.0x1.6	1335
AA20M	25W	36 - 75 VDC	3.3V @ 6A 5V @ 5A 12V @ 2.1A	–	–	0.5x2.0x2.0	1250
AA25A	25W	19-35 VDC or 35-63 VDC	5V @ 5A 5V @ 5A	12V @ 1A 15V @ 0.8A	-12V @ 1A -15V @ 0.8A	0.43x3.0x3.0	1336
AA25B	25W	9-36 VDC or 20-72 VDC	5V @ 5A 12V @ 2A 15V @ 1.6A 12V @ 1A 15V @ 0.8A 5V @ 3.5A 5V @ 3.5A	– – – -12V @ 1A -15V @ 0.8A 12V @ 0.75A 15V @ 0.5A	– – – -12V @ 0.75A -15V @ 0.5A	0.83x2.5x3.0	1337
AA25C	25W	36-75 VDC	5.1 @ 3.8A 5.1 @ 3.1A	12.2 @ 0.25A 15 @ 0.3A	-12.2 @ 0.25A -15 @ 0.3A	0.43x3.0x3.0	1800
AA25D	25W	5-7 VDC	3.3V @ 8A			0.4x2.0x2.0	1801
AA25E	25W	5-7 VDC	3.3V @ 8A			0.4x2.0x1.0	1802
AA30A	30W	19-35 VDC 35-63 VDC	15V @ 2A 12V @ 2.5A	– -12V @ 2A	– –	0.43x3.0x3.0	1338
AA30C	30W	36-75 VDC	– 15V @ 2A 12V @ 1.25A	– – -12V @ 1.25A	– – –	0.43x3.0x3.0	1216
AA30N	30W	36 - 75 VDC	3.3V @ 7.37A 5V @ 6A 12V @ 2.5A	–	–	0.5x2.5x3.0	1251
AA40A	40W	19-35 VDC 35-63 VDC	5V @ 8A	–	–	0.43x3.0x3.0	1339
AA40C	40W	36-75 VDC	5.1 @ 8A 5.1 @ 4A	– -5.1 @ 4A	– –	0.43x3.0x3.0	1804
AA40M	40W	36 - 75 VDC	3.3V @ 11A	–	–	0.5x3.0x3.0	1252
AA50A	50W	20-72 VDC	3.3V @ 12A 5V @ 10A 12V @ 4.2A 15V @ 3.4A 5V @ 6A 5V @ 6A	– – – – 12V @ .750A 15V @ .650A	– – – – -12V @ .750A -15V @ .650A	0.5x4.0x2.6	1352



AMPSS® Micro Regulators

Description

The AMPSS® Micro Regulator series is part of Astec's family of advanced modular power supply components. Featuring high reliability and convenient control functions, these modules are designed to reduce product development time and enhance system performance. These units are ideally suited for telecommunications, industrial, computer and distributed power system applications having a widely varying input voltage.

Features

- *High efficiency*
- *Industry standard packaging*
- *100% computerized final testing*
- *Overvoltage protection*
- *Six sided shielding*
- *Surface mount technology*
- *Single, dual and triple outputs*
- *Regulated outputs*

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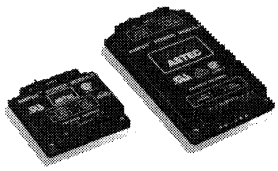
50-500W High Density DC/DC Converters



AMPSS® Power Modules

Features

- *Standard modules / Standard footprint*
- *Small package size*
- *High power density*
- *High efficiency*
- *Programmable functions*
- *Up to 1 MHz fixed frequency*
- *Up to 100°C baseplate temperature*
- *Low output ripple & noise*
- *Excellent transient response*
- *1 million hours MTBF*
- *Wide input voltage range*
- *Parallelable with accurate current sharing*

Description

Featuring high reliability and convenient control and monitoring functions, the AMPSS® family of high density distributed power modules is designed to reduce product development time, and enhance system flexibility and performance. The AMPSS® Power Module range features two levels of power density and eight series providing a wide range of functionality.

Series Overview

AMPSS® Modules are available in Economy, Standard footprint, Enhanced and Performance versions. The Economy Series provides clean, reliable, low cost DC/DC power conversion with simple control functions. The Standard, Enhanced and Performance Series deliver increasing levels of control and monitoring functionality.

Model Selection

AM80A-300L-050F40

- AM80A: Series Size (60=1/2 Size, 80=Full Size)
- 300L: Input Voltage
- 050: Output Voltage (050=5.0V)
- F: Floating Output
- 40: Output Current

Model Series	Max Power	Input Range	Output	Part Number	Dimensions (inches)	Doc. No.
AK60A	50W	18-36	2.2 @ 10A	AK60A-024L-022F10G	2.4 x 2.3 x 0.5	1270
			3.3 @ 10A	AK60A-024L-033F10G		
			5 @ 10A	AK60A-024L-050F10G		
			12 @ 4.2A	AK60A-024L-120F04G		
			15 @ 3.3A	AK60A-024L-150F03G		
			24 @ 2A	AK60A-024L-240F02G		
AK60A	50W	36-75	2.2 @ 10A	AK60A-048L-022F10G	2.4 x 2.3 x 0.5	1270
			3.3 @ 10A	AK60A-048L-053F10G		
			5 @ 10A	AK60A-048L-050F10G		
			12 @ 4.2A	AK60A-048L-120F04G		
			15@ 3.3A	AK60A-048L-150F03G		
			24 @	AK60A-048L-240F02G		
AK60A	50W	200 - 400	2.2 @ 10A	AK60A-300L-022F10G	2.4 x 2.3 x 0.5	1270
			3.3 @ 10A	AK60A-300L-033F10G		
			5 @ 10A	AK60A-300L-050F15G		
			12 @ 4.3A	AK60A-300L-120F04G		
			24 @ 2.1A	AK60A-300L-240F02G		
AK60A	75W	18-36	5 @ 15A	AK60A-024L-050F15	2.4 x 2.3 x 0.5	1328
			12 @ 6.3A	AK60A-024L-0120F06		
			15 @ 5A	AK60A-024L-150F05		
			24 @ 3.1A	AK60A-024L-240F03		
AK60A	75W	36 - 72	5 @ 15A	AK60A-048L-050F15	2.4 x 2.3 x 0.5	1328
			12 @ 6.3A	AK60A-048L-0120F06		
			15 @ 5A	AK60A-048L-150F05		
AK60A	100W	18-36	2.2 @ 20A	AK60A-024L-022F20G	2.4 x 2.3 x 0.5	1272
			3.3 @ 20A	AK60A-024C-033F20G		
			5 @ 20A	AK60A-024L-050F20G		
			12 @ 8.3A	AK60A-024L-120F08G		
			15 @ 6.7A	AK60A-024L-150F07G		
			24 @ 4.2A	AK60A-024L-240F04G		
AK60A	100W	36-72	2.2 @ 20A	AK60A-048L-022F20G	2.4 x 2.3 x 0.5	1272
			3.3 @ 20A	AK60A-048L-033F20G		
			5 @ 20A	AK60A-048L-050F20G		
			12 @ 8.3A	AK60A-048L-120F08G		
			15 @ 6.7A	AK60A-048L-150F07G		
			24 @ 4.2A	AK60A-048L-240F04G		
AK60A	100W	200 - 400	2.2 @ 20A	AK60A-300L-022F20G	2.4 x 2.3 x 0.5	1272
			3.3 @ 20A	AK60A-300L-033F20G		
			5 @ 20A	AK60A-300L-050F20G		
			12 @ 8.3A	AK60A-300L-120F08G		
			24 @ 4.2A	AK60A-300L-240F04G		
AK60C	100W	36 - 75	2.2 @ 20A	AK60C-048L-022F20G	2.4 x 2.3 x 0.5	1272
			3.3 @ 20A	AK60C-048L-033F20G		
			5 @ 20A	AK60C-048L-050F20G		
			12 @ 8A	AK60C-048L-120F08G		
			24 @ 4A	AK60C-048L-240F04G		
AL60A	120W	36-72	2.2 @ 30A	AL60A-048L-022F30	2.4 x 2.3 x 0.5	1205
			3.3 @ 25A	AL60A-048L-033F25		
			5 @ 10A	AL60A-048L-050F10		
			5 @ 20A	AL60A-048L-050F20		
			12 @ 6A	AL60A-048L-120F06		
			12 @ 9A	AL60A-048L-120F09		
			15 @ 8A	AL60A-048L-150F08		
AL60A	120W	180-400	2.0 @ 20A	AL60A-300L-020F20	2.4 x 2.3 x 0.5	1205
			3.3 @ 25A	AL60A-300L-033F25		
			5 @ 20A	AL60A-300L-050F20		
			12 @ 9A	AL60A-300L-120F09		
			15 @ 8A	AL60A-300L-150F08		
			24 @ 3A	AL60A-300L-240F03		
BK60A	150W	36-75	5 @ 30A	BK60A-048L-050F30G	2.4 x 2.3 x 0.5	1274
			12 @ 13A	BK60A-048L-120F13G		
			15 @ 10A	BK60A-048L-150F10G		
BK60A	150W	200 - 400	5 @ 30A	BK60A-300L-050F30G	2.4 x 2.3 x 0.5	1274
			12 @ 13A	BK60A-300L-120F13G		
			15 @ 10A	BK60A-300L-150F10G		

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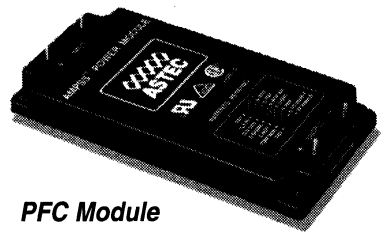
ASTEC

50-500W High Density DC/DC Converters

(continued)

Model Series	Max Power	Input Range	Output	Part Number	Dimensions (inches)	Doc. No.
AK80A	192W	18-36	3.3 @ 40A	AK80A-024L-033F40	2.4 x 4.6 x 0.5	1202
			5 @ 30A	AK80A-024L-050F30		
			12 @ 14A	AK80A-024L-120F14		
			15 @ 12A	AK80A-024L-150F12		
			24 @ 8A	AK80A-024L-240F08		
AK80A	240W	36-72	3.3 @ 50A	AK80A-048L-033F50	2.4 x 4.6 x 0.5	1202
			5 @ 40A	AK80A-048L-050F40		
			12 @ 18A	AK80A-048L-120F18		
			15 @ 16A	AK80A-048L-150F16		
			24 @ 10A	AK80A-048L-240F10		
AK80A	240W	180-400	3.3 @ 50A	AK80A-300L-033F50	2.4 x 4.6 x 0.5	1202
			5 @ 40A	AK80A-300L-050F40		
			12 @ 18A	AK80A-300L-120F18		
			15 @ 16A	AK80A-300L-150F16		
			24 @ 10A	AK80A-300L-240F10		
AL80A	200W	36-72	5 @ 40A	AL80A-048L-050F40	2.4 x 4.6 x 0.5	1201
AL80A	240W	180-400	2.0 @ 60A	AL80A-300L-020F60	2.4 x 4.6 x 0.5	1201
			3.3 @ 50A	AL80A-300L-033F50		
			5 @ 40A	AL80A-300L-050F40		
			6.3 @ 34A	AL80A-300L-063F34		
			12 @ 18A	AL80A-300L-120F18		
			15 @ 16A	AL80A-300L-150F16		
AM80A	240W	36-72	1.2 @ 60A	AM80A-048L-012F60	2.4 x 4.6 x 0.5	1203
			1.8 @ 60A	AM80A-048L-018F60		
			2.2 @ 60A	AM80A-048L-022F60		
			3.3 @ 50A	AM80A-048L-033F50		
			5.0 @ 40A	AM80A-048L-050F40		
			12 @ 18A	AM80A-048L-120F18		
			15 @ 16A	AM80A-048L-150F16		
			24 @ 10A	AM80A-048L-240F10		
AM80A Dual	224W	36-72	3.3 @ 30A 5 @ 25A	AM80A-048L-050P25D033P30	2.4 x 4.6 x 0.5	1204
AM80A	215W	90-200	6.5 @ 33A	AM80A-150L-065F33	2.4 x 4.6 x 0.5	1203
AM80A	252W	180-400	2.2 @ 60A	AM80A-300L-022F60	2.4 x 4.6 x 0.5	1203
			3.3 @ 50A	AM80A-300L-033F50		
			6.5 @ 33A	AM80A-300L-065F33		
			5 @ 40A	AM80A-300L-050F40		
			12 @ 18A	AM80A-300L-120F18		
			15 @ 16A	AM80A-300L-150F16		
			24 @ 10A	AM80A-300L-240F10		
			28 @ 9A	AM80A-300L-280F09		
AM80A	252W	256-400	28 @ 9A	AM80A-320L-280F09	2.4 x 4.6 x 0.5	1203
BM80A	300W	36-72	1.8 @ 100A	BM80M-048L-018F100	2.4 x 4.6 x 0.5	1200
			3.3 @ 70A	BM80A-048L-033F70		
			3.3 @ 80A	BM80A-048L-033F80		
			5 @ 60A	BM80A-048L-050F60		
BM80A	300W	180-400	2.1 @ 100	BM80A-300L-021F100	2.4 x 4.6 x 0.5	1200

AMPSS® PFC Module



PFC Module

Power Factor Correction Module

1200 Watts max • 85-265VAC input, 385V Output

The PFC Power Factor Correction modules are part of Astec's family of advanced high density modular power supply components. Featuring high reliability and convenient control and monitoring functions, these modules are designed to reduce product development time and enhance system performance. The PFC works over all typical line voltages used worldwide, and provides unity power factor with very low levels of harmonic distortion in line current.

Features

- *Unity power factor*
- *High efficiency: up to 95%*
- *Universal input voltage*
- *Up to 1200W output power*
- *Parallelable with current sharing within 3%*
- *<10% harmonic distortion conforming to IEC555-2*
- *85°C baseplate operating temperature (no derating)*
- *Power fail warning signal*
- *PLD feature*
- *Enable output to control AMPSS® DC/DC converters*

AMPSS® Accessories

HEATSINKS

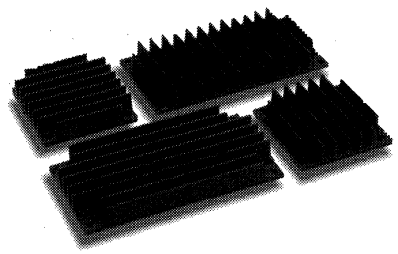
These heatsinks and accessories have been specially designed for use with Astec's family of advanced high density modular power supply components.

THERMAL PADS

THERMSTRATE® thermal pads to fit AMPSS® modules provide a clean and effective alternative to thermal compound for interfacing the heatsink to the module.

MOUNTING KITS

Two types of mounting kits are available for assembling the module and heatsink onto a PC board using screws or solder attachment.



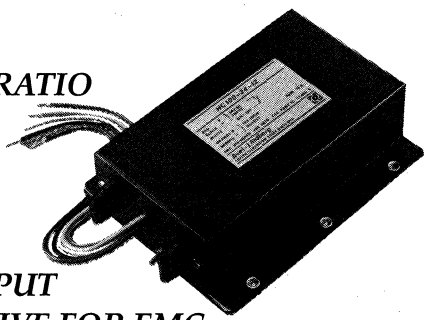
AMPSS® Heatsinks

DC TO DC CONVERTERS

AVEL

DC TO DC CONVERTERS 40 WATTS - 350 WATTS

- COMPACT
- WIDE INPUT RANGE
- HIGH EFFICIENCY
- HIGH POWER TO WEIGHT RATIO
- RUGGED CONSTRUCTION
- MOISTURE RESISTANT
- VIBRATION TOLERANT
- GOOD REGULATION
- PROTECTED INPUT & OUTPUT
- MEETS EUROPEAN DIRECTIVE FOR EMC
- FCC PART 15 CLASS B COMPLIANT
- EN 55 022 COMPLIANT
- EN 60 950, UL 1950 COMPLIANT
- EASY INSTALLATION
- REMOTE LOW POWER SWITCHING
- VERY LOW RFI



Designed to power mobile equipment that requires a consistent 12 or 24 Vdc input from a battery source or other varying dc source.

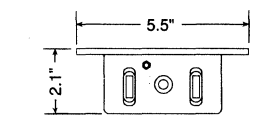
Ideal for sensitive electronics used in communication, data collection, ticketing systems, audio, video, radio and especially where RFI needs to be kept to negligible levels. They are constructed for rough environmental conditions and can withstand high levels of shock and vibration. The epoxy filled units offer complete protection from water, oil and other harmful substances.

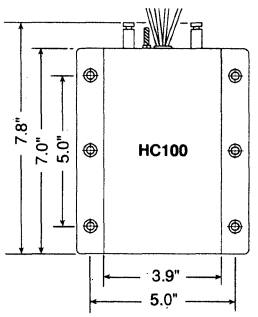
The HC, LC and EC types are isolated from input to output and case and therefore are compatible with positive or negative chassis vehicles.

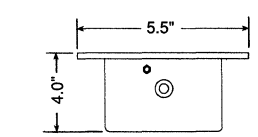
Avel converters offer reliability with competitive pricing.

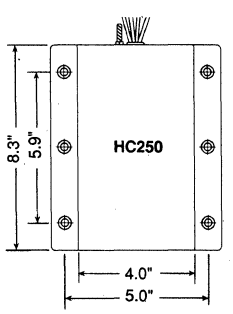
▼ ISOLATED ▼

TYPE	INPUT NOM Vdc	INPUT RANGE Vdc	OUTPUT Vdc	OUTPUT Adc	NO LOAD INPUT mAdc	BASE PLATE DIMENSIONS L" x W" x H"	Weight Lbs.
HC100/24/12	24	16-50	13.8	10	100	7.0 x 5.5 x 2.1	3.5
HC100/24/24	24	16-50	24.0	5	100	7.0 x 5.5 x 2.1	3.5
HC100/48/12	48	30-70	13.8	10	80	7.0 x 5.5 x 2.1	3.5
HC100/48/24	48	30-70	24.0	5	80	7.0 x 5.5 x 2.1	3.5
HC100/110/12	110	70-140	13.8	10	40	7.0 x 5.5 x 2.1	3.5
HC100/110/24	110	70-140	24.0	5	40	7.0 x 5.5 x 2.1	3.5
HC250/24/12	24	16-50	13.8	20	200	8.3 x 5.5 x 4.0	9.9
HC250/24/24	24	16-50	24.0	10	200	8.3 x 5.5 x 4.0	9.9
HC250/48/12	48	30-70	13.8	20	160	8.3 x 5.5 x 4.0	9.9
HC250/48/24	48	30-70	24.0	10	160	8.3 x 5.5 x 4.0	9.9
HC250/110/12	110	70-140	13.8	20	80	8.3 x 5.5 x 4.0	9.9
HC250/110/24	110	70-140	24.0	10	80	8.3 x 5.5 x 4.0	9.9









ADDITIONAL SPECIFICATIONS FOR HC 100/250 TYPES

Efficiency:	>80%
Output voltage regulation:	<5%
Output noise:	<100mV pk-pk
Protection:	- Input: Reverse polarity and fuse - Output: Foldback current limit circuit at approximately 120% plus an output overvoltage crowbar and fuse
Temperature:	- 25 deg C to +55 deg C
Construction:	Epoxy filled aluminum case, flying leads

ISO 9002 certified

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http://www.avellindberg.com • E-mail: avelram@worlnet.att.net

DC TO DC CONVERTERS

AVEL

▼ ISOLATED ▼

TYPE	INPUT NOM Vdc	INPUT RANGE Vdc	OUTPUT Vdc	OUTPUT Adc	BASE PLATE DIMENSIONS L" x W" x H"	Weight lbs.
HC350/12/24	12	11-16	24.0	20	10.4 x 6.1 x 4.3	12.6
HC350/24/24	24	20-32	24.0	20	10.4 x 6.1 x 4.3	12.6
HC350/48/24	48	40-63	24.0	20	10.4 x 6.1 x 4.3	12.6
HC350/24/12	24	20-32	13.8	25	10.4 x 6.1 x 4.3	8.8

ADDITIONAL SPECIFICATIONS FOR HC 350 TYPES

Efficiency: >85%
Output voltage regulation: +/-2%
Output noise: <250 mV pk-pk
Protection:
- Input: User provided fuse
- Output: Foldback current limit circuit at approximately 120% overvoltage crowbar and fuse

Temperature: - 10 deg C to +55 deg C
Construction: Aluminum case, stud connections, epoxy filled except HC350/24/12 which is fan cooled

▼ ISOLATED ▼

TYPE	INPUT NOM Vdc	INPUT RANGE Vdc	OUTPUT Vdc	OUTPUT Adc	NO LOAD INPUT mAdc	BASE PLATE DIMENSIONS L" x W" x H"	Weight lbs.
LC100/12/12	12	11-15	13.7	6	100	7.1 x 3.5 x 1.5	1.1
LC100/12/12F	12	11-15	13.7	10	100	7.1 x 3.5 x 1.5	1.1
LC100/12/12	12	11-15	13.7	10	50	7.1 x 3.5 x 1.5	1.1
LC200/12/12	12	11-15	13.7	20	100	8.8 x 5.3 x 2.2	2.6
LC100/12/24	12	11-15	24.0	5	100	7.1 x 3.5 x 1.5	1.1
LC100/12/24F	12	11-15	24.0	3	100	7.1 x 3.5 x 1.5	1.1
EC100/12/24	12	11-15	24.0	5	100	7.1 x 3.5 x 1.5	2.2
LC200/12/24	12	11-15	26	10	80	8.8 x 5.3 x 2.2	2.6
LC40/24/12	24	20-35	13.6	3	30	5.7 x 2.5 x 1.3	2.6
LC100/24/12	12	18-33	13.7	10	80	7.1 x 3.5 x 1.5	1.1
EC100/24/12	24	18-33	13.7	10	80	7.1 x 3.5 x 1.5	2.2
LC200/24/12	24	18-32	13.7	20	100	8.8 x 5.3 x 2.2	2.6
LC100/24/24	24	18-32	24.0	5	70	7.1 x 3.5 x 1.5	1.1
EC100/24/24	24	18-32	24.0	5	70	7.1 x 3.5 x 1.5	2.2
LC200/24/24	26	18-32	24.0	10	80	8.8 x 5.3 x 2.2	2.6
LC200/48/12	48	36-64	13.7	20	80	8.8 x 5.3 x 2.2	2.6
LC200/48/24	48	36-64	24.0	10	80	8.8 x 5.3 x 2.2	2.6
LC200/110/12	110	90-140	13.7	20	80	8.8 x 5.3 x 2.2	2.6
LC200/110/24	110	90-140	24.0	10	80	8.8 x 5.3 x 2.2	2.6

ADDITIONAL SPECIFICATIONS FOR LC/EC TYPES

Efficiency: >80%
Output voltage regulation: <2%
Output noise: <40 mV pk-pk
Protection:
- Input: Reverse polarity, shut down circuit
- Output: Foldback current limit circuit plus electronic overvoltage protection

Temperature: EC types: - 10 deg C to +55 deg C • LC types: -10 deg C to +40 deg C
Construction: LC types: Aluminum case, lugs are standard, flying leads are also available
EC types: Epoxy filled aluminum case

▼ NON-ISOLATED ▼

TYPE	SUPPLY NOM Vdc	SUPPLY RANGE Vdc	OUTPUT Vdc	OUTPUT Adc	EFF	BASE PLATE DIMENSIONS L" x W" x H"	Weight lbs.
XR100/24/12	24	18-35	13.7	8	90%	5.5 x 3.0 x 1.4	1.5
TR100/12/24	12	10-18	24.0	5	85%	5.5 x 3.0 x 1.4	1.5
TR100/24/12	24	18-35	13.7	8	90%	5.5 x 3.0 x 1.4	1.5
XR200/24/12	24	18-35	13.7	16	90%	7.3 x 5.5 x 1.4	2.0
TR200/24/12	24	18-35	13.7	16	90%	7.3 x 5.5 x 1.4	3.3
XR300/24/12	24	18-35	13.7	25	90%	7.3 x 5.5 x 1.4	2.0
TR300/24/12	24	18-35	13.7	25	90%	7.3 x 5.5 x 1.4	3.3

ADDITIONAL SPECIFICATIONS FOR XR/TR TYPES

Protection:
- Input: Fuse
- Output: TR100/12/24 fuse
  All other TRs: Constant current limit at 115% full overvoltage crowbar at 17V +/-1V

Construction: Aluminum case, flying leads, TR types resin filled, XR no resin filling
Temperature: - 10 deg C to +55 deg C

ISO 9002 certified

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DC/DC Converters

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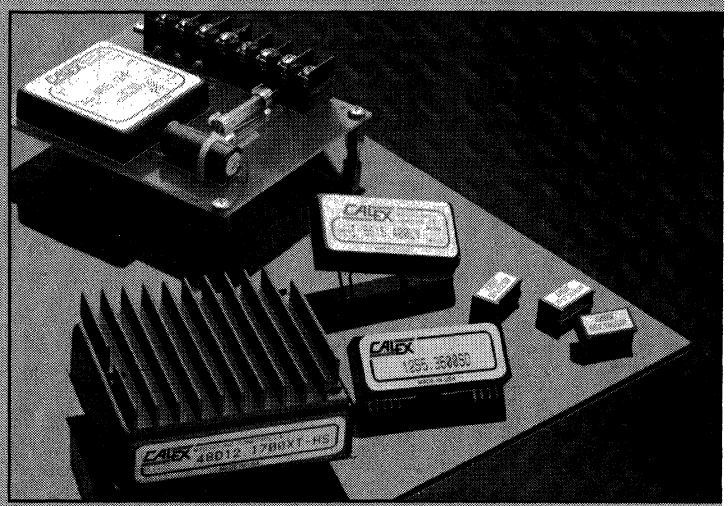

Features

- 0.2 to 100 Watts of Output Power
- Low Noise Operation
- Highly Regulated Outputs
- Modular Designs
- Completely Encapsulated
- Shielded Cases
- *10 Day Guaranteed Shipment Program*
- *5 Year Warranty*
- *Standard and Custom Designs*

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Single Output

0.2 to 3 Watt Output

Watts	V in Nominal	V out	V in Range	I out	Case Size (W x L X H)	Model Number	Notes	*FaxFACTS* #
0.2	N/A	6.8	Iin=135.0 - 150mA	35 mA	1.0" x 3.75" x 2.2"	3S6.35CD		154
0.3	3	5	1.8 - 4.0	50 mA	0.40" x 0.77" x 0.27"	3S5.050SU	2	137
0.3	24	250	22.8 - 25.2	1 mA	2.0" x 2.0" x 0.875"	24S250.1CD		154
0.4	3	25	3.0 - 3.6	15 mA	0.40" x 0.77" x 0.27"	3S25.015LCD		142
0.7	N/A	5	Iin=55.0 - 200mA	135 mA	2.0" x 2.0" x 0.375"	15S5.135CD		154
0.8	5	5	4.5 - 5.5	150 mA	0.40" x 0.77" x 0.27"	5S5.150SIP		138
0.8	5	25	4.5 - 5.0	30 mA	0.40" x 0.77" x 0.27"	5S25.030LCD		142
1	5	7	4.5 - 5.5	140 mA	0.40" x 0.77" x 0.27"	5S7.140SIP		138
1	5	12	4.5 - 5.5	80 mA	0.40" x 0.77" x 0.27"	5S12.080SIP		138
1	5	14	4.5 - 5.5	70 mA	0.40" x 0.77" x 0.27"	5S14.070SIP		138
1	5	15	4.5 - 5.5	65 mA	0.40" x 0.77" x 0.27"	5S15.065SIP		138
1	5	17	4.5 - 5.5	60 mA	0.40" x 0.77" x 0.27"	5S17.060SIP		138
2	5	5	4.5 - 5.5	400 mA	0.80" x 1.25" x 0.43"	5S5.400RM		149
2	5	12	4.5 - 5.5	165 mA	0.80" x 1.25" x 0.43"	5S12.165RM		149
2	5	15	4.5 - 5.5	130 mA	0.80" x 1.25" x 0.43"	5S15.130RM		149
2	12	5	10.8 - 13.2	400 mA	0.80" x 1.25" x 0.43"	12S5.400RM		149
2	12	12	10.8 - 13.2	165 mA	0.80" x 1.25" x 0.43"	12S12.165RM		149
2	12	15	10.8 - 13.2	130 mA	0.80" x 1.25" x 0.43"	12S15.130RM		149
2	24	5	21.6 - 26.4	400 mA	0.80" x 1.25" x 0.43"	24S5.400RM		149
2	24	12	21.6 - 26.4	165 mA	0.80" x 1.25" x 0.43"	24S12.165RM		149
2	24	15	21.6 - 26.4	130 mA	0.80" x 1.25" x 0.43"	24S15.130RM		149
3	5	5	4.5 - 5.5	600 mA	0.80" x 1.25" x 0.43"	5S5.600UM		150
3	5	12	4.5 - 5.5	250 mA	0.80" x 1.25" x 0.43"	5S12.250UM		150
3	5	15	4.5 - 5.5	200 mA	0.80" x 1.25" x 0.43"	5S15.200UM		150
3	12	5	10.8 - 13.2	600 mA	0.80" x 1.25" x 0.43"	12S5.600UM		150

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DC/DC Converters

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CALEX

Single Output

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http://www.calex.com

3 to 10 Watt Output

Watts	V in Nominal	V out	V in Range	I out	Case Size (W x L x H)	Model Number	Notes	FaxFACTS #
3	12	12	10.8 - 13.2	250 mA	0.80" x 1.25" x 0.43"	12S12.250UM		150
3	12	15	10.8 - 13.2	200 mA	0.80" x 1.25" x 0.43"	12S15.200UM		150
3	12	120	10.0 - 14.0	25 mA	1.0" x 1.4" x 0.72"	12S120.25CD		154
3	24	5	21.6 - 26.4	600 mA	0.80" x 1.25" x 0.43"	24S5.600UM		150
3	24	12	21.6 - 26.4	250 mA	0.80" x 1.25" x 0.43"	24S12.250UM		150
3	24	15	21.6 - 26.4	200 mA	0.80" x 1.25" x 0.43"	24S15.200UM		150
3	5	48	4.5 - 6.5	65 mA	1.1" x 1.2" x 0.38"	5S48.65CD		154
4	12	7	9.0 - 36.0	500 mA	1.0" x 2.0" x 0.41"	12S7.500CD		154
5	5	5	4.75 - 5.25	1 A	2.02" x 2.02" x 0.38"	5S5.1000		101
5	5	12	4.75 - 5.25	450 mA	2.02" x 2.02" x 0.38"	5S12.450		101
5	5	15	4.75 - 5.25	350 mA	2.02" x 2.02" x 0.38"	5S15.350		101
5	12	5	11.16 - 13.20	1 A	2.02" x 2.02" x 0.38"	12S5.1000	UL (b)	103
5	12	5	7.0 - 32.0	1 A	2.02" x 2.02" x 0.38"	12S5.1000WF	1	101
5	12	5	9.0 - 27.0	1 A	1.08" x 2.12" x 0.48"	12S5.1000EC		104
5	24	5	22.32 - 26.40	1 A	2.02" x 2.02" x 0.38"	24S5.1000	UL (b)	103
5	28	5	26.40 - 30.80	1 A	2.02" x 2.02" x 0.38"	28S5.1000	UL (b)	103
5	48	5	44.64 - 52.80	1 A	2.02" x 2.02" x 0.38"	48S5.1000	UL (b)	103
5	48	5	20.0 - 60.0	1 A	1.08" x 2.12" x 0.48"	48S5.1000EC		104
5	48	5	20.0 - 60.0	1 A	2.02" x 2.02" x 0.38"	48S5.1000FW	UL (b)	102
5	48	17	44.0 - 52.0	300 mA	2.0" x 2.0" x 0.375"	48S17.300CD		154
6	5	3.33	3.5 - 16.0	2 A	2.02" x 2.02" x 0.45"	5S3.2000LV		108
6	5	5	3.5 - 16.0	1.2 A	1.00" x 2.00" x 0.45"	5S5.1200LV		105
6	5	5.2	3.5 - 16.0	1.2 A	1.00" x 2.00" x 0.45"	5S5.2.1200LV		105
6	5	12	3.5 - 16.0	500 mA	1.00" x 2.00" x 0.45"	5S12.500LV		105
6	5	12	4.75 - 5.25	500 mA	2.0" x 2.0" x 0.365"	5S12.500CD		154
6	5	15	3.5 - 16.0	400 mA	1.00" x 2.00" x 0.45"	5S15.400LV		105
6	12	3.33	9.0 - 18.0	2 A	1.02" x 2.02" x 0.41"	12S3.2000NT		107
6	12	12	11.16 - 13.20	500 mA	2.02" x 2.02" x 0.38"	12S12.500	UL (b)	103
6	12	12	9.0 - 27.0	500 mA	1.08" x 2.12" x 0.48"	12S12.500EC		104
6	12	15	9.0 - 27.0	400 mA	1.08" x 2.12" x 0.48"	12S15.400EC		104
6	12	15	11.16 - 13.20	400 mA	2.02" x 2.02" x 0.38"	12S15.400		103
6	24	3.33	18.0 - 36.0	2 A	1.02" x 2.02" x 0.41"	24S3.2000NT		107
6	24	12	22.32 - 26.40	500 mA	2.02" x 2.02" x 0.38"	24S12.500	UL (b)	103
6	24	15	22.32 - 26.40	400 mA	2.02" x 2.02" x 0.38"	24S15.400	UL (b)	103
6	28	12	26.40 - 30.80	500 mA	2.02" x 2.02" x 0.38"	28S12.500	UL (b)	103
6	28	15	26.40 - 30.80	400 mA	2.02" x 2.02" x 0.38"	28S15.400	UL (b)	103
6	48	3.33	36.0 - 72.0	2 A	1.02" x 2.02" x 0.41"	48S3.2000NT	UL (a)	107
6	48	12	20.0 - 60.0	500 mA	1.08" x 2.12" x 0.48"	48S12.500EC		104
6	48	12	44.64 - 52.80	500 mA	2.02" x 2.02" x 0.38"	48S12.500	UL (b)	103
6	48	15	20.0 - 60.0	400 mA	1.08" x 2.12" x 0.48"	48S15.400EC		104
6	48	15	44.64 - 52.80	400 mA	2.02" x 2.02" x 0.38"	48S15.400	UL (b)	103
6	5	12.25	4.3 - 5.25	500 mA	2.0" x 2.0" x 0.5"	5S12.2.500CD		154
7	24	5	22.8 - 25.2	1.3 A	2.0" x 2.0" x 0.875"	24S5.1300CD		154
7	5	48	4.5 - 5.5	150 mA	1.62" x 2.02" x 0.55"	5S48.150		140
8	12	5	9.0 - 27.0	1.5 A	2.02" x 2.02" x 0.38"	12S5.1500FW		102
8	12	12	9.0 - 27.0	625 mA	2.02" x 2.02" x 0.38"	12S12.625FW		102
8	12	15	9.0 - 27.0	500 mA	2.02" x 2.02" x 0.38"	12S15.500FW		102
8	48	5	36.0 - 72.0	1.5 A	2.02" x 2.02" x 0.38"	48S5.1500FW	UL (b)	102
8	48	5	20.0 - 60.0	1.5 A	1.02" x 2.02" x 0.41"	48S5.1500NT		107
8	48	12	36.0 - 72.0	625 mA	2.02" x 2.02" x 0.38"	48S12.625FW	UL (b)	102
8	48	15	36.0 - 72.0	500 mA	2.02" x 2.02" x 0.38"	48S15.500FW	UL (b)	102
10	48	18.7	20.0 - 60.0	525 mA	1.6" x 2.0" x 0.55"	48S18.525CD		155
10	5	3.33	4.5 - 6.0	3.5 A	2.00" x 0.75" x 0.50"	5S3.3500SD	2	135
10	5	5	3.5 - 16.0	2 A	2.02" x 2.02" x 0.45"	5S5.2000LV	1, 2	108
10	12	5	9.0 - 18.0	2 A	1.02" x 2.02" x 0.41"	12S5.2000NT		107
10	12	12	9.0 - 18.0	900 mA	1.02" x 2.02" x 0.41"	12S12.900NT		107
10	12	12	9.0 - 18.0	900 mA	1.0" x 2.0" x 0.42"	12S12.900CD		155
10	12	15	9.0 - 18.0	700 mA	1.02" x 2.02" x 0.41"	12S15.700NT		107

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10 to 12 Watt Output

Watts	V in Nominal	V out	V in Range	I out	Case Size (W x L x H)	Model Number	Notes	*FaxFACTS* #
10	24	5	12.0 - 36.0	2 A	2.50" x 3.50" x 0.90"	24S5.2000	UL (b)	109
10	24	5	18.0 - 36.0	2 A	1.02" x 2.02" x 0.41"	24S5.2000NT	UL (a)	107
10	24	5	18.0 - 36.0	2 A	1.02" x 2.02" x 0.42"	24S5.2000CD	UL (a)	159
10	24	12	18.0 - 36.0	900 mA	1.02" x 2.02" x 0.41"	24S12.900NT		107
10	24	15	18.0 - 36.0	700 mA	1.02" x 2.02" x 0.41"	24S15.700NT		107
10	48	5	36.0 - 72.0	2 A	1.02" x 2.02" x 0.41"	48S5.2000NT	UL (a)	107
10	48	5	20.0 - 60.0	2 A	1.62" x 2.02" x 0.55"	48S5.2000TC	1, 2	106
10	48	5	24.0 - 72.0	2 A	2.50" x 3.50" x 0.90"	48S5.2000	UL (b)	109
10	48	12	36.0 - 72.0	900 mA	1.02" x 2.02" x 0.41"	48S12.900NT	UL (a)	107
10	48	12	20.0 - 60.0	850 mA	1.62" x 2.02" x 0.55"	48S12.850TC	1, 2	106
10	48	15	36.0 - 72.0	700 mA	1.02" x 2.02" x 0.41"	48S15.700NT	UL (a)	107
10	48	15	20.0 - 60.0	700 mA	1.62" x 2.02" x 0.55"	48S15.700TC	1, 2	106
12	5	12	3.5 - 16.0	1 A	2.02" x 2.02" x 0.45"	5S12.1000LV	1, 2	108
12	5	15	3.5 - 16.0	800 mA	2.02" x 2.02" x 0.45"	5S15.800LV	1, 2	108
12	12	3.33	9.0 - 18.0	4 A	2.02" x 2.02" x 0.45"	12S3.4000NT	1, 2	112
12	24	3.33	18.0 - 36.0	4 A	2.02" x 2.02" x 0.45"	24S3.4000NT	1, 2	112
12	24	12	12.0 - 36.0	1 A	2.50" x 3.50" x 0.90"	24S12.1000	UL (b)	109
12	24	15	12.0 - 36.0	800 mA	2.50" x 3.50" x 0.90"	24S15.800	UL (b)	109
12	48	3.33	36.0 - 72.0	4 A	2.02" x 2.02" x 0.45"	48S3.4000NT	1, 2	112
12	48	12	24.0 - 72.0	1 A	2.50" x 3.50" x 0.90"	48S12.1000	UL (b)	109
12	48	15	24.0 - 72.0	800 mA	2.50" x 3.50" x 0.90"	48S15.800	UL (b)	109

15 to 25 Watt Output

15	12	5	7.0 - 40.0	3 A	2.56" x 3.00" x 0.83"	12S5.3000CD		155
15	12	5	9.0 - 27.0	3 A	2.58" x 3.01" x 0.83"	12S5.3000XC	1, 2	110
15	12	12	9.0 - 27.0	1.25 A	2.58" x 3.01" x 0.83"	12S12.1250XC	1, 2	110
15	12	15	9.0 - 27.0	1 A	2.58" x 3.01" x 0.83"	12S15.1000XC	1, 2	110
15	24	5	9.0 - 32.0	3 A	1.02" x 2.02" x 0.42"	24S5.3000BR		163
15	24	5	18.0 - 72.0	3 A	1.02" x 2.02" x 0.42"	48S5.3000BR		163
15	48	5	18.0 - 72.0	3 A	2.00" x 2.00" x 0.45"	48S5.3000CD		155
15	48	5	20.0 - 60.0	3 A	1.62" x 2.02" x 0.55"	48S5.3000TC	1, 2, UL(b)	111
15	48	5	24.0 - 72.0	3 A	2.58" x 3.01" x 0.83"	48S5.3000XC	1, 2	110
15	48	12	20.0 - 60.0	1.25 A	1.62" x 2.02" x 0.55"	48S12.1250TC	1, 2	111
15	48	12	24.0 - 72.0	1.25 A	2.58" x 3.01" x 0.83"	48S12.1250XC	1, 2	110
15	48	15	20.0 - 60.0	1 A	1.62" x 2.02" x 0.55"	48S15.1000TC	1, 2	111
15	48	15	24.0 - 72.0	1 A	2.58" x 3.01" x 0.83"	48S15.1000XC	1, 2	110
18	12	5	6.5 - 15.5	3.5 A	2.00" x 0.75" x 0.50"	12S5.3500SD	2	135
18	24	3.33	9.0 - 36.0	6 A	2.58" x 3.01" x 0.83"	24S3.6XT	1, 2, 3	115
19	12	8.5	10.0 - 20.0	2.2 A	2.56" x 3.0" x 0.83"	12S8.2200CD		155
20	12	5	9.0 - 18.0	4 A	2.02" x 2.02" x 0.45"	12S5.4000NT	1, 2	112
20	12	12	9.0 - 18.0	1.7 A	2.02" x 2.02" x 0.45"	12S12.1700NT	1, 2	112
20	24	5	18.0 - 36.0	4 A	2.02" x 2.02" x 0.45"	24S5.4000NT	1, 2	112
20	24	8	18.0 - 32.0	2.5 A	2.56" x 3.0" x 0.59"	24S8.2500CD		155
20	24	12	18.0 - 36.0	1.7 A	2.02" x 2.02" x 0.45"	24S12.1700NT	1, 2	112
20	48	5	36.0 - 72.0	4 A	2.02" x 2.02" x 0.45"	48S5.4000NT	1, 2	112
20	48	12	36.0 - 72.0	1.7 A	2.02" x 2.02" x 0.45"	48S12.1700NT	1, 2	112
21	12	15	9.0 - 18.0	1.4 A	2.02" x 2.02" x 0.45"	12S15.1400NT	1, 2	112
21	24	15	18.0 - 36.0	1.4 A	2.02" x 2.02" x 0.45"	24S15.1400NT	1, 2	112
21	48	3.33	20.0 - 72.0	7 A	2.58" x 3.01" x 0.83"	48S3.7XT	1, 2, 3	115
21	48	15	36.0 - 72.0	1.4 A	2.02" x 2.02" x 0.45"	48S15.1400NT	1, 2	112
24	48	8	30.0 - 60.0	3 A	2.56" x 3.0" x 0.89"	48S8.3000CD		155
25	12	5	7.0 - 40.0	5 A	2.56" x 3.0" x 0.83"	12S5.5000CD		155
25	12	5	7.0 - 40.0	5 A	2.58" x 3.01" x 0.83"	12S5.5000UW	1, 2, 3	116
25	24	2.5	18.0 - 36.0	10 A	2.28" x 2.40" x 0.50"	24S2.10HE	1, 2, 3	160
25	24	5	9.0 - 36.0	5 A	2.60" x 4.60" x 0.83"	24S5.5000XW	1, 2, 3	113
25	48	2.5	34.0 - 75.0	10 A	2.28" x 2.40" x 0.50"	48S2.10HE	1, 2, 3	160
25	48	5	20.0 - 72.0	5 A	2.60" x 4.60" x 0.83"	48S5.5000XW	1, 2, 3	113
25	48	5	36.0 - 72.0	5 A	1.62" x 2.02" x 0.55"	48S5.5000NT	1, 2, UL(a)	114

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Watts	V in Nominal	V out	V in Range	I out	Case Size (W x L x H)	Model Number	Notes	*FaxFACTS* #
30	24	12	9.0 - 36.0	2.5 A	2.60" x 4.60" x 0.83"	24S12.2500XW	1, 2, 3	113
30	24	12	14.0 - 40.0	2.5 A	2.56" x 3.0" x 0.83"	24S12.2500CD		155
30	24	12	14.0 - 40.0	2.5 A	2.58" x 3.01" x 0.83"	24S12.2500UW	1, 2, 3	116
30	24	15	9.0 - 36.0	2 A	2.60" x 4.60" x 0.83"	24S15.2000XW	1, 2, 3	113
30	48	12	20.0 - 72.0	2.5 A	2.60" x 4.60" x 0.83"	48S12.2500XW	1, 2, 3	113
30	48	12	36.0 - 72.0	2.5 A	1.62" x 2.02" x 0.55"	48S12.2500NT	1, 2	114
30	48	15	20.0 - 72.0	2 A	2.60" x 4.60" x 0.83"	48S15.2000XW	1, 2, 3	113
30	48	15	36.0 - 72.0	2 A	1.62" x 2.02" x 0.55"	48S15.2000NT	1, 2	114
33	24	3.3	18.0 - 36.0	10 A	2.28" x 2.40" x 0.50"	24S3.10HE	1, 2, 3	160
33	48	3.3	34.0 - 75.0	10 A	2.28" x 2.40" x 0.50"	48S3.10HE	1, 2, 3	160
35	12	5	4.0 - 18.0	7 A	2.56" x 3.0" x 0.83"	12S5.7000CD		155
35	24	5	9.0 - 36.0	7 A	2.58" x 3.01" x 0.83"	24S5.7XT	1, 2, 3	115
38	24	2.5	18.0 - 36.0	15 A	2.28" x 2.40" x 0.50"	24S2.15HE	1, 2, 3	161
38	48	2.5	34.0 - 75.0	15 A	2.28" x 2.40" x 0.50"	48S2.15HE	1, 2, 3	161
40	48	5	20.0 - 72.0	7 A	2.58" x 3.01" x 0.83"	48S5.8XT	1, 2, 3	115
42	24	12	12.0 - 40.0	3.5 A	2.58" x 3.01" x 0.83"	24S12.3500UW	1, 2, 3	116
45	24	12	9.0 - 36.0	3.75 A	2.58" x 3.01" x 0.83"	24S12.4XT	1, 2, 3	115
45	24	15	17.0 - 40.0	3 A	2.58" x 3.01" x 0.83"	24S15.3000UW	1, 2, 3	116
45	24	15	9.0 - 36.0	3 A	2.58" x 3.01" x 0.83"	24S15.3XT	1, 2, 3	115
45	48	12	20.0 - 72.0	3.75 A	2.58" x 3.01" x 0.83"	48S12.4XT	1, 2, 3	115
45	48	15	9.0 - 36.0	3 A	2.58" x 3.01" x 0.83"	48S15.3XT	1, 2, 3	115
49	24	3.3	18.0 - 36.0	15 A	2.28" x 2.40" x 0.50"	24S3.15HE	1, 2, 3	161
50	24	15	18.0 - 36.0	3.3 A	2.28" x 2.40" x 0.50"	24S15.3HE	1, 2, 3	160
50	48	3.3	34.0 - 75.0	15 A	2.28" x 2.40" x 0.50"	48S3.15HE	1, 2, 3	161
50	12	5	9.0 - 18.0	10 A	2.60" x 4.60" x 0.83"	12S5.10XW	1, 2, 3	118
50	24	2.5	18.0 - 36.0	20 A	2.28" x 2.40" x 0.50"	24S2.20HE	* 1, 2, 3	162
50	24	5	18.0 - 36.0	10 A	2.28" x 2.40" x 0.50"	24S5.10HE	1, 2, 3	160
50	24	5	18.0 - 36.0	10 A	2.60" x 4.60" x 0.83"	24S5.10XW	1, 2, 3	118
50	48	2.5	18.0 -36.0	20 A	2.28" x 2.40" x 0.50"	48S2.20HE	* 1, 2, 3	162
50	48	5	34.0 -75.0	10 A	2.28" x 2.40" x 0.50"	48S5.10HE	1, 2, 3	160
50	48	5	36.0 - 72.0	10 A	2.60" x 4.60" x 0.83"	48S5.10XW	1, 2, 3	118
50	24	12	18.0 - 36.0	4.2 A	2.28" x 2.40" x 0.50"	24S12.4HE	1, 2, 3	160
50	24	24	18.0 - 36.0	2.1 A	2.28" x 2.40" x 0.50"	24S24.2HE	1, 2, 3	160
50	48	12	34.0 - 75.0	4.2 A	2.28" x 2.40" x 0.50"	48S12.4HE	1, 2, 3	160
50	48	24	34.0 - 75.0	2.1	2.28" x 2.40" x 0.50"	48S24.2HE	1, 2, 3	160
60	12	12	9.0 - 18.0	5 A	2.60" x 4.60" x 0.83"	12S12.5XW	1, 2, 3	118
60	12	15	9.0 - 18.0	4 A	2.60" x 4.60" x 0.83"	12S15.4XW	1, 2, 3	118
60	24	12	18.0 - 36.0	5 A	2.60" x 4.60" x 0.83"	24S12.5XW	1, 2, 3	118
60	24	15	18.0 - 36.0	4 A	2.60" x 4.60" x 0.83"	24S15.4XW	1, 2, 3	118
60	28	12	36.0 - 72.0	5 A	2.60" x 4.60" x 0.83"	48S12.5XW	1, 2, 3	118
60	48	15	36.0 - 72.0	4 A	2.60" x 4.60" x 0.83"	48S15.4XW	1, 2, 3	118
66	24	3.3	18.0 - 36.0	20 A	2.28" x 2.40" x 0.50"	24S3.20HE	* 1, 2, 3	162
66	48	3.3	34.0 - 75.0	20 A	2.28" x 2.40" x 0.50"	48S3.20HE	* 1, 2, 3	162
72	24	24	18.0 - 36.0	3.3 A	2.28" x 2.40" x 0.50"	24S24.3HE	1, 2, 3	161
72	48	24	34.0 - 75.0	3.3 A	2.28" x 2.40" x 0.50"	48S24.3HE	1, 2, 3	161
75	24	5	18.0 - 36.0	15 A	2.28" x 2.40" x 0.50"	24S5.15HE	1, 2, 3	161
75	24	12	18.0 - 36.0	6.25 A	2.28" x 2.40" x 0.50"	24S12.6HE	1, 2, 3	161
75	24	15	18.0 - 36.0	5 A	2.28" x 2.40" x 0.50"	24S15.5HE	1, 2, 3	161
75	48	5	34.0 - 75.0	15 A	2.28" x 2.40" x 0.50"	48S5.15HE	1, 2, 3	161
75	48	12	34.0 - 75.0	6.25 A	2.28" x 2.40" x 0.50"	48S12.6HE	1, 2, 3	161
75	48	15	34.0 - 75.0	5 A	2.28" x 2.40" x 0.50"	48S15.5HE	1, 2, 3	161
100	24	24	18.0 - 36.0	4.15 A	2.28" x 2.40" x 0.50"	24S24.4HE	* 1, 2, 3	162
100	48	24	34.0 - 75.0	4.15 A	2.28" x 2.40" x 0.50"	48S24.4HE	* 1, 2, 3	162
100	24	5	18.0 - 36.0	20 A	2.28" x 2.40" x 0.50"	24S5.20HE	* 1, 2, 3	162
100	48	5	34.0 - 75.0	20 A	2.28" x 2.40" x 0.50"	48S5.20HE	* 1, 2, 3	162
100	24	12	18.0 - 36.0	8.35 A	2.28" x 2.40" x 0.50"	24S12.8HE	* 1, 2, 3	162
100	48	12	34.0 - 75.0	8.35 A	2.28" x 2.40" x 0.50"	48S12.8HE	* 1, 2, 3	162
100	24	15	18.0 - 36.0	6.7 A	2.28" x 2.40" x 0.50"	24S15.6HE	* 1, 2, 3	162
100	48	15	34.0 - 75.0	6.7 A	2.28" x 2.40" x 0.50"	48S15.6HE	* 1, 2, 3	162

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0.8 to 8 Watt Output

Watts	V in Nominal	V out	V in Range	I out	Case Size (W x L x H)	Model Number	Notes	FaxFACTS #
0.8	5	±5	4.5 - 5.5	±75 mA	0.40" x 0.77" x 0.27"	5D5.075SIP		139
0.9	5	±5	4.5 - 5.5	±90 mA	0.80" x 1.25" x 0.50"	5D5.090RM		151
0.9	12	±5	10.8 - 13.2	±90 mA	0.80" x 1.25" x 0.50"	12D5.090RM		151
0.9	24	±5	21.6 - 26.4	±90 mA	0.80" x 1.25" x 0.50"	24D5.090RM		151
1	5	±7	4.5 - 5.5	±70 mA	0.40" x 0.77" x 0.27"	5D7.070SIP		139
1	5	±12	4.5 - 5.5	±40 mA	0.40" x 0.77" x 0.27"	5D12.040SIP		139
1	5	±14	4.5 - 5.5	±35 mA	0.40" x 0.77" x 0.27"	5D14.035SIP		139
1	5	±15	4.5 - 5.5	±33 mA	0.40" x 0.77" x 0.27"	5D15.033SIP		139
1	5	±17	4.5 - 5.5	±30 mA	0.40" x 0.77" x 0.27"	5D17.030SIP		139
1	48	±5	30.0 - 60.0	±100 mA	0.8" x 1.25" x 0.4"	48D5.100CD		156
2	24	+15 -15	16.0 - 28.0	100 mA 10 mA	1.0" x 2.0" x 0.53"	24D15.100CD		156
2	5	±12	4.6 - 5.5	±75 mA	1.02" x 1.25" x 0.50"	5D12.075		119
2	5	±15	4.6 - 5.5	±60 mA	1.02" x 1.25" x 0.50"	5D15.060		119
2	12	±12	10.8 - 13.8	±75 mA	1.02" x 1.25" x 0.50"	12D12.075		119
2	12	±15	10.8 - 13.8	±60 mA	1.02" x 1.25" x 0.50"	12D15.060		119
2	5	±12	4.5 - 5.5	±85 mA	0.80" x 1.25" x 0.50"	5D12.085RM		151
2	12	±12	10.8 - 13.2	±85 mA	0.80" x 1.25" x 0.50"	12D12.085RM		151
2	24	±12	21.6 - 26.4	±85 mA	0.80" x 1.25" x 0.50"	24D12.085RM		151
2	5	±15	4.5 - 5.5	±70 mA	0.80" x 1.25" x 0.50"	5D15.070RM		151
2	12	±15	10.8 - 13.2	±70 mA	0.80" x 1.25" x 0.50"	12D15.070RM		151
2	24	±15	21.6 - 26.4	±70 mA	0.80" x 1.25" x 0.50"	24D15.070RM		151
3	50	+5 -5	48.0 - 51.0	540 mA 20 mA	2.0" x 2.0" x 0.5"	48D5.540CD		156
5	5	±12	4.75 - 5.25	±185 mA	2.02" x 2.02" x 0.38"	5D12.185B		120
5	5	±12	4.75 - 5.25	±185 mA	2.02" x 2.02" x 0.38"	5D12.185B-5		120
5	5	±15	4.75 - 5.25	±150 mA	2.02" x 2.02" x 0.38"	5D15.150B		120
5	5	±15	4.75 - 5.25	±150 mA	2.02" x 2.02" x 0.38"	5D15.150B-5		120
5	5	±15	4.75 - 5.25	±167 mA	2.02" x 2.02" x 0.38"	5D15.167B		120
5	5	±15	4.75 - 5.25	±167 mA	2.02" x 2.02" x 0.38"	5D15.167B-5		120
5	48	±15.6	43.0 - 56.0	±150 mA	2.0" x 2.0" x 0.375"	48D15.150CD		156
6	12	±12	11.16 - 13.20	±250 mA	2.02" x 2.02" x 0.38"	12D12.250A		121
6	12	±15	11.16 - 13.20	±200 mA	2.02" x 2.02" x 0.38"	12D15.200A		121
6	24	±12	22.32 - 26.40	±250 mA	2.02" x 2.02" x 0.38"	24D12.250A		121
6	24	±15	22.32 - 26.40	±200 mA	2.02" x 2.02" x 0.38"	24D15.200A		121
6	28	±12	26.04 - 30.80	±250 mA	2.02" x 2.02" x 0.38"	28D12.250A		121
6	28	±15	26.04 - 30.80	±200 mA	2.02" x 2.02" x 0.38"	28D15.200A		121
6	48	±12	44.64 - 52.80	±250 mA	2.02" x 2.02" x 0.38"	48D12.250A		121
6	48	±15	44.64 - 52.80	±200 mA	2.02" x 2.02" x 0.38"	48D15.200A		121
6	12	+5 -5	9.0 - 36.0	1 A 250 mA	2.0" x 2.0" x 0.45"	12D5.1000CD		156
7	15	+72 -48	14.0 - 16.0	60 mA 60 mA	1.0" x 2.0" x 0.45"	15D72.48CD		156
8	24	±15	21.6 - 26.4	±250 mA	2.0" x 2.0" x 0.875"	24D15.250CD		156
8	48	±5	18.0 - 72.0	±800 mA	1.02" x 2.02" x 0.42"	48D5.800WD		145

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9 to 17 Watt Output

Watts	V in Nominal	V out	V in Range	I out	Case Size (W x L X H)	Model Number	Notes	FaxFACTS #
9	24	±5	9.0 - 36.0	±850 mA	1.02" x 2.02" x 0.42"	24D5.850WD	UL (a)	148
10	5	±5	3.5 - 16.0	±1 A	2.02" x 2.02" x 0.45"	5D5.1000LV		125
10	24	±12	9.0 - 36.0	±400 mA	1.02" x 2.02" x 0.42"	24D12.400WD		148
10	24	±15	9.0 - 36.0	±320 mA	1.02" x 2.02" x 0.42"	24D15.320WD		148
10	28	±5	18.0 - 54.0	±1 A	2.50" x 3.50" x 0.90"	28D5.1000		124
10	48	±12	20.0 - 60.0	±400 mA	1.62" x 2.02" x 0.55"	48D12.400TC	1, 2	123
10	48	±12	18.0 - 72.0	±415 mA	1.02" x 2.02" x 0.42"	48D12.415 WD		145
10	48	±15	18.0 - 72.0	±330 mA	1.02" x 2.02" x 0.42"	48D15.330WD		145
10	48	±15	20.0 - 60.0	±350 mA	1.62" x 2.02" x 0.55"	48D15.350TC	1, 2	123
12	5	±12	3.5 - 16.0	±500 mA	2.02" x 2.02" x 0.45"	5D12.500LV		125
12	5	±15	3.5 - 16.0	±400 mA	2.02" x 2.02" x 0.45"	5D15.400LV		125
12	24	±12	12.0 - 36.0	±500 mA	2.50" x 3.50" x 0.90"	24D12.500		124
12	24	±15	12.0 - 36.0	±400 mA	2.50" x 3.50" x 0.90"	24D15.400		124
12	48	±12	24.0 - 72.0	±500 mA	2.50" x 3.50" x 0.90"	48D12.500		124
12	48	±15	24.0 - 72.0	±400 mA	2.50" x 3.50" x 0.90"	48D15.400		124
15	48	±12	20.0 - 72.0	±625 mA	1.62" x 2.02" x 0.55"	48D12.625TC	1, 2	126
15	48	±15	20.0 - 72.0	±500 mA	1.62" x 2.02" x 0.55"	48D15.500TC	1, 2	126
17	12	±5	9.0 - 18.0	±1.7 A	2.02" x 2.02" x 0.45"	12D5.1700NT	1, 2	127
17	24	±5	18.0 - 36.0	±1.7 A	2.02" x 2.02" x 0.45"	24D5.1700NT	1, 2	127
17	48	±5	36.0 - 72.0	±1.7 A	2.02" x 2.02" x 0.45"	48D5.1700NT	1, 2	127

20 to 76 Watt Output

20	12	±12	9.0 - 18.0	±850 mA	2.02" x 2.02" x 0.45"	12D12.850NT	1, 2	127
20	12	±15	9.0 - 18.0	±700 mA	2.02" x 2.02" x 0.45"	12D15.700NT	1, 2	127
20	24	±12	18.0 - 36.0	±850 mA	2.02" x 2.02" x 0.45"	24D12.850NT	1, 2	127
20	24	±15	18.0 - 36.0	±700 mA	2.02" x 2.02" x 0.45"	24D15.700NT	1, 2	127
20	48	±12	36.0 - 72.0	±850 mA	2.02" x 2.02" x 0.45"	48D12.850NT	1, 2	127
20	48	±15	36.0 - 72.0	±700 mA	2.02" x 2.02" x 0.45"	48D15.700NT	1, 2	127
30	12	±12	9.0 - 18.0	±1.25 A	2.60" x 4.60" x 0.83"	12D12.1250XW	2	128
30	12	±15	9.0 - 18.0	±1 A	2.60" x 4.60" x 0.83"	12D15.1000XW	2	128
30	24	±5	9.0 - 36.0	±3 A	2.58" x 3.01" x 0.83"	24D5.3000XT	2	136
30	24	±12	18.0 - 36.0	±1.25 A	2.60" x 4.60" x 0.83"	24D12.1250XW	2	128
30	24	±15	18.0 - 36.0	±1 A	2.60" x 4.60" x 0.83"	24D15.1000XW	2	128
30	48	±12	36.0 - 72.0	±1.25 A	2.60" x 4.60" x 0.83"	48D12.1250XW	2	128
30	48	±15	36.0 - 72.0	±1 A	2.60" x 4.60" x 0.83"	48D15.1000XW	2	128
31	24	+5 +12	9.0 - 36.0	+3 A +1.3 A	2.58" x 3.01" x 0.83"	24D5.12CS	1, 2	141
31	48	+5 +12	20.0 - 72.0	+3 A +1.3 A	2.58" x 3.01" x 0.83"	48D5.12CS	1, 2	141
35	48	±5	20.0 - 72.0	±3.5 A	2.58" x 3.01" x 0.83"	48D5.3500XT	2	136
36	24	±12	9.0 - 36.0	±1.5 A	2.58" x 3.01" x 0.83"	24D12.1500XT	2	136
36	24	±15	9.0 - 36.0	±1.2 A	2.58" x 3.01" x 0.83"	24D15.1200XT	2	136
39	48	±15	20.0 - 72.0	±1.3 A	2.58" x 3.01" x 0.83"	48D15.1300XT	2	136
41	48	±12	20.0 - 72.0	±1.7 A	2.58" x 3.01" x 0.83"	48D12.1700XT	2	136
76	24	5 35	18.0 - 36	1.1 A 2 A	4.6" x 2.6" x 0.83"	24D5.35CD		156

Notes	
1	Trim Capability
2	On/Off Function
3	Output Sense Pins
UL(a)	UL Recognition: UL 1950
UL(b)	UL Recognition: UL 1459
*	Preliminary, Consult Factory

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9 to 93 Watt Output

Watts	V in Nominal	V out	V in Range	I out	Case Size (W x L X H)	Model Number	Notes	FaxFACTS #
9	12	5, ±12	9.0 - 36.0	800 mA, ±185mA	2.58" x 3.01" x 0.83"	12T5.12UW	2	129
9	12	5, ±15	9.0 - 36.0	800 mA, ±150 mA	2.58" x 3.01" x 0.83"	12T5.15UW	2	129
9	48	5, ±12	18.0 - 72.0	800 mA, ±185 mA	2.58" x 3.01" x 0.83"	48T5.12UW	2	129
9	48	5, ±15	18.0 - 72.0	800 mA, ±150 mA	2.58" x 3.01" x 0.83"	48T5.15UW	2	129
9	7	5, ±12	5.0 - 14.5	850 mA, ±200 mA	2.0" x 1.6" x 0.48"	5T5.12CD		157
13	12	5, 6.5, 12.2	9.0 - 36.0	1.4 A, 500 mA, 200 mA	2.0" x 2.0" x 0.45"	12T5.7.12CD		157
15	12	5, ±12	9.0 - 18.0	1.5 A, ±310 mA	2.58" x 3.01" x 0.83"	12T5.12SW	2	130
15	12	5, ±15	9.0 - 18.0	1.5 A, ±250 mA	2.58" x 3.01" x 0.83"	12T5.15SW	2	130
15	24	5, ±12	18.0 - 36.0	1.5 A, ±310 mA	2.58" x 3.01" x 0.83"	24T5.12SW	2	130
15	24	5, ±15	18.0 - 36.0	1.5 A, ±250 mA	2.58" x 3.01" x 0.83"	24T5.15SW	2	130
15	48	5, ±15	18.0 - 72.0	1.5 A, ±250 mA	2.0" x 2.0" x 0.45"	48T5.15CD		157
15	48	5, ±12	36.0 - 72.0	1.5 A, ±310 mA	2.58" x 3.01" x 0.83"	48T5.12SW	2	130
15	48	5, ±15	36.0 - 72.0	1.5 A, ±250 mA	2.58" x 3.01" x 0.83"	48T5.15SW	2	130
20	12	5, ±12	9.0 - 18.0	2.5 A, ±310 mA	2.02" x 2.02" x 0.45"	12T5.12HP		131
20	12	5, ±15	9.0 - 18.0	2.5 A, ±250 mA	2.02" x 2.02" x 0.45"	12T5.15HP		131
20	24	5, ±12	18.0 - 36.0	2.5 A, ±310 mA	2.02" x 2.02" x 0.45"	24T5.12HP		131
20	24	5, ±15	18.0 - 36.0	2.5 A, ±250 mA	2.02" x 2.02" x 0.45"	24T5.15HP		131
20	48	5, ±12	36.0 - 72.0	2.5 A, ±310 mA	2.02" x 2.02" x 0.45"	48T5.12HP		131
20	48	5, ±15	36.0 - 72.0	2.5 A, ±250 mA	2.02" x 2.02" x 0.45"	48T5.15HP	UL (a)	131
25	12	5, ±12	10.0 - 20.0	2.5 A, ±500 mA	2.58" x 3.01" x 0.83"	12T5.12XC	1, 2, UL (b)	132
25	12	5, ±15	10.0 - 20.0	2.5 A, ±400 mA	2.58" x 3.01" x 0.83"	12T5.15XC	1, 2, UL (b)	132
26	48	5, 8, 18	34.5 - 75.0	4 A, 150 mA, 250 mA	2.56" x 3.00" x 0.55"	48T5.18CD		157
27	12	5, ±12	9.0 - 36.0	3 A, ±500 mA	2.58" x 3.01" x 0.83"	12T5.12LE		133
27	12	5, ±15	9.0 - 36.0	3 A, ±400 mA	2.58" x 3.01" x 0.83"	12T5.15LE		133
29	48	+5, -5, +12	18.0 - 72.0	3 A, 300 mA, 1 A	2.56" x 3.00" x 0.53"	48T12.5CD		157
30	24	5, ±12	18.0 - 36.0	3 A, ±625 mA	2.58" x 3.01" x 0.83"	24T5.12XC	1, 2, UL (b)	132
30	24	5, ±15	18.0 - 36.0	3 A, ±500 mA	2.58" x 3.01" x 0.83"	24T5.15XC	1, 2, UL (b)	132
30	48	5, ±12	18.0 - 72.0	3 A, ±625 mA	2.58" x 3.01" x 0.83"	48T5.12LE		133
30	48	5, ±12	36.0 - 72.0	3 A, ±625 mA	2.58" x 3.01" x 0.83"	48T5.12XC	1, 2, UL (b)	132
30	48	5, ±15	18.0 - 72.0	3 A, ±500 mA	2.58" x 3.01" x 0.83"	48T5.15LE		133
30	48	5, ±15	36.0 - 72.0	3 A, ±500 mA	2.58" x 3.01" x 0.83"	48T5.15XC	1, 2, UL (b)	132
55	12	5, ±12	9.0 - 18.0	5 A, ±1.25 A	3.50" x 5.50" x 0.90"	12T5.12K	2, 3	134
55	12	5, ±15	9.0 - 18.0	5 A, ±1 A	3.50" x 5.50" x 0.90"	12T5.15K	2, 3	134
55	12	5, ±12	9.0 - 32.0	5 A, 1.25 A	3.50" x 5.50" x 0.90"	12T5.12CD		157
55	24	5, ±12	18.0 - 36.0	5 A, ±1.25 A	3.50" x 5.50" x 0.90"	24T5.12K	2, 3	134
55	24	5, ±15	18.0 - 36.0	5 A, ±1 A	3.50" x 5.50" x 0.90"	24T5.15K	2, 3	134
55	48	5, ±12	36.0 - 72.0	5 A, ±1.25 A	3.50" x 5.50" x 0.90"	48T5.12K	2, 3	134
55	48	5, ±15	36.0 - 72.0	5 A, ±1 A	3.50" x 5.50" x 0.90"	48T5.15K	2, 3	134
93	12	5, +12, -12	10.0 - 18.00	500 mA, 7.3 A, 200 mA	4.60" x 2.60" x 0.83"	12T12.5CD		157

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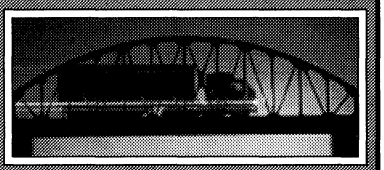

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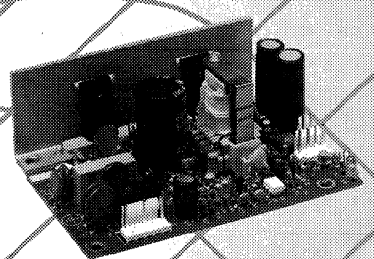

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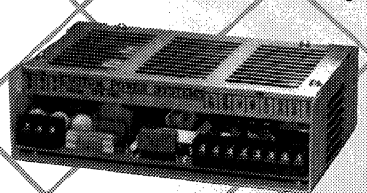

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Argentina (IRAM) Instituto Argentino de Racionalization de Materiales

Australia (SAA) Standards Association of Australia

Austria (ÖVE) Öesterreichischer Verband für Elektrotechnik

Belgium (CEB) Comité Electrotechnique Belge

Brazil (ABNT) Associação Brasileira de Normas Teonicas

Canada (CSA) Canadian Standards Association

Czechoslovakia Urad pro Normalizaci a Mereni (Office for Standards and Measurements)

Denmark (DEK) Dansk Elektroteknisk Komite (Danish Electrotechnical Committee)

Egypt (EOS) Egyptian Organization for Standardization and Quality Control

Finland (SETI) Electrical Inspectorate

France (UTE) Union Technique de l'Électricité

Germany, Democratic Republic of (East) (ASMW) Amt für Standardi-sierung Messwesen und Warenprufung (Office for Standardization, Metrology and Quality Control)

Germany, Federal Republic of (West) (DKE) Deutsche Electrotechnische Kommission im DIN und VDE (German Electrotechnical Commission of DIN and VDE)

Greece (ELOT) The Hellenic Organization of Standardization

Hong Kong Hong Kong Standards & Testing Centre

Hungary (MSZH) Magyar Szabvanyugi Hivatal (Hungarian Office for Standardization)

India (ISI) Indian Standards Institute "Manak Bhavan"

Indonesia Badan Kerjasama Standardisasi LIPI-YDNI (LIPI-YDNI Joint Standardization Committee)

Iran Institute of Standards and Industrial Research of Iran

Ireland (IIRS) Institute for Industrial Research and Standards

Israel (SII) Standards Institution of Israel

Italy (CEI) Comitato Elettrotecnico Italiano (Italian Electrotechnical Committee)

Japan (JISC) Japanese Industrial Standards Committee Agency of Industrial Science and Technology

Korea, Republic of (South) Industrial Advance Administration

Mexico (DGN) Dirección General de Normas Secretaria de Patrimonio y Fomento Industrial Puente de Tecamachalco

Netherlands (NEC) Nederlands Elektrotechnisch Comite

New Zealand (SANZ) Standards Association of New Zealand

Norway (NEK) Norsk Elektroteknisk Komite (Norwegian Electrotechnical Committee)

Pakistan Pakistan Standards Institution

Poland Polski Komitet Normalizacji Miar i Jakosci (Polish Committee for Standardization, Measures and Quality Control)

Portugal (CEP) Comissão Electrotécnica Portuguesa

Romania Institutul Roman de Standardizare (Romanian Standards Institute)

Singapore Singapore Institute of Standards and Industrial Research

South Africa (SABS) South African Bureau of Standards

Spain (IRANOR) Instituto Nacional de Racionalización y Normalización

Sweden (SEK) Svenska Elektriska Kommissionen (Swedish Electrotechnical Commission)

Switzerland (SEV) Schweizerischer Elektrotechnischer Verein Postfach

Turkey (TSE) Turk Standardlari Enstitusu (Turkish Standards Institution)

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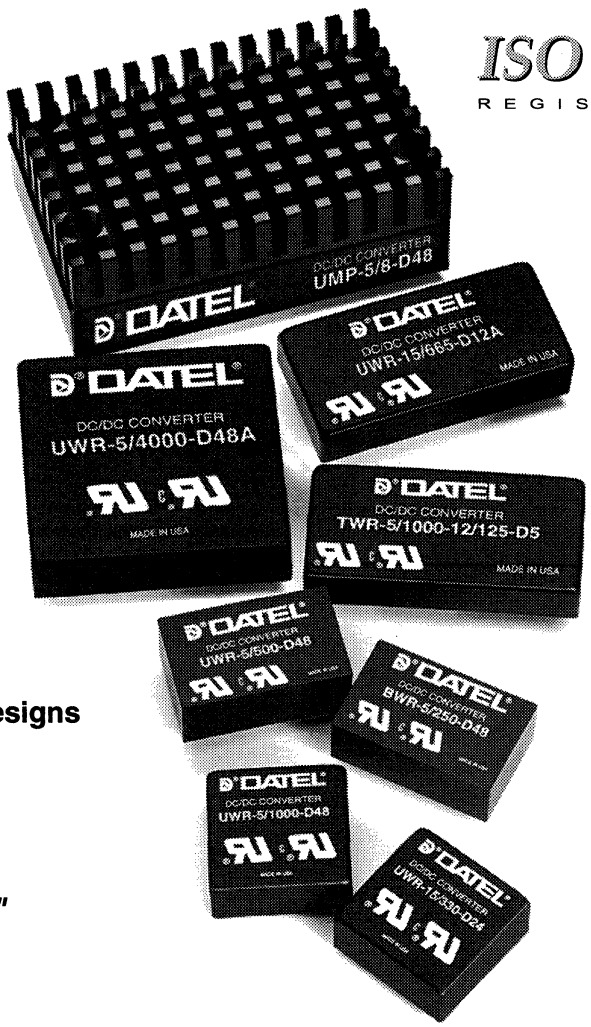

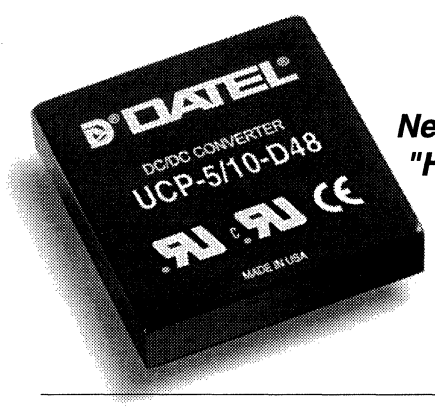

New 50/60W "Half-Bricks"

IEC950
EN60950

FCC

Custom Designs:

DATEL invites inquiries for virtually any large-volume, non-standard product. We fully appreciate that common systems designs often require uncommon power supplies. DATEL has developed a large library of modified-standard and custom designs. We may already have what you need. If we don't, we'll do our best to satisfy your needs, in your time frame, and at your price.

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2.5V SINGLE OUTPUT, NON-ISOLATED

Output Current (Amps, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Regulation Line (Max.)	Regulation Load (Max.)	Ripple/ Noise ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
2	5 (4.75-5.5)	1 x 1 x 0.45	C7, P9	±0.4%	±0.5%	30	83%	UNR-2.5/2-D5	UNR, 5W
8	5 (4.75-5.5)	2 x 1 x 0.385	C5A, P9	±0.1%	±0.5%	40	86%	UNR-2.5/8-D5	UNR, 20/25W
	12 (10.4-13.6)	2 x 1 x 0.385	C5A, P9	±0.1%	±0.5%	60	85%	UNR-2.5/8-D12	UNR, 20/25W
10	5 (4.75-5.5)	2 x 1 x 0.385	C5A, P9	±0.1%	±0.5%	40	85%	UNR-2.5/10-D5	UNR, 20/25W
	12 (10.4-13.6)	2 x 1 x 0.385	C5A, P9	±0.1%	±0.5%	60	83%	UNR-2.5/10-D12	UNR, 20/25W
12	5 (4.75-5.5)	2 x 1 x 0.45	④	±0.25%	±0.5%	50	86%	UNR-2.5/12-D5 ⑤	UNR, 30W
20	5 (4.75-5.5)	2 x 2 x 0.45	④	±0.25%	±0..5%	50	84%	UNR-2.5/20-D5 ⑤	UNR, 50W

3.3V SINGLE OUTPUT, NON-ISOLATED

3	5 (4.75-5.5)	1 x 1 x 0.45	C7, P9	±0.4%	±0.5%	30	86%	UNR-3.3/3-D5	UNR, 10W
	7.5 (4.75-13.6)	2 x 0.4 x 0.8	B1, P18	±0.5%	±1.5%	50	90% ⑥	UNS-3.3/3-D5	UNS, 10/15W
	7.5 (4.75-13.6)	2 x 0.8 x 0.4	B2, P18	±0.5%	±1.5%	50	90% ⑥	UNS-3.3/3-D5D	UNS, 10/15W
	12 (10.4-13.6)	1 x 1 x 0.45	C7, P9	±0.25%	±0.5%	90	87%	UNR-3.3/3-D12	UNR, 10W
8	5 (4.75-5.5)	2 x 1 x 0.385	C5A, P9	±0.1%	±0.5%	40	88%	UNR-3.3/8-D5	UNR, 26/33W
	12 (10.4-13.6)	2 x 1 x 0.385	C5A, P9	±0.1%	±0.5%	60	86%	UNR-3.3/8-D12	UNR, 26/33W
10	5 (4.75-5.5)	2 x 1 x 0.385	C5A, P9	±0.1%	±0.5%	40	86%	UNR-3.3/10-D5	UNR, 26/33W
	12 (10.4-13.6)	2 x 1 x 0.385	C5A, P9	±0.1%	±0.5%	60	85%	UNR-3.3/10-D12	UNR, 26/33W
12	5 (4.75-5.5)	2 x 1 x 0.45	④	±0.25%	±0.5%	50	87%	UNR-3.3/12-D5 ⑤	UNR, 40/50W
15	5 (4.75-5.5)	2 x 2 x 0.45	④	±0.25%	±0.5%	50	85%	UNR-3.3/15-D5 ⑤	UNR, 40/50W

5V SINGLE OUTPUT, NON-ISOLATED

3	12 (6-16.5)	2 x 0.4 x 0.8	B1, P18	±0.5%	±1.5%	50	92% ⑥	UNS-5/3-D12	UNS, 10/15W
	12 (6-16.5)	2 x 0.8 x 0.4	B2, P18	±0.5%	±1.5%	50	92% ⑥	UNS-5/3-D12D	UNS, 10/15W
5 ⑦	12 (10.4-13.6)	2 x 1 x 0.5	④	±0.25%	±0.5%	60	87%	UNR-5/5-D12	UNR, 25W

Listed specifications are typical at T_A = +25°C under nominal line voltage and full-load conditions, unless noted.
① See the last page in DATEL's DC/DC Converter section for mechanical specifications and pinouts.
② Ripple/Noise is specified over a 20MHz bandwidth.
③ See page 4 in DATEL's DC/DC Converter section for information on retrieving DATEL data sheets.
④ Contact DATEL for detailed package and pinout information.
⑤ Listed specifications for these products are preliminary. Contact DATEL or vistit our web site for the latest technical information.
⑥ Listed specification is a typical.
⑦ Output voltage is user adjustable from 3.3 to 6V.

3.3V SINGLE OUTPUT, ISOLATED

Output Current (Amps, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Regulation Line (Max.)	Regulation Load (Max.)	Ripple/ Noise ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
3.65	24 (9-36)	2 x 2 x 0.5	C4, P6	±1.0%	±1.0%	75 ④	77%	UER-3.3/3650-D12	UER, 12-15W
	48 (18-72)	2 x 2 x 0.5	C4, P6	±1.0%	±1.0%	75 ④	77%	UER-3.3/3650-D48	UER, 12-15W
4.25	5 (4.7-7.5)	2 x 2 x 0.45	C4, P6	±1.0%	±1.0%	50	76%	UWR-3.3/4250-D5A	A-Series, 14-20W
4.85	24 (9-36)	2 x 2 x 0.45	C4, P6	±0.5%	±1.0%	40	77%	UWR-3.3/4850-D12A	A-Series, 14-20W
	24 (9-36)	2 x 2 x 0.45	C8, P6	±0.5%	±1.0%	75 ④	77%	UHR-3.3/4850-D12	UHR, 16-20W
	48 (18-72)	2 x 2 x 0.45	C4, P6	±1.0%	±1.0%	40	79%	UWR-3.3/4850-D48A	A-Series, 14-20W
	48 (18-72)	2 x 2 x 0.45	C8, P6	±1.0%	±1.0%	100 ④	78%	UHR-3.3/4850-D48	UHR, 16-20W
15	24 (18-36)	2.4 x 2.3 x 0.5	C12, P17	±0.4%	±1.0%	75	81%	UCP-3.3/15-D24	UCP, 50/60W
	48 (36-75)	2.4 x 2.3 x 0.5	C12, P17	±0.4%	±1.0%	75	81%	UCP-3.3/15-D48	UCP, 50/60W

Listed specifications are typical at T_A = +25°C under nominal line voltage and full-load conditions unless noted.
① See page D•1963 in DATEL's DC/DC Converter section for mechanical specifications and pinouts.
② Ripple/Noise is specified over a 20MHz bandwidth.
③ See page D•1958 in DATEL's DC/DC Converter section for information on retrieving DATEL data sheets.
④ Listed specifications is a maximum.

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5V SINGLE OUTPUT, ISOLATED

Output Current (Amps, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Regulation Line (Max.)	Regulation Load (Max.)	Ripple/ Noise ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
0.5	5 (4.5-9)	1.25 x 0.8 x 0.45	C1, P1	±0.2%	±0.5%	120 ④	70%	UWR-5/500-D5	UWR, 3W
	5 (4.5-9)	1.25 x 0.8 x 0.45	C1A, P19	±0.2%	±0.5%	120 ④	70%	UWP-5/500-D5	UWP, 3W
	12 (9-18)	1.25 x 0.8 x 0.45	C1, P1	±0.2%	±0.5%	120 ④	70%	UWR-5/500-D12	UWR, 3W
	12 (9-18)	1.25 x 0.8 x 0.45	C1A, P19	±0.2%	±0.5%	120 ④	70%	UWP-5/500-D12	UWP, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1, P1	±0.2%	±0.5%	120 ④	75%	UWR-5/500-D48	UWR, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1A, P19	±0.2%	±0.5%	120 ④	75%	UWP-5/500-D48	UWP, 3W
1	24 (18-36)	1 x 1 x 0.45	C7, P3	±2.0%	±2.0%	120 ④	75%	UWR-5/1000-D24	UWR, 5W
	48 (36-72)	1 x 1 x 0.45	C7, P3	±2.0%	±2.0%	120 ④	75%	UWR-5/1000-D48	UWR, 5W
1.6	5 (4.7-7.25)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	50	74%	UWR-5/1600-D5A	A-Series, 6-10W
1.8	48 (18-72)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	75	77%	UWR-5/1800-D48A	A-Series, 6-10W
2	12 (9-18)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	50	79.5%	UWR-5/2000-D12A	A-Series, 6-10W
	24 (18-36)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	50	83%	UWR-5/2000-D24E	A-Series, 6-10W
	48 (36-72)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	50	82%	UWR-5/2000-D48E	A-Series, 6-10W
3	5 (4.7-7.5)	2 x 2 x 0.45	C4, P6	±1.0%	±1.0%	50	78%	UWR-5/3000-D5A	A-Series, 14-20W
	12 (9-18)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	75	81%	UWR-5/3000-D12A ⑤	A-Series, 15W
	24 (9-36)	2 x 2 x 0.5	C4, P6	±1.0%	±1.0%	100 ④	80%	UER-5/3000-D12	UER, 12-15W
	24 (18-36)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	75	81%	UWR-5/3000-D24A ⑤	A-Series, 15W
	48 (18-72)	2 x 2 x 0.5	C4, P6	±1.0%	±1.0%	100 ④	80%	UER-5/3000-D48	UER, 12-15W
	48 (36-72)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	75	81%	UWR-5/3000-D48A ⑤	A-Series, 15W
4	24 (9-36)	2 x 2 x 0.45	C4, P6	±0.3%	±0.5%	30	81%	UWR-5/4000-D12A	A-Series, 14-20W
	24 (9-36)	2 x 2 x 0.45	C8, P6	±0.3%	±0.5%	100 ④	79%	UHR-5/4000-D12	UHR, 16-20W
	48 (18-72)	2 x 2 x 0.45	C4, P6	±0.3%	±0.5%	35	82%	UWR-5/4000-D48A	A-Series, 14-20W
	48 (36-72)	2 x 2 x 0.45	C4, P6	±0.3%	±0.5%	50	84%	UWR-5/4000-D48E	A-Series, 14-20W
	48 (18-72)	2 x 2 x 0.45	C8, P6	±0.3%	±0.5%	100 ④	80%	UHR-5/4000-D48	UHR, 16-20W
5	24 (10-36)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	75	77%	UMP-5/5-Q12	UMP, 25-40W
	24 (10-36)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	75	77%	UPB-5/5-Q12	UPB, 25-40W
6	48 (18-75)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	75	79%	UMP-5/6-Q48	UMP, 25-40W
	48 (18-72)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	75	79%	UPB-5/6-Q48	UPB, 25-40W
7	24 (18-36)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	75	82%	UMP-5/7-D24	UMP, 25-40W
	24 (18-36)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	75	82%	UPB-5/7-D24	UPB, 25-40W
8	48 (36-75)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	75	82%	UMP-5/8-D48	UMP, 25-40W
	48 (36-72)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	75	82%	UPB-5/8-D48	UPB, 25-40W
12	24 (18-36)	2.4 x 2.3 x 0.5	C12, P17	±0.5%	±1.0%	75	84%	UCP-5/12-D24	UCP, 50/60W
	48 (36-75)	2.4 x 2.3 x 0.5	C12, P17	±0.5%	±1.0%	75	84%	UCP-5/12-D48	UCP, 50/60W

5.2V SINGLE OUTPUT, ISOLATED

1.5	5 (4.7-7.25)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	50	74%	UWR-5.2/1500-D5A	A-Series, 6-10W
3	5 (4.7-7.5)	2 x 2 x 0.45	C4, P6	±1.0%	±1.0%	50	79%	UWR-5.2/3000-D5A	A-Series, 14-20W

12V SINGLE OUTPUT, ISOLATED

0.25	5 (4.5-9)	1.25 x 0.8 x 0.45	C1, P1	±0.5%	±0.5%	150 ④	72%	UWR-12/250-D5	UWR, 3W
	5 (4.5-9)	1.25 x 0.8 x 0.45	C1A, P19	±0.5%	±0.5%	150 ④	72%	UWP-12/250-D5	UWP, 3W
	12 (9-18)	1.25 x 0.8 x 0.45	C1, P1	±0.5%	±0.5%	150 ④	72%	UWR-12/250-D12	UWR, 3W
	12 (9-18)	1.25 x 0.8 x 0.45	C1A, P19	±0.5%	±0.5%	150 ④	72%	UWP-12/250-D12	UWP, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1, P1	±0.5%	±0.5%	150 ④	76%	UWR-12/250-D48	UWR, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1A, P19	±0.5%	±0.5%	150 ④	76%	UWP-12/250-D48	UWP, 3W

Listed specifications are typical at T_A = +25°C under nominal line voltage and full-load conditions unless noted.
① See page D•1963 in DATEL's DC/DC Converter section for mechanical specifications and pinouts.
② Ripple/Noise is specified over a 20MHz bandwidth.
③ See page D•1958 in DATEL's DC/DC Converter section for information on retrieving DATEL data sheets.
④ Listed specifications is a maximum.
⑤ Listed specifications for these products are preliminary.

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12V SINGLE OUTPUT, ISOLATED (Continued)

Output Current (Amps, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Regulation Line (Max.)	Regulation Load (Max.)	Ripple/ Noise ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
0.42	24 (18-36)	1 x 1 x 0.45	C7, P3	±2.0%	±2.0%	150 ④	80%	UWR-12/420-D24	UWR, 5W
	48 (36-72)	1 x 1 x 0.45	C7, P3	±2.0%	±2.0%	150 ④	80%	UWR-12/420-D48	UWR, 5W
0.665	5 (4.7-7.25)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	75	75%	UWR-12/665-D5A	A-Series, 6-10W
0.75	48 (18-72)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	75	80%	UWR-12/750-D48A	A-Series, 6-10W
0.83	12 (9-18)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	75	81%	UWR-12/830-D12A	A-Series, 6-10W
1.25	5 (4.7-7.5)	2 x 2 x 0.45	C4, P6	±1.0%	±1.0%	75	80%	UWR-12/1250-D5A	A-Series, 14-20W
	12 (9-18)	2 x 1 x 0.375	C2, P11	±0.3%	±0.5%	75	81%	UWR-12/1250-D12A ⑤	A-Series, 15W
	24 (9-36)	2 x 2 x 0.5	C4, P6	±1.0%	±1.0%	100 ④	82%	UER-12/1250-D12	UER, 12-15W
	24 (18-36)	2 x 1 x 0.375	C2, P11	±0.3%	±0.5%	75	81%	UWR-12/1250-D24A ⑤	A-Series, 15W
	48 (18-72)	2 x 2 x 0.5	C4, P6	±1.0%	±1.0%	100 ④	82%	UER-12/1250-D48	UER, 12-15W
	48 (36-72)	2 x 1 x 0.375	C2, P11	±0.3%	±0.5%	75	81%	UWR-12/1250-D48A ⑤	A-Series, 15W
1.65	24 (9-36)	2 x 2 x 0.45	C4, P6	±0.3%	±0.5%	40	82%	UWR-12/1650-D12A	A-Series, 14-20W
	24 (9-36)	2 x 2 x 0.45	C8, P6	±0.3%	±0.5%	100 ④	81%	UHR-12/1650-D12	UHR, 16-20W
	48 (18-72)	2 x 2 x 0.45	C4, P6	±0.3%	±0.5%	50	82.5%	UWR-12/1650-D48A	A-Series, 14-20W
	48 (18-72)	2 x 2 x 0.45	C8, P6	±0.3%	±0.5%	100 ④	81%	UHR-12/1650-D48	UHR, 16-20W
2.1	24 (10-36)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	100	80%	UMP-12/2.1-Q12	UMP, 25-40W
	24 (10-36)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	100	80%	UPB-12/2.1-Q12	UPB, 25-40W
2.5	48 (18-75)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	100	82%	UMP-12/2.5-Q48	UMP, 25-40W
	48 (18-72)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	100	82%	UPB-12/2.5-Q48	UPB, 25-40W
3	24 (18-36)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	100	82%	UMP-12/3-D24	UMP, 25-40W
	24 (18-36)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	100	82%	UPB-12/3-D24	UPB, 25-40W
3.3	48 (36-75)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	100	83%	UMP-12/3.3-D48	UMP, 25-40W
	48 (36-72)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	100	83%	UPB-12/3.3-D48	UPB, 25-40W
5	24 (18-36)	2.4 x 2.3 x 0.5	C12, P17	±0.5%	±1.0%	75	84%	UCP-12/5-D24	UCP, 50/60W
	48 (36-75)	2.4 x 2.3 x 0.5	C12, P17	±0.5%	±1.0%	75	85.5%	UCP-12/5-D48	UCP, 50/60W

15V SINGLE OUTPUT, ISOLATED

0.2	5 (4.5-9)	1.25 x 0.8 x 0.45	C1, P1	±0.5%	±0.5%	150 ④	72%	UWR-15/200-D5	UWR, 3W
	5 (4.5-9)	1.25 x 0.8 x 0.45	C1A, P19	±0.5%	±0.5%	150 ④	72%	UWP-15/200-D5	UWP, 3W
	12 (9-18)	1.25 x 0.8 x 0.45	C1, P1	±0.5%	±0.5%	150 ④	72%	UWR-15/200-D12	UWR, 3W
	12 (9-18)	1.25 x 0.8 x 0.45	C1A, P19	±0.5%	±0.5%	150 ④	72%	UWP-15/200-D12	UWP, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1, P1	±0.5%	±0.5%	150 ④	76%	UWR-15/200-D48	UWR, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1A, P19	±0.5%	±0.5%	150 ④	76%	UWP-15/200-D48	UWP, 3W
0.335	24 (18-36)	1 x 1 x 0.45	C7, P3	±2.0%	±2.0%	150 ④	80%	UWR-15/335-D24	UWR, 5W
	48 (36-72)	1 x 1 x 0.45	C7, P3	±2.0%	±2.0%	150 ④	80%	UWR-15/335-D48	UWR, 5W
0.53	5 (4.7-7.25)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	50	75%	UWR-15/530-D5A	A-Series, 6-10W
0.6	48 (18-72)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	75	81.5%	UWR-15/600-D48A	A-Series, 6-10W
0.665	12 (9-18)	2 x 1 x 0.375	C2, P11	±0.2%	±0.5%	75	82%	UWR-15/665-D12A	A-Series, 6-10W
1	5 (4.7-7.5)	2 x 2 x 0.45	C4, P6	±1.0%	±1.0%	75	80%	UWR-15/1000-D5A	A-Series, 14-20W
	12 (9-18)	2 x 1 x 0.375	C2, P11	±0.3%	±0.5%	75	81%	UWR-15/1000-D12A ⑤	A-Series, 15W
	24 (9-36)	2 x 2 x 0.5	C4, P6	±1.0%	±1.0%	100 ④	82%	UER-15/1000-D12	UER, 12-15W
	24 (18-36)	2 x 1 x 0.375	C2, P11	±0.3%	±0.5%	75	81%	UWR-15/1000-D24A ⑤	A-Series, 15W
	48 (18-72)	2 x 2 x 0.5	C4, P6	±1.0%	±1.0%	100 ④	82%	UER-15/1000-D48	UER, 12-15W
	48 (36-72)	2 x 1 x 0.375	C2, P11	±0.3%	±0.5%	75	81%	UWR-15/1000-D48A ⑤	A-Series, 15W

Listed specifications are typical at T_A = +25°C under nominal line voltage and full-load conditions unless noted.
① See page D•1963 in DATEL's DC/DC Converter section for mechanical specifications and pinouts.
② Ripple/Noise is specified over a 20MHz bandwidth.
③ See page D•1958 in DATEL's DC/DC Converter section for information on retrieving DATEL data sheets.
④ Listed specifications is a maximum.
⑤ Listed specifications for these products are preliminary.

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15V SINGLE OUTPUT, ISOLATED (Continued)

Output Current (Amps, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Regulation Line (Max.)	Regulation Load (Max.)	Ripple/ Noise ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
1.3	24 (9-36)	2 x 2 x 0.45	C4, P6	±0.3%	±0.5%	40	82%	UWR-15/1300-D12A	A-Series, 14-20W
	24 (9-36)	2 x 2 x 0.45	C8, P6	±0.3%	±0.5%	100 ④	82%	UHR-15/1300-D12	UHR, 16-20W
	48 (18-72)	2 x 2 x 0.45	C4, P6	±0.3%	±0.5%	50	83%	UWR-15/1300-D48A	A-Series, 14-20W
	48 (18-72)	2 x 2 x 0.45	C8, P6	±0.3%	±0.5%	100 ④	82%	UHR-15/1300-D48	UHR, 16-20W
1.7	24 (10-36)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	100	80%	UMP-15/1.7-Q12	UMP, 25-40W
	24 (10-36)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	100	80%	UPB-15/1.7-Q12	UPB, 25-40W
2	48 (18-75)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	100	82%	UMP-15/2-Q48	UMP, 25-40W
	48 (18-72)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	100	82%	UPB-15/2-Q48	UPB, 25-40W
2.5	24 (18-36)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	100	83%	UMP-15/2.5-D24	UMP, 25-40W
	24 (18-36)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	100	83%	UPB-15/2.5-D24	UPB, 25-40W
2.65	48 (36-75)	3 x 2 x 0.5	C11, P14	±0.5%	±1.0%	100	83%	UMP-15/2.65-D48	UMP, 25-40W
	48 (36-72)	3 x 2 x 0.5	C10, P14	±0.5%	±1.0%	100	83%	UPB-15/2.65-D48	UPB, 25-40W
4	24 (18-36)	2.4 x 2.3 x 0.5	C12, P17	±0.5%	±1.0%	100	84%	UCP-15/4-D24	UCP, 50/60W
	48 (36-75)	2.4 x 2.3 x 0.5	C12, P17	±0.5%	±1.0%	100	84.5%	UCP-15/4-D48	UCP, 50/60W

+5V/+3.3V DUAL OUTPUT, ISOLATED

Output Currents (Amps, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Regulation Line (Max.)	Regulation Load (Max.)	Ripple/ Noise ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
4/3	48 (36-75)	3 x 2 x 0.5	C10 ⑤	±1.0/±1.0%	±1.0/±1.0%	75/100	80%	BMP-5/4-3.3/3-D48	Contact DATEL

±5V DUAL OUTPUT, ISOLATED

±0.25	12 (9-18)	1.25 x 0.8 x 0.45	C1, P2	±0.5%	±1.0%	120 ④	75%	BWR-5/250-D12	BWR, 3W
	12 (9-18)	1.25 x 0.8 x 0.45	C1A, P20	±0.5%	±1.0%	120 ④	75%	BWP-5/250-D12	BWP, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1, P2	±0.5%	±1.0%	120 ④	75%	BWR-5/250-D48	BWR, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1A, P20	±0.5%	±1.0%	120 ④	75%	BWP-5/250-D48	BWP, 3W
±0.5	24 (18-36)	1 x 1 x 0.45	C7, P4	±2.0%	±2.0%	150 ④	75%	BWR-5/500-D24	BWR, 5W
	48 (36-72)	1 x 1 x 0.45	C7, P4	±2.0%	±2.0%	120 ④	75%	BWR-5/500-D48	BWR, 5W
±0.7	5 (4.7-7.25)	2 x 1 x 0.375	C2, P12	±0.3%	±1.0%	50	76%	BWR-5/700-D5A	A-Series, 7-10W
	48 (18-72)	2 x 1 x 0.375	C2, P12	±0.3%	±1.0%	50	79%	BWR-5/700-D48A	A-Series, 7-10W
±0.9	12 (9-18)	2 x 1 x 0.375	C2, P12	±0.3%	±1.0%	75	81%	BWR-5/900-D12A	A-Series, 7-10W
±1.5	5 (4.7-7.5)	2 x 2 x 0.45	C4, P7	±0.3%	±0.5%	75	78%	BWR-5/1500-D5A	A-Series, 15-20W
	24 (9-36)	2 x 2 x 0.5	C4, P7	±0.5%	±1.0%	100 ④	80%	BER-5/1500-D12	BER, 15W
	48 (18-72)	2 x 2 x 0.5	C4, P7	±0.5%	±1.0%	100 ④	80%	BER-5/1500-D48	BER, 15W
±1.7	24 (9-36)	2 x 2 x 0.45	C4, P7	±0.6%	±1.0%	75	80.5%	BWR-5/1700-D12A	A-Series, 15-20W
	48 (18-72)	2 x 2 x 0.45	C4, P7	±0.3%	±0.5%	75	81%	BWR-5/1700-D48A	A-Series, 15-20W
±4	24 (10-36)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	60	82%	BMP-5/4-Q12 ⑥	BMP, 25-40W
	24 (10-36)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	60	82%	BPB-5/4-Q12 ⑥	BPB, 25-40W
	24 (18-36)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	100	84%	BMP-5/4-D24 ⑥	BMP, 25-40W
	24 (18-36)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	100	84%	BPB-5/4-D24 ⑥	BPB, 25-40W
	48 (18-75)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	100	82%	BMP-5/4-Q48 ⑥	BMP, 25-40W
	48 (18-72)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	100	82%	BPB-5/4-Q48 ⑥	BPB, 25-40W
	48 (36-75)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	100	83%	BMP-5/4-D48 ⑥	BMP, 25-40W
	48 (36-72)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	100	83%	BPB-5/4-D48 ⑥	BPB, 25-40W

Listed specifications are typical at T_A = +25°C under nominal line voltage and full-load conditions unless noted.
① See page D•1963 in DATEL's DC/DC Converter section for mechanical specifications and pinouts.
② Ripple/Noise is specified over a 20MHz bandwidth.
③ See page D•1958 in DATEL's DC/DC Converter section for information on retrieving DATEL data sheets.
④ Listed specifications is a maximum.
⑤ Contact DATEL for detailed package and pinout information.
⑥ Q12, Q48, D24 and D48 models are rated at total ouput powers of 25, 30, 35 and 40 Watts, respectively.

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±12V DUAL OUTPUT, ISOLATED

Output Currents (mA, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Regulation Line (Max.)	Regulation Load (Max.)	Ripple/ Noise ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
±105	5 (4.5-9)	1.25 x 0.8 x 0.45	C1, P2	±0.5%	±1.0%	150 ④	70%	BWR-12/105-D5	BWR, 3W
	5 (4.5-9)	1.25 x 0.8 x 0.45	C1A, P20	±0.5%	±1.0%	150 ④	70%	BWP-12/105-D5	BWP, 3W
±125	12 (9-18)	1.25 x 0.8 x 0.45	C1, P2	±0.5%	±1.0%	150 ④	73%	BWR-12/125-D12	BWR, 3W
	12 (9-18)	1.25 x 0.8 x 0.45	C1A, P20	±0.5%	±1.0%	150 ④	73%	BWP-12/125-D12	BWP, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1, P2	±0.5%	±1.0%	150 ④	78%	BWR-12/125-D48	BWR, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1A, P20	±0.5%	±1.0%	150 ④	78%	BWP-12/125-D48	BWP, 3W
±210	24 (18-36)	1 x 1 x 0.45	C7, P4	±2.0%	±2.0%	150 ④	80%	BWR-12/210-D24	BWR, 5W
	48 (36-72)	1 x 1 x 0.45	C7, P4	±2.0%	±2.0%	150 ④	80%	BWR-12/210-D48	BWR, 5W
±335	5 (4.7-7.25)	2 x 1 x 0.375	C2, P12	±0.3%	±1.0%	75	76%	BWR-12/335-D5A	A-Series, 7-10W
±415	12 (9-18)	2 x 1 x 0.375	C2, P12	±0.3%	±1.0%	100	83%	BWR-12/415-D12A	A-Series, 7-10W
	48 (18-72)	2 x 1 x 0.375	C2, P12	±0.3%	±1.0%	75	80.5%	BWR-12/415-D48A	A-Series, 7-10W
±625	5 (4.7-7.5)	2 x 2 x 0.45	C4, P7	±0.3%	±0.5%	75	79%	BWR-12/625-D5A	A-Series, 15-20W
	24 (9-36)	2 x 2 x 0.5	C4, P7	±0.5%	±1.0%	100 ④	81%	BER-12/625-D12	BER, 15W
	48 (18-72)	2 x 2 x 0.5	C4, P7	±0.5%	±1.0%	100 ④	81%	BER-12/625-D48	BER, 15W
±830	24 (9-36)	2 x 2 x 0.45	C4, P7	±0.3%	±0.5%	75	81.5%	BWR-12/830-D12A	A-Series, 15-20W
	48 (18-72)	2 x 2 x 0.45	C4, P7	±0.4%	±0.5%	75	81%	BWR-12/830-D48A	A-Series, 15-20W
±1650	24 (10-36)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	60	83%	BMP-12/1.65-Q12 ⑥	BMP, 25-40W
	24 (10-36)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	60	83%	BPB-12/1.65-Q12 ⑥	BPB, 25-40W
	24 (18-36)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	100	85%	BMP-12/1.65-D24 ⑥	BMP, 25-40W
	24 (18-36)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	100	85%	BPB-12/1.65-D24 ⑥	BPB, 25-40W
	48 (18-75)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	75	84%	BMP-12/1.65-Q48 ⑥	BMP, 25-40W
	48 (18-72)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	75	84%	BPB-12/1.65-Q48 ⑥	BPB, 25-40W
	48 (36-75)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	75	85%	BMP-12/1.65-D48 ⑥	BMP, 25-40W
	48 (36-72)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	75	85%	BPB-12/1.65-D48 ⑥	BPB, 25-40W

±15V DUAL OUTPUT, ISOLATED

Output Currents (mA, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Regulation Line (Max.)	Regulation Load (Max.)	Ripple/ Noise ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
±85	5 (4.5-9)	1.25 x 0.8 x 0.45	C1, P2	±0.5%	±0.5%	150 ④	70%	BWR-15/85-D5	BWR, 3W
	5 (4.5-9)	1.25 x 0.8 x 0.45	C1A, P20	±0.5%	±0.5%	150 ④	70%	BWP-15/85-D5	BWP, 3W
±100	12 (9-18)	1.25 x 0.8 x 0.45	C1, P2	±0.5%	±1.0%	150 ④	73%	BWR-15/100-D12	BWR, 3W
	12 (9-18)	1.25 x 0.8 x 0.45	C1A, P20	±0.5%	±1.0%	150 ④	73%	BWP-15/100-D12	BWP, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1, P2	±0.5%	±1.0%	150 ④	80%	BWR-15/100-D48	BWR, 3W
	48 (18-72)	1.25 x 0.8 x 0.45	C1A, P20	±0.5%	±1.0%	150 ④	80%	BWP-15/100-D48	BWP, 3W
±165	24 (18-36)	1 x 1 x 0.45	C7, P4	±2.0%	±2.0%	150 ④	80%	BWR-15/165-D24	BWR, 5W
	48 (36-72)	1 x 1 x 0.45	C7, P4	±2.0%	±2.0%	150 ④	80%	BWR-15/165-D48	BWR, 5W
±275	5 (4.7-7.25)	2 x 1 x 0.375	C2, P12	±0.3%	±1.0%	75	75%	BWR-15/275-D5A	A-Series, 7-10W
±330	12 (9-18)	2 x 1 x 0.375	C2, P12	±0.3%	±1.0%	75	83%	BWR-15/330-D12A	A-Series, 7-10W
	48 (18-72)	2 x 1 x 0.375	C2, P12	±0.3%	±1.0%	75	81.5%	BWR-15/330-D48A	A-Series, 7-10W
±500	5 (4.7-7.5)	2 x 2 x 0.45	C4, P7	±0.3%	±0.5%	75	80%	BWR-15/500-D5A	A-Series, 15-20W
	24 (9-36)	2 x 2 x 0.5	C4, P7	±0.5%	±1.0%	100 ④	81%	BER-15/500-D12	BER, 15W
	48 (18-72)	2 x 2 x 0.5	C4, P7	±0.5%	±1.0%	100 ④	81%	BER-15/500-D48	BER, 15W
±670	24 (9-36)	2 x 2 x 0.45	C4, P7	±0.3%	±0.5%	75	82%	BWR-15/670-D12A	A-Series, 15-20W
	48 (18-72)	2 x 2 x 0.45	C4, P7	±0.3%	±0.5%	75	82%	BWR-15/670-D48A	A-Series, 15-20W
±1300	24 (10-36)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	100	83%	BMP-15/1.3-Q12 ⑥	BMP, 25-40W
	24 (10-36)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	100	83%	BPB-15/1.3-Q12 ⑥	BPB, 25-40W
	24 (18-36)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	60	85%	BMP-15/1.3-D24 ⑥	BMP, 25-40W
	24 (18-36)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	60	85%	BPB-15/1.3-D24 ⑥	BPB, 25-40W
	48 (18-75)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	100	83%	BMP-15/1.3-Q48 ⑥	BMP, 25-40W
	48 (18-72)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	100	83%	BPB-15/1.3-Q48 ⑥	BPB, 25-40W
	48 (36-75)	3 x 2 x 0.5	C11, P15	±0.5%	±1.0%	60	84%	BMP-15/1.3-D48 ⑥	BMP, 25-40W
	48 (36-72)	3 x 2 x 0.5	C10, P15	±0.5%	±1.0%	60	84%	BPB-15/1.3-D48 ⑥	BPB, 25-40W

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+5/±12V TRIPLE OUTPUT, ISOLATED

Primary +5V Output Current (Amps, Max.)	Auxiliary ±12V Output Currents (mA, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Primary Output R/N ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
1	±125	5 (4.7-7)	2 x 1 x 0.375	C3, P5	75	74%	TWR-5/1000-12/125-D5A	A-Series, 8-11W
	±210	12 (9-18)	2 x 1 x 0.375	C3, P5	75	80.5%	TWR-5/1000-12/210-D12A	A-Series, 8-11W
	±210	24 (18-36)	2 x 1 x 0.375	C3, P5	75	82%	TWR-5/1000-12/210-D24A	A-Series, 8-11W
	±210	48 (36-72)	2 x 1 x 0.375	C3, P5	75	82%	TWR-5/1000-12/210-D48A	A-Series, 8-11W
1.2	±250	48 (18-72)	2 x 2 x 0.45	C4, P8	50	79%	TWR-5/1200-12/250-D48A	A-Series, 12-15W
1.5	±250	48 (18-72)	2 x 2 x 0.45	C4, P8	50	78%	TWR-5/1500-12/250-D48A	A-Series, 12-15W
1.8	±200	48 (18-72)	2 x 2 x 0.45	C4, P8	50	79%	TWR-5/1800-12/200-D48A	A-Series, 12-15W
3	±500	24 (9-36)	2 x 2 x 0.45	C4, P13	50	81%	TWR-5/3000-12/500-D12A	A-Series, 20W
	±500	48 (18-72)	2 x 2 x 0.45	C4, P13	50	82%	TWR-5/3000-12/500-D48A	A-Series, 20W
5	±1000	24 (10-36)	3 x 2 x 0.5	C11, P16	75	82%	TMP-5/5-12/1-Q12 ④	TMP, 25-40W
	±1000	24 (10-36)	3 x 2 x 0.5	C10, P16	75	81%	TPB-5/5-12/1-Q12 ④	TPB, 25-40W
	±1000	24 (18-36)	3 x 2 x 0.5	C11, P16	75	83%	TMP-5/5-12/1-D24 ④	TMP, 25-40W
	±1000	24 (18-36)	3 x 2 x 0.5	C10, P16	75	82%	TPB-5/5-12/1-D24 ④	TPB, 25-40W
	±1000	48 (18-75)	3 x 2 x 0.5	C11, P16	75	83%	TMP-5/5-12/1-Q48 ④	TMP, 25-40W
	±1000	48 (18-72)	3 x 2 x 0.5	C10, P16	75	82%	TPB-5/5-12/1-Q48 ④	TPB, 25-40W
	±1000	48 (36-75)	3 x 2 x 0.5	C11, P16	75	83%	TMP-5/5-12/1-D48 ④	TMP, 25-40W
	±1000	48 (36-72)	3 x 2 x 0.5	C10, P16	75	83%	TPB-5/5-12/1-D48 ④	TPB, 25-40W

+5/±15V TRIPLE OUTPUT, ISOLATED

Primary +5V Output Current (Amps, Max.)	Auxiliary ±15V Output Currents (mA, Max.)	Input Voltage, Nominal (Range) (Volts)	Package ① Dimensions (Inches)	Package ① Case, Pinout	Primary Output R/N ② (mVp-p)	Efficiency (Min.)	DATEL Model Number	Data Sheet @ www.datel.com ③
0.8	±150	5 (4.7-7)	2 x 1 x 0.375	C3, P5	75	74%	TWR-5/800-15/150-D5A	A-Series, 8-11W
1	±200	12 (9-18)	2 x 1 x 0.375	C3, P5	75	79%	TWR-5/1000-15/200-D12A	A-Series, 8-11W
	±200	24 (18-36)	2 x 1 x 0.375	C3, P5	75	82%	TWR-5/1000-15/200-D24A	A-Series, 8-11W
	±200	48 (36-72)	2 x 1 x 0.375	C3, P5	75	82%	TWR-5/1000-15/200-D48A	A-Series, 8-11W
	±250	48 (18-72)	2 x 2 x 0.45	C4, P8	50	79%	TWR-5/1000-15/250-D48A	A-Series, 12-15W
1.5	±250	48 (18-72)	2 x 2 x 0.45	C4, P8	50	79%	TWR-5/1500-15/250-D48A	A-Series, 12-15W
1.8	±150	48 (18-72)	2 x 2 x 0.45	C4, P8	50	80%	TWR-5/1800-15/150-D48A	A-Series, 12-15W
3	±500	24 (9-36)	2 x 2 x 0.45	C4, P13	50	81%	TWR-5/3000-15/500-D12A	A-Series, 20W
	±500	48 (18-72)	2 x 2 x 0.45	C4, P13	50	81%	TWR-5/3000-15/500-D48A	A-Series, 20W
5	±1000	24 (10-36)	3 x 2 x 0.5	C11, P16	75	82%	TMP-5/5-15/1-Q12 ④	TMP, 25-40W
	±1000	24 (10-36)	3 x 2 x 0.5	C10, P16	75	82%	TPB-5/5-15/1-Q12 ④	TPB, 25-40W
	±1000	24 (18-36)	3 x 2 x 0.5	C11, P16	75	83.5%	TMP-5/5-15/1-D24 ④	TMP, 25-40W
	±1000	24 (18-36)	3 x 2 x 0.5	C10, P16	75	83%	TPB-5/5-15/1-D24 ④	TPB, 25-40W
	±1000	48 (18-75)	3 x 2 x 0.5	C11, P16	75	82%	TMP-5/5-15/1-Q48 ④	TMP, 25-40W
	±1000	48 (18-72)	3 x 2 x 0.5	C10, P16	75	82%	TPB-5/5-15/1-Q48 ④	TPB, 25-40W
	±1000	48 (36-75)	3 x 2 x 0.5	C11, P16	75	83%	TMP-5/5-15/1-D48 ④	TMP, 25-40W
	±1000	48 (36-72)	3 x 2 x 0.5	C10, P16	75	82%	TPB-5/5-15/1-D48 ④	TPB, 25-40W

Listed specifications are typical at T_A = +25°C under nominal line voltage and full-load conditions unless noted.
① See page D•1963 in DATEL's DC/DC Converter section for mechanical specifications and pinouts.
② Ripple/Noise (R/N) is specified over a 20MHz bandwidth.
③ See page D•1958 in DATEL's DC/DC Converter section for information on retrieving DATEL data sheets.
④ Q12, Q48, D24 and D48 models are rated at total ouput powers of 25, 30, 35 and 40 Watts, respectively.

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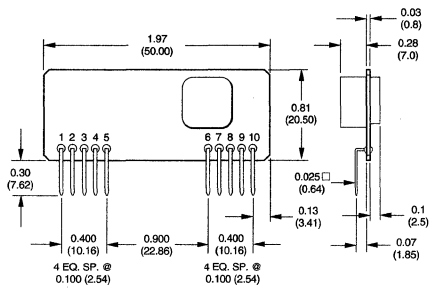
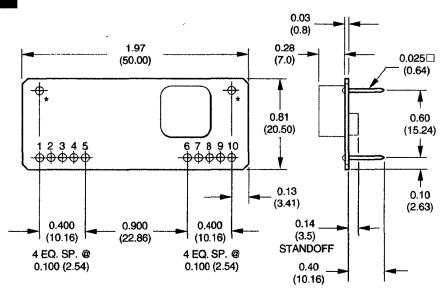
DC/DC CONVERTERS

B1

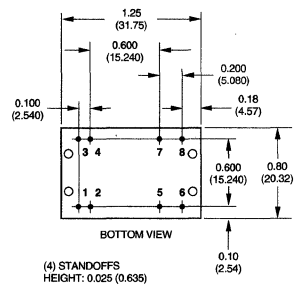


B2



* NO CONNECTION. FOR MECHANICAL STABILITY ONLY.

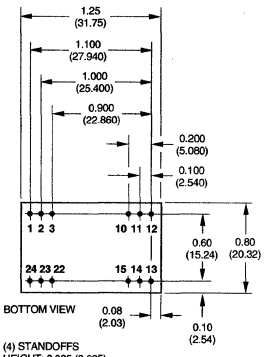
C1



(4) STANDOFFS
HEIGHT: 0.025 (0.635)

PLASTIC CASE, INSULATED BASE
CASE HEIGHT: 0.45 (11.43)
PIN LENGTH: 0.15 MIN (3.81)
PIN DIAMETER: 0.020 ±0.002 (0.508 ±0.051)

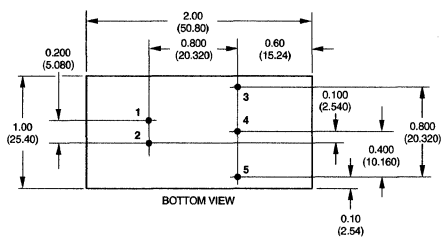
C1A



(4) STANDOFFS
HEIGHT: 0.025 (0.635)

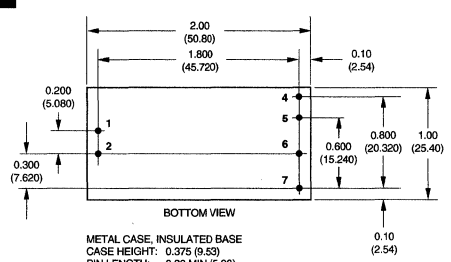
PLASTIC CASE, INSULATED BASE
CASE HEIGHT: 0.45 (11.43)
PIN LENGTH: 0.15 MIN (3.81)
PIN DIAMETER: 0.020 ±0.002 (0.508 ±0.051)

C2



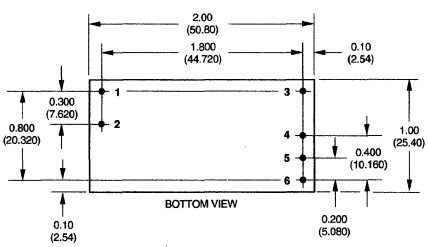
METAL CASE, INSULATED BASE
CASE HEIGHT: 0.375 (9.53)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER: 0.040 ±0.002
(1.016 ±0.051)

C3



METAL CASE, INSULATED BASE
CASE HEIGHT: 0.375 (9.53)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER: 0.040 ±0.002 (1.016 ±0.051)

C5/C5A

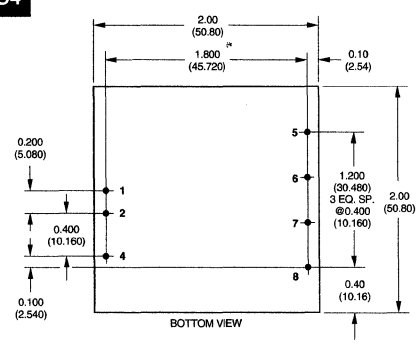


CASE C5
METAL CASE, INSULATED BASE
CASE HEIGHT: 0.45 (11.43)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER: 0.040 ±0.002 (1.016 ±0.051)

CASE C5A
PLASTIC CASE, INSULATED BASE
CASE HEIGHT: 0.385 (9.78)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETERS:

MODELS	UNR-2.5/8-D5	PINS 1-6: 0.040 ±0.002 DIA.
	UNR-2.5/8-D12	(1.016 ±0.051)
	UNR-3.3/8-D5	
	UNR-3.3/8-D12	
MODELS	UNR-2.5/10-D5	PINS 1-2: 0.040 ±0.002 DIA.
	UNR-2.5/10-D12	(1.016 ±0.051)
	UNR-3.3/10-D5	PINS 3-6: 0.060 ±0.002 DIA.
	UNR-3.3/10-D12	(1.524 ±0.051)

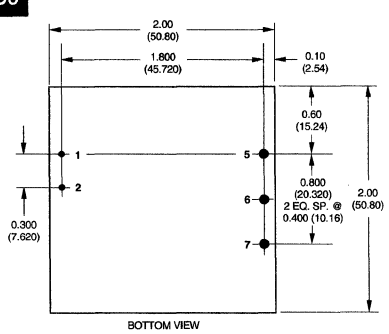
C4



PLASTIC CASE, INSULATED BASE
CASE HEIGHT: 0.50 (12.70)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER: 0.040 ±0.002
(1.016 ±0.051)

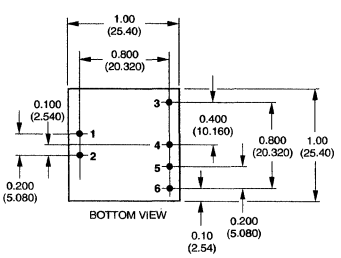
METAL CASE, INSULATED BASE
CASE HEIGHT: 0.45 (11.43)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER: 0.040 ±0.002
(1.016 ±0.051)

C6



METAL CASE, INSULATED BASE
CASE HEIGHT: 0.45 (11.43)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER:
PINS 1-2 0.040 ±0.002 (1.016 ±0.051)
PINS 5-7 0.060 ±0.002 (1.524 ±0.051)

C7



METAL CASE, INSULATED BASE OR
PLASTIC CASE, INSULATED BASE
CASE HEIGHT: 0.45 (11.43)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER: 0.040 ±0.002 (1.016 ±0.051)

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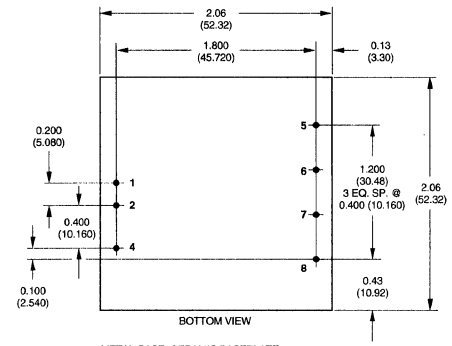
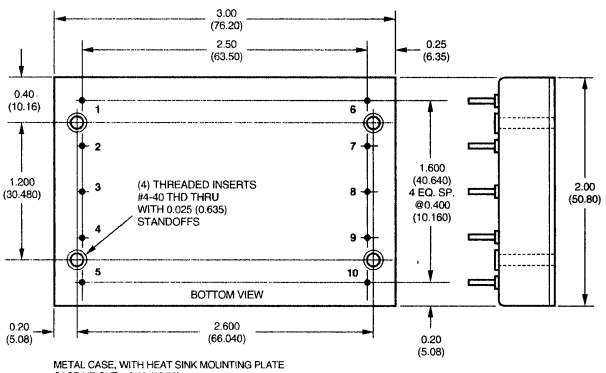
C8



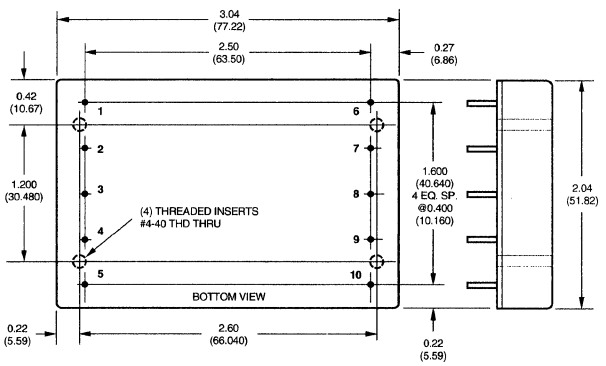
METAL CASE, CERAMIC BASEPLATE
CASE HEIGHT: 0.45 (11.43)
PIN LENGTH: 0.30 (7.62)
PIN DIAMETER: 0.040 ±0.002 (1.016 ±0.051)

C10



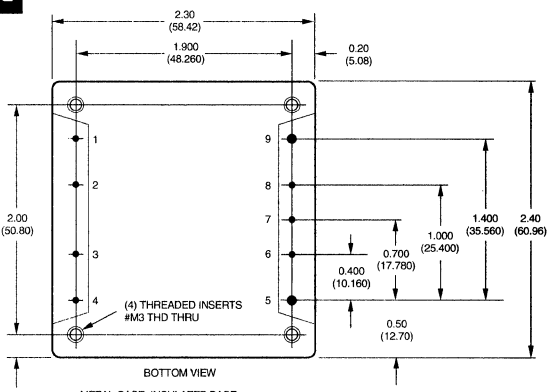
METAL CASE, WITH HEAT SINK MOUNTING PLATE
CASE HEIGHT: 0.50 (12.70)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER: 0.040 ±0.002 (1.016 ±0.051)

C11



METAL CASE, WITH HEAT SINK MOUNTING PLATE
CASE HEIGHT: 0.55 (13.97)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER: 0.040 ±0.002 (1.016 ±0.051)

C12



METAL CASE, INSULATED BASE
CASE HEIGHT: 0.52 (13.21)
PIN LENGTH: 0.20 MIN (5.08)
PIN DIAMETER: PINS 1-4, 6-8 0.040 ±0.002 (1.016 ±0.051)
PINS 5, 9 0.080 ±0.002 (2.032 ±0.051)

I/O CONNECTIONS

Function	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10
P1	+Input	+Input	–Input	–Input	Common	+Output	Common	+Output	No pin	No pin
P2	+Input	+Input	–Input	–Input	Common	+Output	Common	–Output	No pin	No pin
P3	+Input	–Input	+Output	No pin	No pin	Common	No pin	No pin	No pin	No pin
P4	+Input	–Input	+Output	Common	No pin	–Output	No pin	No pin	No pin	No pin
P5	+Input	–Input	No pin	+12/15V Out	–12/15V Out	Common	+5V Out	No pin	No pin	No pin
P6	+Input	–Input	No pin	Control	No pin	+Output	Common	Trim	No pin	No pin
P7	+Input	–Input	No pin	Control	+Output	Common	–Output	Trim	No pin	No pin
P8	+Input	–Input	No pin	No pin	+12/15V Out	+5V Out	Common	–12/15V Out	No pin	No pin
P9	Logic Gnd.	Control	+Output	Output Rtn.	Input Rtn.	+Input	No pin	No pin	No pin	No pin
P10	T.P. (DNC)	N.C.	+Output	Output Rtn.	Input Rtn.	+Input	No pin	No pin	No pin	No pin
P11	+Input	–Input	+Output	No pin	Common	No pin	No pin	No pin	No pin	No pin
P12	+Input	–Input	+Output	Common	–Output	No pin	No pin	No pin	No pin	No pin
P13	+Input	–Input	No pin	Control	+12/15V Out	+5V Out	Common	–12/15V Out	No pin	No pin
P14	No pin	–Input	+Input	Case	Control	No pin	No pin	Common	+Output	Trim
P15	No pin	–Input	+Input	Case	Control	–Output	No pin	Common	+Output	Trim
P16	No pin	–Input	+Input	Case	Control	–12/15V Out	+12/15V Out	Common	+5V Out	Trim
P17	–Input	Case	Control	+Input	+Output	+Sense	Trim	–Sense	–Output	No pin
P18	+Input	+Input	–Input	–Input	Control	Trim	Common	Common	+Output	+Output

Pin	Function P19	Function P20
1	+Input	+Input
2	N.C.	–Output
3	N.C.	Common
10	–Output	Common
11	+Output	+Output
12	–Input	–Input
13	–Input	–Input
14	+Output	+Output
15	–Output	Common
22	N.C.	Common
23	N.C.	–Output
24	+Input	+Input

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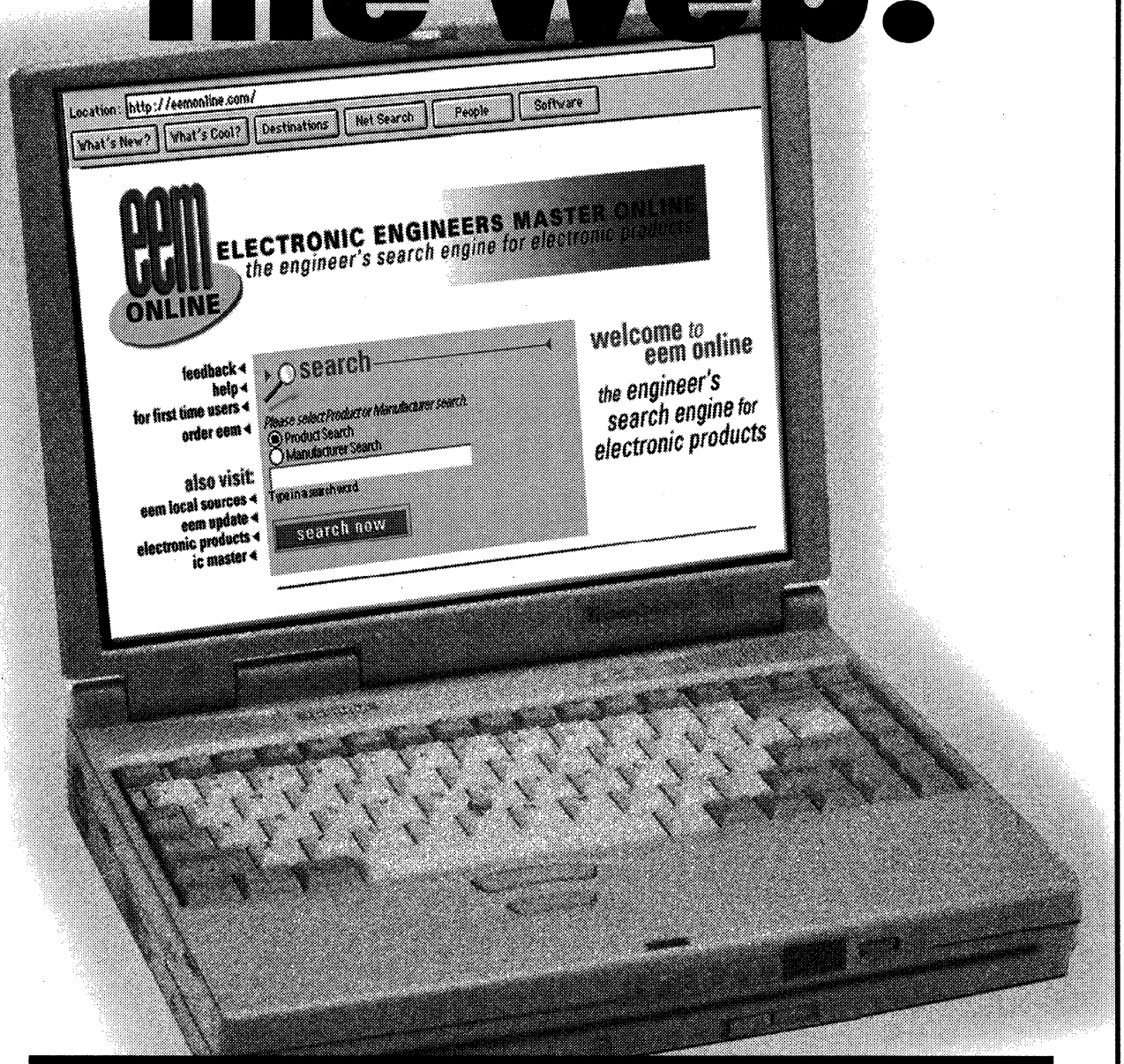

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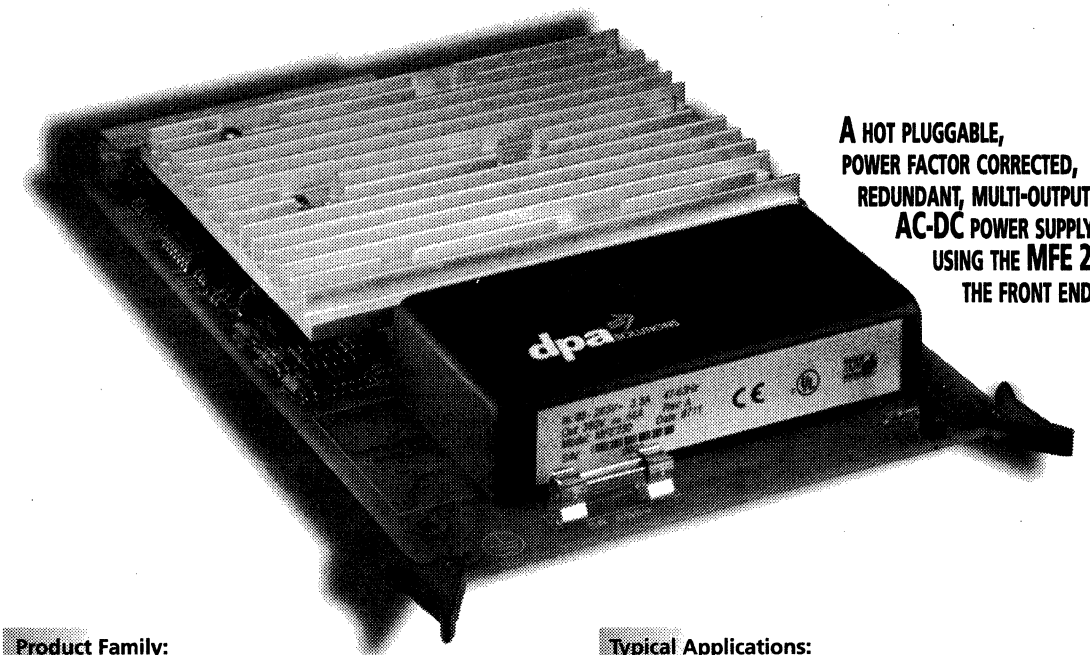
FRONT END CONVERTERS FOR POWERING YOUR DC-DC MODULES

FULLY INTEGRATED • PFC • BOARD MOUNTABLE



A HOT PLUGGABLE, POWER FACTOR CORRECTED, REDUNDANT, MULTI-OUTPUT AC-DC POWER SUPPLY CARD USING THE MFE 250 AS THE FRONT END.

Product Family:
- Modular Front End Series (MFE)

Models:
- MFE 250: 250 W
- MFE 500: 500 W
- MFE 750: 750 W
- MFE 1400: 1400 W

Description:
- The MFE is the first fully integrated, board or chassis mountable, AC-DC front end converter for powering DC-DC modules. There is NO need for additional EMI filtering or bulk capacitance.

Key Features:
- **Power factor correction**
- **Class B EMI compliance**
- **Integral hold-up capacitors (16mS minimum)**
- **Complete safety agency approvals including CE mark**
- Regulated output voltage
- Integral phase control for inrush limiting, current limit, input overvoltage protection, and short circuit protection.
- Low profile 1.1" to 1.5"
- No additional heatsinks required
- 100°C operating temp.
- Auxiliary supply output
- Complete monitoring signals
- Overtemperature warnings and shutdown

Typical Applications:
- Hot plug AC-DC power supplies
- Telecom front ends
- Distributed architectures
- Quick turn designs

Other Applications:
- Industrial motor controls
- System upgrades for EMC compliance

Optional Configurations:
- Chassis mount interface with terminal blocks
- Integral IEC receptacles and fuses

MFE PRODUCT FAMILY

dpa SOLUTIONS

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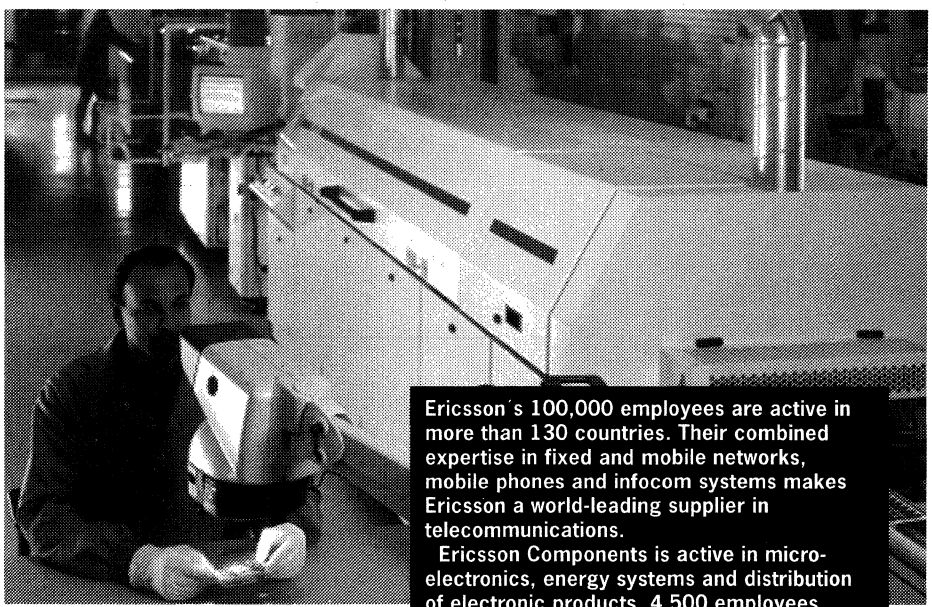
http://www.dpasolutions.com
sales@dpasolutions.com

ISO 9001 CERTIFIED

DC/DC Power Modules



Ericsson's 100,000 employees are active in more than 130 countries. Their combined expertise in fixed and mobile networks, mobile phones and infocom systems makes Ericsson a world-leading supplier in telecommunications.

Ericsson Components is active in micro-electronics, energy systems and distribution of electronic products. 4,500 employees around the world design, manufacture and market advanced products, mainly for the telecommunications industry.

Energy Systems provides a full range of power products and systems, climate systems and energy management systems. Ericsson has designed, manufactured and marketed power products for more than 100 years. Energy Systems is active in some 90 countries.

- **DC/DC Power Modules for Distributed Power Architectures**
- **Manufactured by World Class Automation Process**
- **Operations Certified in Accordance with ISO 9001**

Ericsson Components, Energy Systems

Ericsson Components' Energy Systems Division has been in the forefront of electronic power supply development for over four decades. Ericsson Components, which includes activities for power, micro-electronics and fibre optical circuits and modules, is a strategically important company within the internationally renowned Ericsson group.

Throughout the group's history, which dates back to 1876, Ericsson has been active on the challenging telecommunication market. It's a market which demands a combination of advanced technique, high reliability and commercially competitive business practice in order to surpass customers expectations. The group's success in this area is clearly demonstrated by its current position in world markets sales of $23 billion, activities in 130 countries and 100,000 employees (1997).

Ericsson Components' manufacturing of power modules is located in Sweden and in a recent established JV in The Peoples Republic of China. In order to provide local sales and technical support around the world, Ericsson has established sales offices, distributors and agents throughout Europe, North America and the Far East.

Every local office provides a high level of technical and applications advice to customers and a local point of contact for sales enquiries and orders.

As a vast part of Ericssons power products is exported, the company is geared to providing an efficient and rapid service to customers, wherever they may be located.

Innovative design, quality of products and dedication to service are the hallmarks of Ericsson Components Energy Systems.

Since 1991, Ericsson Components AB is an ISO 9001 certified supplier.

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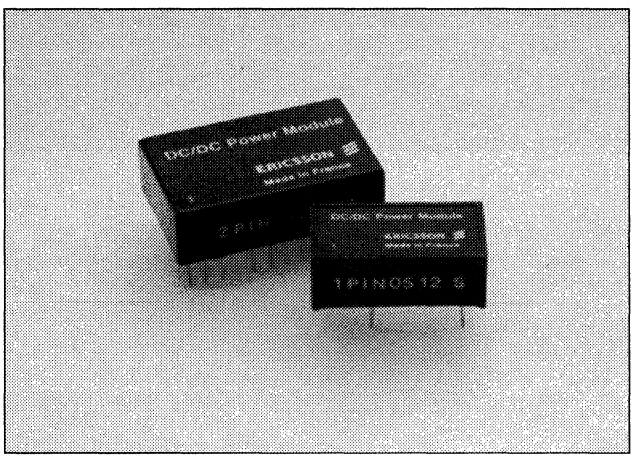
DC/DC Power Modules 0.3–2.5 W PIN/PIR Series

- *MTBF > 500,000 hours at +25 °C*
- *Thickfilm hybrid or SMD*
- *Isolation voltage 500 V dc*
- *High power density and low heat dissipation*
- *Input filters and short ciricut protection (1PIN 10s)*
- *Industrial input voltage range models*
- *Operating temperature –25 °C to +75 °C*



Miniature DC/DC Power Modules

PIN/PIR are various series of DC/DC power modules in SMD technology meeting the growing demand for PCB voltage conversion or circuit isolation in high quality telecom and industrial circuits. High switching frequencies and efficient thermal management bring high power densities. All types (except 1PIN) are designed with high attenuation input filters. There is short circuit protection with foldback characteristics for all types except 1PIN for which the protection is limited to 10 s.
The power modules are encapsulated with an epoxy filled plastic box. The encapsulation is self-extinguishing, meeting UL requirements.

Non Regulated Types

Type and power range	Input V=	Output V dc/mA (types with spec. output current are standard)					
		5 V mA	12 V mA	15 V mA	±5 V mA	±12 V mA	±15 V mA
1PIN 0.3 to 0.7 W	5 V	60	33	26	±50	±30	±20
	12 V	80	41	33	±50	±30	±20
	24 V	80	41	33	±50	±30	±20

Regulated Types

Type and power range	Input V=	Output V dc/mA (types with spec. output current are standard)					
		5 V mA	12 V mA	15 V mA	±5 V mA	±12 V mA	±15 V mA
2 PIR 0.5 to 2 W	5 V	100	100	100	±80	±80	±65
	12 V	100	100	100	±80	±80	±65
	24 V	100	100	100	±80	±80	±65
3 PIR 2.5 W	5 V	500					
	12 V	500					
	24 V	500					

For complete specification please request the PIN/PIR series datasheet.

Ericsson Inc.
Energy Systems
701 North Glenville Drive. Building H-24. Richardson, TX. 75081
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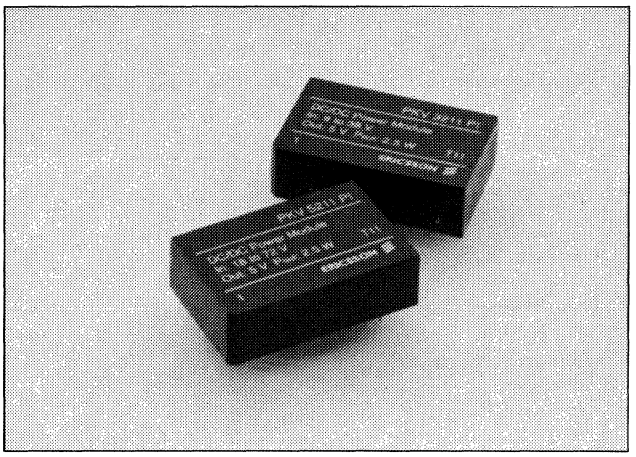
ERICSSON

DC/DC Power Modules 1.65–3 W PKV Series

- *MTBF > 650,000 hours at +25 °C ambient temperature*
- *Isolation voltage up to 1,500 V dc*
- *High power density and low heat dissipation*
- *Input filters and short circuit protection*
- *Extended input voltage range 4:1*
- *Operating temperature –40 °C to +70 °C*
- *Low idling power*



Pulse Width Modulation DC/DC Power Modules

The **PKV series** is a range of DC/DC power modules designed in full SMD technology, utilizing MOSFET transistors and 200 kHz switching frequency.
The PKV is characterized by high efficiency over a wide load range, very low quiscent power and an excellent line and load regulation. These features are maintained over the full, very wide input range 4:1, each range thus covering two system voltages 12/24 V and 48/60 V. The converter is encapsulated in a silicon resin filled plastic box.
The flammability classes of the encapsulating materials are in conformance with UL 94V-0 and have an adequate thermal conductivity. The materials withstand all normal PCB cleaning methods.

V_I	V_O/I_O max	P_O max	Ordering No.
9–36 V	3.3 V/500 mA	1.65 W	PKV 3110 PI
	5 V/500 mA	2.50 W	PKV 3211PI
	12 V/250 mA	3.00 W	PKV 3313 PI
	15 V/200 mA	3.00 W	PKV 3315 PI
	±5 V/250 mA	2.50 W	PKV 3322 PI
	±12 V/125 mA	3.00 W	PKV 3321 PI
	±15 V/100 mA	3.00 W	PKV 3325 PI
18–72 V	3.3 V/500 mA	1.65 W	PKV 5110 PI
	5 V/500 mA	2.50 W	PKV 5211PI
	12 V/250 mA	3.00 W	PKV 5313 PI
	15 V/200 mA	3.00 W	PKV 5315 PI
	±5 V/250 mA	2.50 W	PKV 5322 PI
	±12 V/125 mA	3.00 W	PKV 5321 PI
	±15 V/100 mA	3.00 W	PKV 5325 PI

For complete specification please request the PKV series datasheets.

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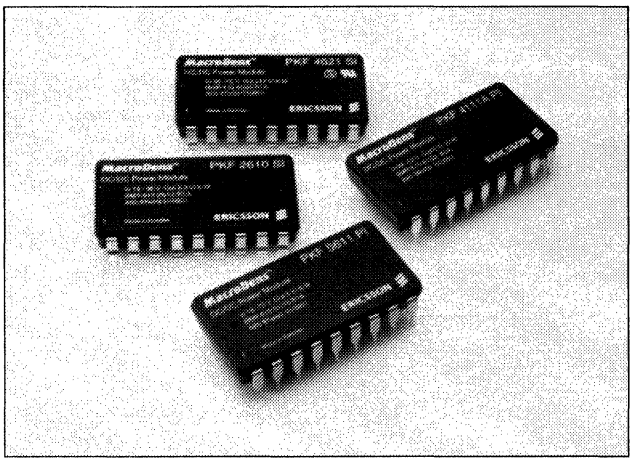
ERICSSON

DC/DC Power Modules 3–10 W
PKF Series

- *Through-hole and SMD versions in 20 g DIL case*
- *Very low component height <8 mm (0.315 in.)*
- *83% efficiency (typ at 5 V)*
- *Complies with fully and semi aqueous cleaning processes*
- *1,500 V dc isolation voltage*
- *MTBF >4.9 million hours at +50 °C pin temperature*
- *Low EMI in conformance with class A in CISPR 22 and FCC Part 15J*
- *LxWxH in mm (inches) 48x24x8 (1.89x0.95x0.315)*



Power Modules for Automated Mounting

The MacroDens™ PKF DC/DC power modules is a family of true component level on-board power modules for 24 and 48/60 V DC systems, according to ETSI specifications, and 1,500 V dc isolation. Utilization of thick film technology and a high degree of silicon integration has made it possible to achieve the very high MTBF. Together with the low height these DC/DC power modules are particularly suited for Information Technology and Telecom (IT&T) applications, with board spacing down to 15 mm or 0.6 inch. The thermal design, optimized for free convection cooling, makes the MacroDens™ ideal as distributed power sources in decentralized power systems. They are designed for an operational ambient temperature range in compliance with present and future application needs, including not temperature controlled environments. The mechanical design offers the choice of through-hole or surface mount delivered in ready-to-use tubes or trays. These products are manufactured in highly automated lines using surface mount, laser trimming, 100% burn-in and ATE final inspection.

V_I	V_O/I_{Omax}		P_{Omax}	Ordering No.	
	Output 1	Output 2		Through-hole	SMD
18–36 V	3.3 V/2.0 A		6.6 W	PKF 2610A PI	PKF 2610A SI
	5 V/1.2 A		6.0 W	PKF 2611 PI	PKF 2611 SI
38–72 V	2.1 V/1.5 A		3.0 W	PKF 4310 PI	PKF 4310 SI
	3.3 V/1.5 A		5.0 W	PKF 4510 PI	PKF 4510 SI
	5 V/1.2 A		6.0 W	PKF 4611 PI	PKF 4611 SI
	5 V/2.0 A		10.0 W	PKF 4111A PI	PKF 4111A SI
	12 V/0.6 A*)		7.0 W	PKF 4713 PI	PKF 4713 SI
	+12 V/0.5 A*)	-12 V/0.5 A	6.0 W	PKF 4621 PI	PKF 4621 SI
	+5 V/1.0 A	-5 V/1.0 A	6.0 W	PKF 4622 PI	PKF 4622 SI
	+5 V/1.0 A	+3.3 V/1.0 A	6.0 W	PKF 4628 PI	PKF 4628 SI
	+5 V/1.2 A	-12 V/0.5 A	7.0 W	PKF 4629 PI	PKF 4629 SI
18–72 V	5 V/1.2 A		6.0 W	PKF 5611 PI	PKF 5611 SI

*) Adjustable to 15 V.

For complete specification please request the PKF series datasheets.

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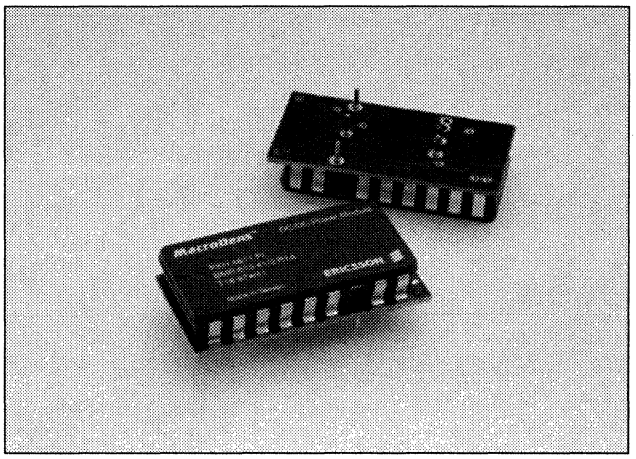
ERICSSON

DC/DC Power Modules 5–7 W
PKH Series

- *Wide input voltage range: 2:1*
- *83% efficiency (typ @ 5 V and full load)*
- *Complies with fully and semi aqueous cleaning processes*
- *1,500 V dc isolation voltage*
- *MTBF >4.5 million hours at +40 °C ambient*
- *Industrial central pin-out*
- *Low EMI in conformance with class A in CISPR 22 and FCC Part 15J*
- *LxWxH in mm (inches) 50.1x25.4x10.5 (2.0x1.0x0.41)*



Industry Standard DC/DC Power Modules

The PKH series is a family of DC/DC power modules for 24 and 48/60 V DC systems, according to ETSI specifications. The PKH is based on the MacroDens™ PKF series and adopted to the industry standard pin-out. Utilization of thick film technology and a high degree of silicon integration has made it possible to achieve the very high MTBF. The PKH power modules have high efficiency and very low idling input current, which makes them ideal as distributed power sources in decentralized power systems with battery back-up. They are optimized for free convection cooling and are designed for an operational ambient temperature range of −40 to +75°C in compliance with present and future application needs. In addition to the industry standard. They can also operate in parallel for redundancy and power upgrading.

V_I	V_O/I_Omax		$P_O$max	Ordering No.	
	Output 1	Output 2		Standard	RC option
18–36 V	3.3 V/2.0 A		6.6 W	PKH 2610A PI	PKH 2610A PIR
	5 V/1.2 A		6.0 W	PKH 2611 PI	PKH 2611 PIR
38–72 V	3.3 V/1.5 A		5.0 W	PKH 4510 PI	PKH 4510 PIR
	5 V/1.2 A		6.0 W	PKH 4611 PI	PKH 4611 PIR
	12 V/0.6 A		7.0 W	PKH 4713 PI	PKH 4713 PIR
	+12 V/0.5 A	-12 V/0.5 A	6.0 W	PKH 4621 PI	PKH 4621 PIR
	+5 V/1.0 A	-5 V/1.0 A	6.0 W	PKH 4622 PI	PKH 4622 PIR

For complete specification please request the PKH series datasheets.

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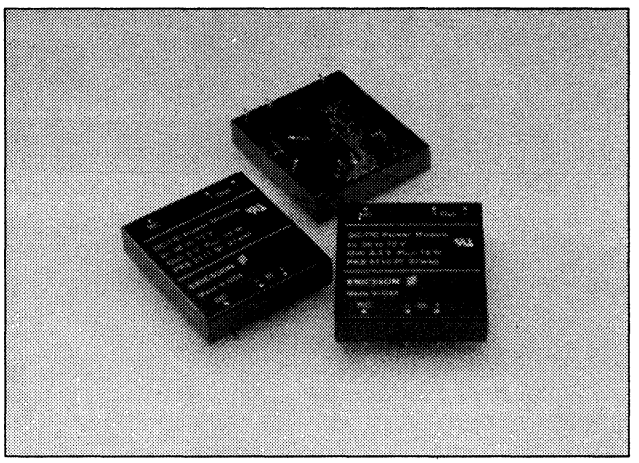
ERICSSON

DC/DC Power Modules 13–15 W
PKS Series

- *High power density of 15 W/in³ in a very small footprint*
- *Through-hole SMD and versions*
- *MTBF is 3 million hours at +40 °C ambient temperature*
- *Wide input voltage range: 2:1*
- *Operating ambient temperature range –40 to +85 °C and max. case temperature +100 °C*
- *1,500 V dc isolation voltage*
- *LxWxH in mm (inches) 36.8x41.7x9.7 (1.45x1.64x0.38)*



Free Convection Cooled High Density Power Modules

The PKS series of DC/DC power modules are especially designed for decentralized power distribution systems with distributed on-board DC/DC converters using a system voltage of 24/28 or 48/60 V dc. Their low profile and high power density allows board spacings down to 18 mm or 0.7 in., or lower, depending on board size, while occupying a minimum of the board's area.
By using a ceramic substrate with all surface-mount components and a copper leadframe, excellent heat transfer is provided to the terminal pins which readily conduct the power dissipation to the printed circuit board. The extremely efficient thermal management and the very high reliability performance together with a fixed switching frequency makes these DC/DC power modules very suitable for demanding applications within e.g. Information Technology and Telecom (IT&T), industrial, medical and aircraft industry.

The current mode forward converter topology features a very good static output regulation and fast dynamic response. A remote on/off control makes it possible to turn off or start up with external control. Over-temperature and short-circuit protection is included to prevent damage at fault conditions. Input to output isolation is 1,500 V dc.
Mechanical ruggedness is very high and mounted on a printed circuit board extreme temperature conditions can be met since the PKS DC/DC power modules can operate with full output power in ambient temperatures from –40 °C up to +85 °C and they are therefore also ideal for applications in non-temperature controlled locations.
In production the strictest manufacturing and quality control standards are enforced and the PKS series are assembled in automated manufacturing lines using SMT, laser trimming and ATE final inspection.

			Ordering No.	
V_I	V_O/I_O max	P_O max	Through-hole	SMD
18–36 V	5 V/3.0 A	15 W	PKS 2111 PI	PKS 2111 SI
	12 V/1.25 A	15 W	PKS 2113 PI	PKS 2113 SI
	15 V/1.0 A	15 W	PKS 2115 PI	PKS 2115 SI
36–72 V (max. 75 V)	3.3 V/4.0 A	13 W	PKS 4110 PI	PKS 4110 SI
	5 V/3.0 A	15 W	PKS 4111 PI	PKS 4111 SI
	12 V/1.25 A	15 W	PKS 4113 PI	PKS 4113 SI
	15 V/1.0 A	15 W	PKS 4115 PI	PKS 4115 SI

For complete specification please request the PKS series datasheets.

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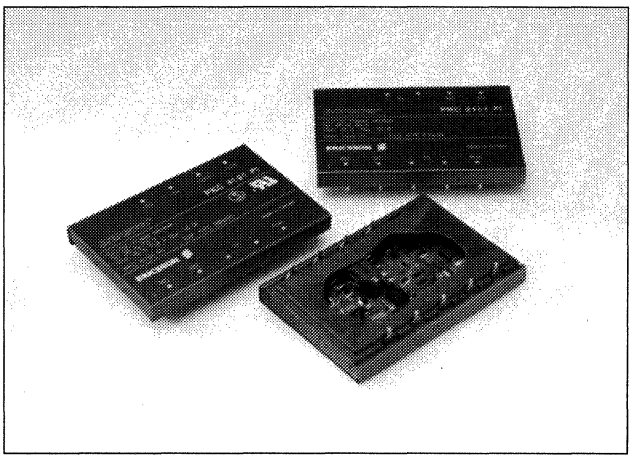
ERICSSON

DC/DC Power Modules 15–18W PKC Series

- *Single, dual and triple outputs*
- *Low profile 10.7 mm (0.42 in.), allows 0.8 in. board pitch or 0.6 in. if recessed in the PCB*
- *MTBF > 2,000,000 hours at +75 °C case temperature*
- *Efficiency 85% typ, at full load. No extra heatsink up to +85 °C ambient. Max. +115 °C case temperature*
- *Low EMI in conformance with class A in EN 55022 and FCC part 15J*
- *LxWxH in mm (inches) 80x55x10.7 (3.15x2.16x0.42)*



Compact On-Card DC/DC Power Modules

The 15–18 watts PKC series DC/DC power modules are especially designed for decentralized 24/28 and 48/60 V DC systems with distributed on-board DC/DC power modules. Their low profile allows very narrow board pitches and slim designs. By using a thickfilm technology, which provides a high degree of integration as well as an efficient thermal management and by utilizing a 300 kHz switching frequency technology based on proprietary drive & control circuits, these highly reliable products can be used in demanding applications within e.g. Information Technology and Telecom (IT&T), medical, industrial and aircraft industry. By using magnetic integration of the output voltages in the feedback loop, all outputs are kept within a ±3% total tolerance band. Input to output isolation is 500 V dc and mechanical ruggedness, specified in conformance with IEC 68-2, is close to requirements for discrete components.
Extreme temperature conditions can be met since the PKC power modules can operate with full output power in ambient temperatures from -45 °C to +85 °C, or up to +115 °C case temperature, making the products ideal also for applications within non-temperature controlled environments.
The PKC series are manufactured in highly automated production lines using SMT, laser trimming and an 100% burn-in and ATE final inspection.

V_I	V_O/I_Omax			P_O max	Ordering No.
	Output 1	Output 2	Output 3		
18–36 V	5 V/3.0 A			15 W	PKC 2111 PI
	12 V/1.5 A			18 W	PKC 2113 PI
	+12 V/1.2 A	-12 V/1.2 A		18 W	PKC 2121 PI
	+15 V/1.0 A	-15 V/1.0 A		18 W	PKC 2126 PI
	+ 5 V/3.0 A	+12 V/0.6 A	-12 V/0.6 A	15 W	PKC 2131 PI
	+ 5 V/3.0 A	+15 V/0.5 A	-15 V/0.5 A	15 W	PKC 2132 PI
	+ 5 V/3.0 A	+12 V/0.6 A	- 5V/1.0 A	15 W	PKC 2135 PI
36–72 V	5 V/3.0 A			15 W	PKC 4111 PI
	12 V/1.5 A			18 W	PKC 4113 PI
	+12 V/1.2 A	-12 V/12 A		18 W	PKC 4121 PI
	+15 V/1.0 A	-15 V/1.0 A		18 W	PKC 4126 PI
	+ 5 V/3.0 A	+12 V/0.6 A	-12 V/0.6 A	15 W	PKC 4131 PI
	+ 5 V/3.0 A	+15 V/0.5 A	-15 V/0.5 A	15 W	PKC 4132 PI
	+ 5 V/3.0 A	+12 V/0.6 A	- 5V/1.0 A	15 W	PKC 4135 PI

For complete specification please request the PKC series datasheets.

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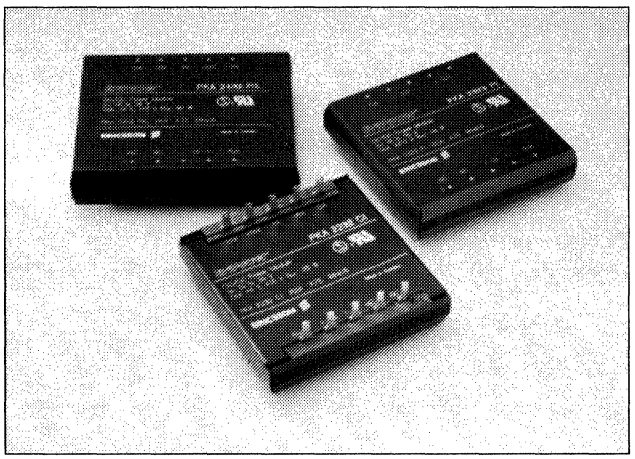
ERICSSON

DC/DC Power Modules 25–40 W
PKA Series

- *Single, dual and triple outputs*
- *No derating within –45 °C to +85 °C ambient and max. +115 °C case temperature*
- *MTBF >2,000,000 hours at +75 °C case temperature*
- *Efficiency 80 – 85%*
- *500 V dc isolated or non-isolated models*
- *Complete, no extra filters or heatsinks required*
- *LxWxH in mm (inches) 76x76x17.8 (2.99x2.99x0.7)*



On-/Off-Card DC/DC Power Modules

The PKA-series of DC/DC power modules are available in non-isolated or 500 V dc input/output isolated versions. The single, dual and triple output power modules with input ratings of 19–35 V dc and with an output power of 25–40 W, are recognized as the industry standard for on-card power modules. The ambient temperature range is –45 °C to +85 °C without derating. Low profile 40 W models with a height of only 19.8 mm have a temperature range of –45 °C to +65 °C. Using thickfilm hybrid technology, very efficient thermal management combined with a 300 kHz switching frequency has made it possible to achieve a verified MTBF of >200 years. The reliability makes them ideal in cellular radio, medical, industrial and airborne applications. Their electrical and mechanical ruggedness offer possibilities for use as distributed power sources directly on PCB:s (on-card) or chassis (off-card) mounted in industrial, airborne and other demanding applications. Special design care has been taken regarding the mechanical performance and vibration, shock and bump specifications are equal or close to specifications normally associated with components such as resistors and capacitors. The PKA 2000 and PKA 2000 I series are manufactured in highly automated production lines using SMT, laser trimming, 100% burn-in and ATE final inspection.

V_I	V_O/I_O max		P_O max	Non-Isolated	Isolated	
	Output 1	Output 2 & 3		On-Card	On-Card	Off-Card
19–35 V	5 V/5.0 A		25 W	PKA 2212 P	PKA 2211 PI	PKA 2211 CI
	5 V/8.0 A		40 W		PKA 2411 PIL	
	12 V/2.0 A	12 V/2.0 A	30 W		PKA 2323 PI	PKA 2323 CI
	15 V/1.6 A	15 V/1.6 A	30 W		PKA 2325 PI	PKA 2325 CI
	+ 5 V/5.0 A	±12 V/1.0 A	25 W	PKA 2231 P	PKA 2231 PI	PKA 2231 CI
	+ 5 V/5.0 A	±15 V/0.8 A	25 W	PKA 2232 P	PKA 2232 PI	PKA 2232 CI
	5 V/8.0 A	±15 V/2.0 A	40 W		PKA 2432 PIL	

For complete specification please request the PKA series datasheets.

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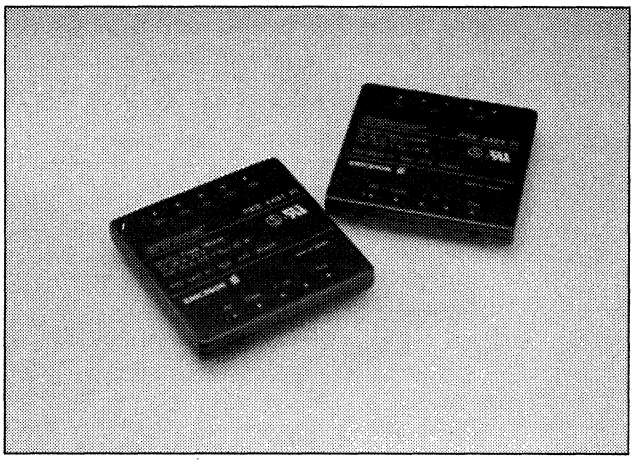
ERICSSON

DC/DC Power Modules 25–40 W PKE Series

- *Single, dual and triple outputs*
- *No derating of output power within –45 °C to +85 °C ambient temperature range*
- *10.7 mm (0.42 in.) height allows 0.8 in. board spacing*
- *1,500 V dc isolation voltage*
- *MTBF >2,000,000 hours at +75 °C case temperature*
- *Efficiency 83–85%*
- *Complete, no extra filters or heatsinks required*
- *LxWxH in mm (inches) 76x76x10. (2.99x2.99x0.42)*



Low Profile DC/DC Power Modules in Standard Footprint

The 25–40 watts PKE 4000 series DC/DC power modules are designed for decentralized 48/60 V DC power distribution systems with distributed on-board DC/DC power modules in applications with extra high temperature and isolation requirements. Their low profile allows very narrow board pitches and slim designs. By using a thickfilm technology, which provides a high degree of integration as well as an efficient thermal management and by utilizing a 300 kHz switching frequency technology based on proprietary drive and control circuits, these highly reliable products conform to standard Information Technology and Telecom (IT&T) requirements in not temperature controlled environment applications. The mechanical ruggedness, tested in accordance to IEC 68-2, is close to the requirements for discrete components. The power modules can operate with full output power in ambient temperatures from –45 to +85 °C making the products ideal in most demanding applications. To meet generic requirements for power supplies, the products are also UL recognized and Semko certified.

The PKE 4000 series are manufactured in highly automated production lines, using SMT, laser trimming, 100% burn-in and ATE final inspection.

V_I	V_O/I_Omax			$P_O$max	Ordering No.
	Output 1	Output 2	Output 3		
38–72 V	3.3 V/7.6 A			25 W	PKE 4210 PI
	5 V/5.0 A			25 W	PKE 4211 PI
	5 V/8.0 A			40 W	PKE 4411 PI
	12 V/2.0 A	12 V/2.0 A		30 W	PKE 4323 PI
	15 V/1.6 A	15 V/1.6 A		30 W	PKE 4325 PI
	+5 V/5.0 A	+12 V/1.0 A	-12 V/1.0 A	25 W	PKE 4231 PI
	+5 V/5.0 A	+15 V/0.8 A	-15 V/0.8 A	25 W	PKE 4232 PI
	+5 V/5.0 A	+12 V/1.0 A	-5 V/3.0 A	25 W	PKE 4235 PI
	+5 V/7.0 A	+12 V/2.0 A	-12 V/2.0 A	40 W	PKE 4431 PI

For complete specification please request the PKE series datasheet.

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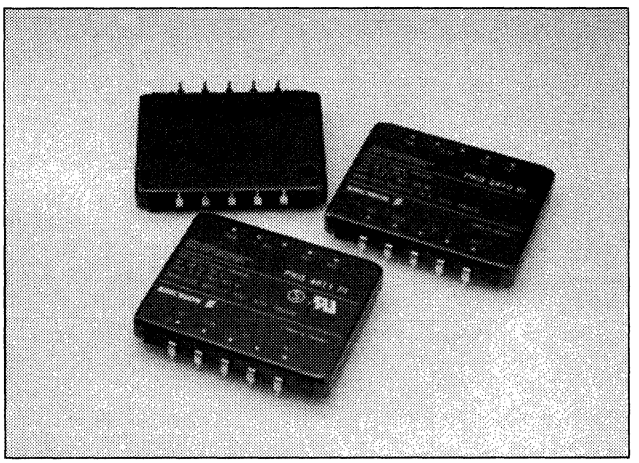
ERICSSON

DC/DC Power Modules 30–60 W PKG Series

- *Efficiency 86% at full load*
- *Rugged mechanical design and efficient thermal management, max +100 °C case temperature*
- *Low profile 11.0 mm (0.43 in.)*
- *1,500 V dc isolation voltage (duals = 1,000 V dc)*
- *MTBF >200 years at +75 °C case temperature*
- *Low EMI measured according to EN 55022 and FCC part 15J*
- *LxWxH in mm (inches) 74.7x59.3x11.0 (2.94x2.33x0.43)*



Compact Low Profile DC/DC Power Modules

The EriPower™ PKG DC/DC power modules are low profile DC/DC power modules for distributed power architectures in 24/28 and 48/60 V DC systems according to ETSI specification. They provide up to 60 W in single and dual output versions. Utilizing the standard EriPower™ PKA/PKE pinout with an even smaller footprint, the power density is as high as 20 W/cu.in.

The PKG units can be used as distributed on-board power modules, or serve as building blocks for dedicated power boards. Featuring an efficiency of 86% (5 V, 48/60 V version), the modules can operate at full power up to +35 °C ambient temperature (derated to 30 W at +65 °C ambient) in free convection cooling without any extra heatsinks. At forced convection cooling (>200 lfm), the PKG units can deliver full power without heatsinks up to +65 °C ambient. By adding external heatsinking, the thermal performance can be extended even further. Maximum case temperature is +100 °C. Thanks to its peak power capability, the PKG series is ideal for applications where max. power is only required during short durations e.g. powering disc drives.

The PKG units are built on a ceramic substrate with plated or direct bounded copper in order to achieve good thermal management and low voltage drop, and, in turn, a high efficiency. Switching frequency is a fixed 510 kHz, and EMI filters are included.

These products are manufactured in highly automated lines using SMT, laser trimming, 100% burn-in and ATE testing.

V_I	V_O/I_{Omax}		P_{Omax}	Ordering No.
	Output 1	Output 2		
18–36 V	3.3 V/14 A		45 W	PKG 2410 PI
	5 V/12 A		60 W	PKG 2611 PI
	12 V/4 A	12 V/4 A	60 W	PKG 2623 PI
	15 V/3.2 A	15 V/3.2 A	60 W	PKG 2625 PI
38–72 V	2 V/15 A		30 W	PKG 4310 PI
	3.3 V/14 A		47 W	PKG 4410 PI
	5 V/12 A		60 W	PKG 4611 PI
	3.3 V/9.6 A	5 V/6.4 A	40 W	PKG 4428 PI
	12 V/4 A	12 V/4 A	60 W	PKG 4623 PI
	5 V/8 A	12 V/3 A	60 W	PKG 4627 PI

For complete specification please request the PKG series datasheets.

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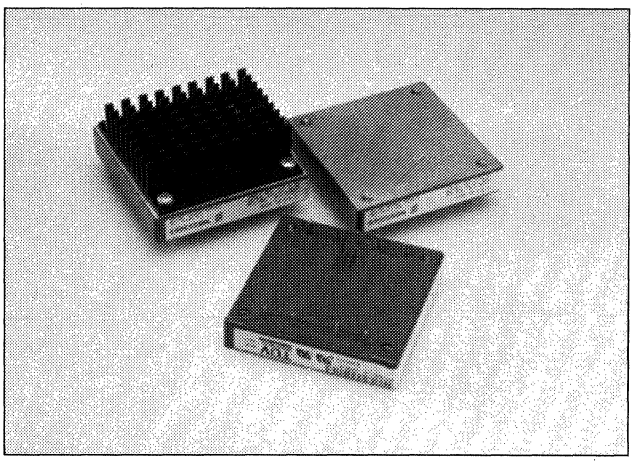
ERICSSON

DC/DC Power Modules 50–150 W
PKT Series

- *Basic and full featured versions with extensive control functions*
- *Max. base plate temperature +100 °C*
- *MTBF 1.1 million hours at +40 °C base plate temperature*
- *Wide input voltage range according to ETSI specifications*
- *High power density, up to 51 W/in3*
- *1,500 Vdc isolation voltage*
- *Industry standard foot print*



High Density DC/DC Power Modules in Standard Half-brick Footprint

The PKT 4000 is a series of high density DC/DC power modules in surface mount technology intended for distributed power architectures in either on-board or power board applications in 48/60 V DC systems according to ETSI specifications.
The series offers an alternative to existing industry standard products with extended input voltage range. Additional heatsinks can be attached by means of four threaded holes on the mounting base plate. The incorporation of a highly efficent thermal design, allowing baseplate temperatures up to 100 °C, results in exceptional effective power density in actual applications.
These products are manufactured in highly automated manufacturing lines with a world-class quality commitment and five year warranty. The products offer current sharing parallel operation and have a remote control pin for on/off operation.
Also available are Full featured versions, offering extensive control functions like current sharing, module OK, secondary remote control and over-temperature warning.
The outputs are short circuit proof and have a remote sense facility to compensate for distribution voltage drop. Moreover, the outputs can be adjusted +20/-30% for individual need. The input to output isolation is 1,500 V dc and input and output filters are included. Since 1991, Ericsson Components AB is an ISO 9001 certified supplier.

V_I	Output	P_O = 50 W	P_O = 75 W	P_O = 100 W	P_O = 150 W
36–72 V	2.5 V	PKT 4519 PI	PKT 4719 PI		
	3.3 V	PKT 4410 PI	PKT 4610 PI*)	PKT 4910 PI	
	5.0 V	PKT 4511 PI	PKT 4711 PI	PKT 4111 PI	PKT 4111 API
	12.0 V	PKT 4513 PI	PKT 4713 PI	PKT 4113 PI	PKT 4113 API
	15.0 V	PKT 4515 PI	PKT 4715 PI	PKT 4115 PI	PKT 4115 API

*) P_O = 66W

NOTE: Add "F" to the product number for Full fetaured versions.

For comlete specification please request the PKT series datasheet.

Ericsson Inc.
Energy Systems
701 North Glenville Drive. Building H-24. Richardson, TX. 75081
Tel 1-888-85ENERGY (1-888-853-6374) Fax (972) 583-7999
www.ericsson.com/US/energy

ERICSSON

MINIGLOSSARY ENCAPSULATION

MATERIALS/HANDLING

Catalyst: A substance which changes the *rate* of chemical reaction. Very small quantities can cause fast change.

Conformal coating Sprayed or dipped. A thin conformal jacket which protects an assembly from moisture or other degrading environments.

Curing agent: See catalyst.

Hardener: See catalyst.

Hermetic: A permanent gas-tight seal.

RTV: Room Temperature Vulcanizing. Associated with silicone rubber sealants which vulcanize at room temperature.

Thermoplastic: Plastic materials which can be made to flow *repeatedly* with the application of heat.

Thermosetting: Plastics which once cured cannot be made to flow again.

Thixotropy: The property of a coating compound which has low viscosity when agitated, but which thickens when the agitation ceases.

Viscosity: Measured in units of *poise* or *centipoise*. The property of a liquid which resists internal flow. Low viscosity equates with thin and vice-versa.

PROCESSING

Casting: Parts or assemblies are placed in a mold. Encapsulating material is added and cured. Part is then removed from the mold.

Dip coating: Part or assembly is dipped into the encapsulating material. Final thickness is determined by number of dips, viscosity, rate of withdrawal, and temperature.

Embedding: Wherein an encapsulant substantially fills all voids in and about an assembly.

Impregnation: A process of encapsulation involving evacuating all air and then allowing the encapsulating material to flow in and fill all voids.

Molding: Similar to casting except this process usually implies multicavity molds and costly machines.

Potting: Wherein the part or assembly is immersed in an encapsulating material contained in a shell which becomes a permanent outer surface after curing.

DIELECTRIC

Arc resistance: An encapsulant's resistance to the formation of a conductive path or track. Measured in time.

Breakdown voltage: The voltage at which an encapsulant fails electrically.

Capacitance: The property of conductors and dielectrics which allows the storage of an electrical charge when the voltage is applied.

Corona: A luminous discharge of electricity due to air ionization when a certain voltage is reached. Can be internal or external. The formation of ozone can cause rapid deterioration of certain materials.

Dielectric: Insulator (Nonconductor.)

Dielectric constant: The property of a material that determines its ability to store electrostatic energy.

Dielectric strength: The ratio of dielectric breakdown to the thickness of insulating material.

Dissipation factor: The ratio of a dielectric material's energy losses.

Flashover: Point at which an electric discharge occurs around an edge or across a surface. Can result in a carbon track and permanent degradation.

Insulation resistance: (IR) An insulating material's total DC leakage.

Surface resistivity: The resistance of the surface of an insulating material to the flow of direct current.

Voltage endurance: Sometimes called corona resistance. The ability of a material to withstand the application of sustained high voltage.

Volume resistivity: The resistance of a material to direct current flow as a measure of volume. Expressed as ohm-centimeters.

DC/DC Converters

1503 Rocky River Road North, Monroe, NC 28110. • 704-289-5423. Fax: 704-283-7170. Internet: www.etrinet.com

A New Generation of DC/DC Converters

ETRI, Inc. has greatly expanded its DC/DC converter product line for demanding applications like:

- ▸ Telecommunications equipment
- ▸ Transportation equipment (aerospace, railway)
- ▸ Battery operated equipment
- ▸ Distributed power networks
- ▸ Factory automation, robotics
- ▸ Data processing equipment
- ▸ Portable test equipment
- ▸ Industrial control circuits
- ▸ Operational amplifiers
- ▸ Process control equipment
- ▸ Popular 3.3V Logic

Superior Design, Broad Product Line

ETRI's unique design and broad product offering provide you with significant advantages:

- ▸ High reliability, some models up to 1,400,000h (MIL SPEC HDBK-217 REV.E)
- ▸ Popular sizes, industry standard pin-outs & packages
- ▸ Ultra-wide input ranges available (4 : 1 on some converters, up to 8 : 1 on some regulators)
- ▸ Output power range from 0.3 to 30 watts on DC/DC converters and from 4 to 72 watts on switching regulators
- ▸ Over 280 models available
- ▸ Standard and custom designs
- ▸ 3.3 to 48 VDC outputs
- ▸ Precise line and load regulation
- ▸ Single and dual output on virtually every model
- ▸ 3 year warranty on all models
- ▸ 100% burn in at full load
- ▸ High efficiencies: many models >85%, perfect for battery applications
- ▸ ISO 9001 certified
- ▸ Converters are input/output isolated
- ▸ No external components needed
- ▸ Optional SYNC and shutdown pin on some models

UNREGULATED / 0.3 - 4 Watts

Series	Input Voltage	Voltage Range	Output Voltages	Case Dimensions	Efficiency	Isolation	Life Expectancy	Output Power (W)
1CN/1CS	5,12,24	±10%	5,12,15, ±5,±12,±15	0.97"x0.49"x0.4"	60%-68%	500VDC	>1,000,000h	0.3 - 0.75 W
2CCN	5,12,24	±10%	5,12,15, ±5,±12,±15	1.26"x0.78"x0.4"	70%-75%	500VDC	>1,000,000h	1 W
4CCN	5,12,24	±10%	5,12,15, ±5,±12,±15	1.26"x0.78"x0.4"	70%-80%	500VDC	>430,000h	3 - 4 W

- 54 models available, single and dual outputs
- Output ripple (peak to peak) < 100mV
- Operating temperature: -25C to +75C
- No external components required

ETRI®

DC/DC Converters

1503 Rocky River Road North, Monroe, NC 28110. • 704-289-5423. Fax: 704-283-7170. Internet: www.etrinet.com

REGULATED / 0.5 - 2.5 Watts

Series	Input Voltage	Voltage Range	Output Voltages	Case Dimensions	Efficiency	Isolation	Life Expectancy	Output Power (W)
2CCR	5,12,24	±10%	5,12,15, ±5,±12,±15	1.26"x0.78"x0.4"	50%-60%	500VDC	>1,000,000h	0.5 - 2W
3CCR/3DCR	5,12,24,48	±10%	5,±5	1.26"x0.78"x0.4"	50%-60%	500VDC	>1,000,000h	1.5 - 2.5W
2CHR	5,12,24	±10%	5,12,15, ±5,±12,±15	1.26"x0.78"x0.4"	60%-65%	3000VDC	>1,000,000h	0.5 - 2W

- 44 models available, single and dual outputs
- Input filter is PI filter type
- Line and load regulation <1% on all models
- Operating temperature: -25C to 75C
- Output ripple (Peak to Peak) < 60mV
- Fixed Switching Frequency: consult factory

INDUSTRIAL P.W.M. / 1.5 - 6 Watts

Series	Input Voltage	Voltage Range	Output Voltages	Case Dimensions	Efficiency	Isolation	Life Expectancy	Output Power (W)
4DCR	5,12,24,48	2 : 1	3.3, 5, 12, 15, ±12,±15	1.26"x0.78"x0.4"	65%-72%	500VDC	>500,000h	1.5 - 3W
7DCR	5,12,24,48	4.5V-63V in 4 ranges	5, 12, 15, ±5, ±12, ±15	2"x1"x0.4"	65%-74%	1500VDC	>500,000h	4 - 5W
8DCR	5,12,24,48	4.5V-63V in 4 ranges	5, 12, 15, ±5,±12,±15	2"x2"x0.4"	65%-74%	1500VDC	>500,000h	5 - 6W

- 72 models available, single and dual outputs
- Input filter is PI filter type
- Line and load regulation <1% on all models
- Operating temperature: -25C to +75C
- Output ripple (Peak to Peak): 50mV
- No external components required

COMPACT P.W.M. / 2 - 30 Watts

Series	Input Voltage	Voltage Range	Output Voltages	Case Dimensions	Efficiency	Isolation	Life Expectancy	Output Power (W)
2CPR	12,24,48	2 : 1	3.3, 5, 12, 15, ±5,±12,±15	1.26"x0.78"x0.5"	72%-88%	1500VDC	>1,500,000h	2 - 3W
3CPR	24,48	4 : 1	5,12,15, ±5,±12,±15	1.26"x0.78"x0.5"	78%-82%	1500VDC	>1,300,000h	2.5 - 3W
6CPR	48.00	4 : 1	5,12,15, ±5,±12,±15	2"x1"x0.4"	75%-82%	1500VDC	>1,000,000h	6W
7CPR	12,24,48	2 : 1	5,12,15, ±5,±12,±15	2"x1"x0.4"	80%-85%	1500VDC	>1,400,000h	7.5 - 9W
15CPR	12,24,48	2 : 1	5,12,15, ±5,±12,±15	2"x2"x0.46"	80%-85%	1500VDC	>1,400,000h	15 - 18W
25CPR	12,24,48	2 : 1	3.3, 5, 12, 15, ±5,±12,±15, 5/±12,5/±15	2"x2"0.45"	80%-86%	750VDC	>1,000,000h	25W
30CPR	24,48	2 : 1	3.3, 5, 12, 15, ±12,±15, 5/±12,5/±15, 3.3/±12,3.3/±15	3"x2.4"0.5"	78%-84%	1500VDC/ -2200VDC	>1,000,000h	20 - 30W

- Over 100 models available, single and dual outputs
- Triple output available on 30CPR
- Operating temperature: -25C to +75C
- 3CPR: -40C to +75C
- Ultra wide input range on 3CPR and 6CPR
- Excellent for telecom applications
- PI input filter (L type on some models)
- No external components needed
- Short circuit protected
- Shut down and synchronization options
- Industry standard package and pinout
- No derating up to +75C (3, 6, 7CPR models)

I.S.D.N. Converter

Series	Input Voltage	Voltage Range	Output Voltages	Case Dimensions	Efficiency	Isolation	Life Expectancy	Output Power (W)
UCCR	48	25V - 115V	5V - 40V	2"x2"x0.7"	83%	4000VDC	>450,000h	1W

- Application: U interface box for ISDN terminals
- 100% surface mount technology
- Can be directly connected to telephone line
- Operating temperature: -25C to +75V
- Ultra wide input range: 25V - 115VDC
- Compact 2" x 2" size

Switching Regulators

Series	Input Voltage	Voltage Range	Output Voltages	Case Dimensions	Efficiency	Life Expectancy	Output Power (W)
3RXE	12,24	4V - 36V in 2 range	3.3,5	1.26"x0.78"x0.4"	76%	>500,000h	4 - 5W
7RXE	12,24	4V - 36V in 4 ranges	3.3,5,12,15	2"x1"x0.4"	75%-88%	>500,000h	8.25 - 18W
15RXE	48	9V-60V in 4 ranges	5,12,15,24	2.75"x1.97"x0.73"	72%-92%	>1,200,000h	15 - 48W
25RXE	48	9V-60V in 4 ranges	5,12,15,24	2.75"x1.97"x0.73"	74%-92%	>800,000h	25 - 72W
15RS	48	9V-80V in 4 ranges	5,12,15,24	2.75"x1.97"x0.62"	80%-94%	>680,000h	15 - 48W
25RS	24	8V-40V	5	2.75"x1.97"x0.62"	78%	>1,300,000h	25W

- 20 models available
- Step down regulator, non isolated type.
- Broad input voltage ranges - up to 8:1
- Operating temperature: -25C to +75C
- DIL24 package on 3RXE
- No external components required

AC/DC PFCI Modules

Power Factor Correction Module / 100W

Series	Input Voltage	Voltage Range	Output Voltages	Case Dimensions	Efficiency	I/O Isolation	Life Expectancy	Output Power (W)
PFCI	115, 230	85 - 264 VAC in 2 ranges	24, 48	4.6" x 2.4" x .78	83%	2,000 VAC/ 3,000 VAC	>500,000h	100W

- 4 models available
- Input/Output isolation
- Reduces components from 3 to 1
- Operating temperature: -25C to +75C
- 100 watt AC/DC converter with integrated filter
- Designed to meet existing and proposed safety standards

For more information, including dimensional detail, temperature/derating curves and full part numbers, contact:

ISO 9001

1503 Rocky River Road North
Monroe, North Carolina 28110
704/289-5423
Fax 704/283-7170

9-11, rue de Moulin des Bruyéres
92400 Courbevoie FRANCE
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On the internet: http://www.etrinet.com Email:sales@etrinet.net

EXTREMELY LOW LEAKAGE TRANSFORMER FOR SMPS

Low Profile • Low Cost • High Frequency • Matching Inductor

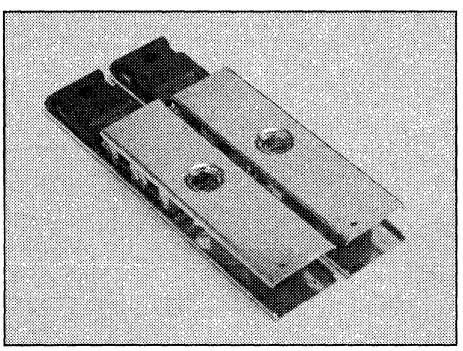
- **Low Profile:** 6mm to 10mm high
- **High frequency:** 250 Khz to 1Mhz with over 99.6% in efficiency
- **Low leakage inductance:** 4nH per module per turns square
- **No "hot spots":** Uniform thermal loading
- **Very high current density:** over 100 amps at outputs of 5 volts or below
- **Low costs:** 2.5¢ per watts. Includes the matching inductor/choke
- **Field re-configurable:** Primary windings can be adjusted or changed

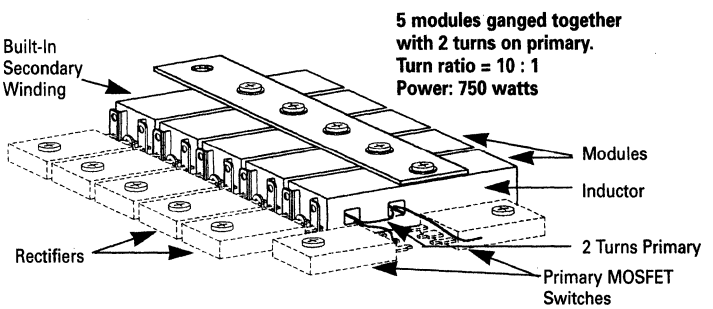
These transformers are suitable for **low output voltage** (<30 volts), and very **high output currents.** (over 100 amps)

Application: SMPS Power Converters, DC-DC Converters Modules, AC-DC Converters, Battery Chargers, etc.

Suitable Topology: Half bridge, Full Bridge, Push Pull, Resonant, etc.

Transformer with matching inductor.





FTI - 12X2A - 1B - R

- FTI: Transformer & Inductor
- 12X2A: Height of module; No. of cores; Base Type
- 1B: Rev. No.; No. of section
- R: Optional rectifier pre-connected

	2-Core Module	4-Core Module
Part Number	FTI-12X2A-1B	FTI-12X4A-1B
Power Capacity (Watt)	150 nominal	300 nominal
Output Voltages (volts): Min	1	1
(250 Khz) Type	5	10
Max	20	30
Max. Current (Amps)	40	40
Dimension(mm): L-W-H	78x17.6x12	100x17.6x12
Thermal Impedance (hot spot) deg. C/W	0.3	0.3
Ae (Eff. Cross-section Core area in sq. cm)	0.68	1.36
Le (Magnetic length in cm)	2.8	2.8
Ve (Core volume in cubic cm)	2.0	4.0
Al type (±30% nH/turns sq.)	6725	6725
Typ. Core loss @ 250Khz, 90 deg. C Bmax = 80 mT (800 gauss)	400 mW	800 mW
Leakage Inductance (per turn sq.)	4 nh	8 nh

Inductor Section:

- Inductance (min.) at 0 amps: 2.2 µH
- Inductance (min.) at 25 amps: 1.8 µH

12mm High Series; Optimum Switching Frequency @ 250 Khz

Example of transformer input voltages for a given P_T is shown below†

Part Number	No. of Modules (M)	Output Voltages (VDC)			Output Current		Output wattage		Turn Ratio Calculation N=*PT x M:1		
		MIN	NOM	MAX	@ nom. voltage	@ max. voltage	@ nom. voltage	@ max voltage	P_T=1	P_T=5	P_T=10
FTI-12X2A-1B	1	0 V	5 V	15 V	30 A @ 5 V	20 A @ 15 V	150 W	300 W	5 Vac	25 Vac	50 Vac
FTI-12X4A-1B	1	0 V	10 V	30 V	30 A @ 10 V	20 A @ 30 V	300 W	600 W	10 Vac	50 Vac	100 Vac

For more information call:

Flat Transformer Technology Corp.

240 Briggs Ave., Costa Mesa, California 92626, U.S.A. • **Tel.: 714-850-7320** • **Fax: 714-850-1163**

DC-DC CONVERTERS

5-6 WATT WIDE INPUT DC-DC CONVERTERS

EC4A Series

NOTE: 1. Nominal Input Voltage 12,24 or 48 VDC

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		% EFF	CASE
				NO LOAD	FULL LOAD		
EC4A01	9-18VDC	5 VDC	1000 mA	7.5 mA	545 mA	76	A
EC4A02	9-18 VDC	12 VDC	470 mA	7.5 mA	585 mA	80	A
EC4A03	9-18 VDC	15 VDC	400 mA	7.5 mA	625 mA	80	A
EC4A04	9-18 VDC	±12 VDC	±230 mA	12 mA	575 mA	80	A
EC4A05	9-18 VDC	±15 VDC	±190 mA	12 mA	590 mA	80	A
EC4A11	18-36 VDC	5 VDC	1000 mA	5 mA	265 mA	78	A
EC4A12	18-36 VDC	12 VDC	470 mA	5 mA	285 mA	82	A
EC4A13	18-36 VDC	15 VDC	400 mA	5 mA	305 mA	82	A
EC4A14	18-36 VDC	±12 VDC	±230 mA	7.5 mA	285 mA	81	A
EC4A15	18-36 VDC	±15 VDC	±190 mA	7.5 mA	295 mA	81	A
EC4A21	36-72 VDC	5 VDC	1000 mA	2 mA	133 mA	78	A
EC4A22	36-72 VDC	12 VDC	470 mA	2 mA	145 mA	81	A
EC4A23	36-72 VDC	15 VDC	400 mA	2 mA	154 mA	81	A
EC4A24	36-72 VDC	±12 VDC	±230 mA	3 mA	142 mA	81	A
EC4A25	36-72 VDC	±15 VDC	±190 mA	3 mA	147 mA	81	A

15 WATT DC-DC CONVERTERS

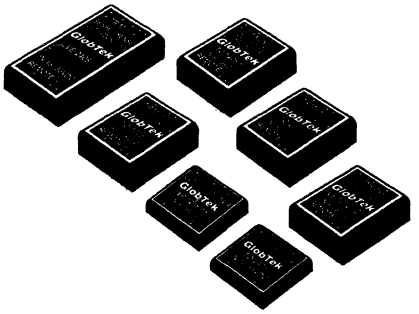
EC4EE Series

NOTE: 1. Nominal Input Voltage 12,24 or 48 VDC

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		% EFF	CASE
				NO LOAD	FULL LOAD		
EC4EE01	9-36 VDC	5 VDC	3000 mA	15 mA	810 mA	77	E
EC4EE02	9-36 VDC	12 VDC	1250 mA	15 mA	780 mA	80	E
EC4EE03	9-36 VDC	15 VDC	1000 mA	15 mA	780 mA	80	E
EC4EE04	9-36 VDC	±12 VDC	±625 mA	20 mA	780 mA	80	E
EC4EE05	9-36 VDC	±15 VDC	±500 mA	20 mA	780 mA	80	E
EC4EE06	9-36 VDC	5/±12 VDC	1500/±310 mA	20 mA	780 mA	80	E
EC4EE07	9-36 VDC	5/±15 VDC	1500/±250 mA	20 mA	780 mA	80	E
EC4EE08	9-36 VDC	+5/+12/-5 VDC	1500/310 500 mA	20 mA	715 mA	80	E
EC4EE11	18-72 VDC	5 VDC	3000 mA	10 mA	410 mA	77	E
EC4EE12	18-72 VDC	12 VDC	1250 mA	10 mA	390 mA	80	E
EC4EE13	18-72 VDC	15 VDC	1000 mA	10 mA	390 mA	80	E
EC4EE14	18-72 VDC	±12 VDC	±625 mA	15 mA	380 mA	82	E
EC4EE15	18-72 VDC	±15 VDC	±500 mA	15 mA	380 mA	82	E
EC4EE16	18-72 VDC	5/±12 VDC	1500/±310 mA	15 mA	380 mA	82	E
EC4EE17	18-72 VDC	5/±15 VDC	1500/±250 mA	15 mA	380 mA	82	E
EC4EE18	18-72 VDC	+5/+12/-5 VDC	1500/310 500 mA	15 mA	350 mA	82	E

PIN CONNECTION					
	500 VDC			3K VDC	
Pin	Single Output	Dual Output	Pin	Single Output	Dual Output
1	+V Input	+V Input	1	NP	NP
2	NC	-V Output	2	-V Input	-V Input
3	NC	Common	3	-V Input	-V Input
9	NP	NP	9	NC	Common
10	-V Output	Common	10	NC	NC
11	+V Output	+V Output	11	NC	-V Output
12	-V Input	-V Input	12	NP	NP
13	-V Input	-V Input	13	NP	NP
14	+V Output	+V Output	14	+V Output	+V Output
15	-V Output	Common	15	NC	NC
16	NP	NP	16	-V Output	Common
22	NC	Common	22	+V Input	+V Input
23	NC	-V Output	23	+V Input	+V Input
24	+V Input	+V Input	24	NP	NP

*NP-NO PIN *TP-TEST POINT
*NC-NO CONNECTION WITH PIN *GO-GROUND



PIN CONNECTION			
Pin	Single Output	Dual Output	Triple
1.	+Input	+Input	+Input
2.	-Input	-Input	-Input
3.	No Pin	+Output	+Output
4.	Output Trim	Common	Common
5.	No Pin	-Output	-Output
6.	+Output	No Pin	+5V Output
7.	-Output	No Pin	No Pin
8.	Remote On/Off Control		

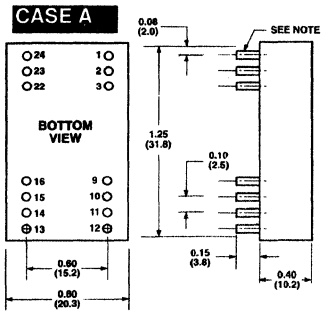
25 to 30 WATT DC-DC CONVERTERS

EC6E Series

NOTE: 1. Nominal Input Voltage 12,24 or 48 VDC

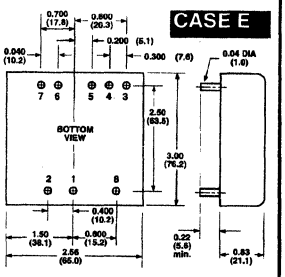
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		% EFF	CASE
				NO LOAD	FULL LOAD		
EC6E01	9-36 VDC	5 VDC	5000 mA	20 mA	1350 mA	77	E
EC6E02	9-36 VDC	12 VDC	2500 mA	20 mA	1560 mA	80	E
EC6E03	9-36 VDC	15 VDC	2000 mA	20 mA	1560 mA	80	E
EC6E04	9-36 VDC	±12 VDC	±1250 mA	25 mA	1560 mA	80	E
EC6E05	9-36 VDC	±15 VDC	±1000 mA	25 mA	1560 mA	80	E
EC6E06	9-36 VDC	5/±12 VDC	3000/±625 mA	25 mA	1650 mA	76	E
EC6E07	9-36 VDC	5/±15 VDC	3000/±500 mA	25 mA	1650 mA	76	E
EC6E08	9-36 VDC	+5/+12/-5 VDC	3000/600/1000 mA	25 mA	1450 mA	78	E
EC6E11	18-72 VDC	5 VDC	5000 mA	15 mA	670 mA	78	E
EC6E12	18-72 VDC	12 VDC	2500 mA	15 mA	770 mA	81	E
EC6E13	18-72 VDC	15 VDC	2000 mA	15 mA	770 mA	81	E
EC6E14	18-72 VDC	±12 VDC	±1250 mA	20 mA	750 mA	84	E
EC6E15	18-72 VDC	±15 VDC	±1000 mA	20 mA	750 mA	84	E
EC6E16	18-72 VDC	5/±12 VDC	3000/±625 mA	20 mA	790 mA	79	E
EC6E17	18-72 VDC	5/±15 VDC	3000/±500 mA	20 mA	780 mA	80	E
EC6E18	18-72 VDC	+5/+12/-5 VDC	3000/600/1000 mA	20 mA	725 mA	78	E

CASE A



NOTE:Pin Size is 0.02" inch (0.5m/m) DIA or .020 x .014 inch

CASE E



All Dimensions in inches (mm)

See corresponding page for additional DC-DC Converters

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DC-DC CONVERTERS

40W DC-DC CONVERTER

	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NO.	CASE
SINGLE OUTPUT	12 VDC (9-18)	5 VDC	8000 ma	BL-1205	F
		12 VDC	3400 ma	BL-1212	F
		15 VDC	2700 ma	BL-1215	F
	24 VDC (18-36)	5 VDC	8000 ma	BL-2405	F
		12 VDC	3400 ma	BL-2412	F
		15 VDC	2700 ma	BL-2415	F
	48 VDC (36-72)	5 VDC	8000 ma	BL-4805	F
		12 VDC	3400 ma	BL-4812	F
		15 VDC	2700 ma	BL-4815	F
DUAL OUTPUT	12 VDC (9-18)	+/- 5 VDC	+/- 4000 ma	BL-1205-5	F
		+/- 12 VDC	+/- 1670 ma	BL-1212-12	F
		+/- 15 VDC	+/- 1340 ma	BL-1215-15	F
	24 VDC (18-36)	+/- 5 VDC	+/- 4000 ma	BL-2405-5	F
		+/- 12 VDC	+/- 1670 ma	BL-2412-12	F
		+/- 15 VDC	+/- 1340 ma	BL-2415-15	F
	48 VDC (36-72)	+/- 5 VDC	+/- 4000 ma	BL-4805-5	F
		+/- 12 VDC	+/- 1670 ma	BL-4812-12	F
		+/- 15 VDC	+/- 1340 ma	BL-4815-15	F
TRIPLE OUTPUT	12 VDC (9-18)	+5V/+12V/-12V	7000/300/300ma	BL-1205-12D	F
		+5V/+15V/-15V	6200/300/300ma	BL-1205-15D	F
		+5V/-5V/+12V	7000/300/300ma	BL-1205D-12	F
	24 VDC (18-36)	+5V/+12V/-12V	7000/300/300ma	BL-2405-12D	F
		+5V/+15V/-15V	6200/300/300ma	BL-2405-15D	F
		+5V/-5V/+12V	7000/300/300ma	BL-2405D-12	F
	48 VDC (36-72)	+5V/+12V/-12V	7000/300/300ma	BL-4805-12D	F
		+5V/+15V/-15V	6200/300/300ma	BL-4805-15D	F
		+5V/-5V/+12V	7000/300/300ma	BL-4805D-12	F

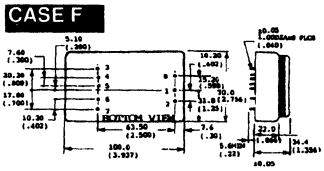
60W DC-DC CONVERTER

	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NO.	CASE
SINGLE OUTPUT	12 VDC (9-18)	5 VDC	12000 ma	CQ-1205	G
		12 VDC	5000 ma	CQ-1212	G
		15 VDC	4000 ma	CQ-1215	G
	24 VDC (18-36)	5 VDC	12000 ma	CQ-2405	G
		12 VDC	5000 ma	CQ-2412	G
		15 VDC	4000 ma	CQ-2415	G
	48 VDC (36-72)	5 VDC	12000 ma	CQ-4805	G
		12 VDC	5000 ma	CQ-4812	G
		15 VDC	4000 ma	CQ-4815	G
DUAL OUTPUT	12 VDC (9-18)	+/- 5 VDC	+/- 6000 ma	CQ-1205-5	G
		+/- 12 VDC	+/- 2500 ma	CQ-1212-12	G
		+/- 15 VDC	+/- 2000 ma	CQ-1215-15	G
	24 VDC (18-36)	+/- 5 VDC	+/- 6000 ma	CQ-2405-5	G
		+/- 12 VDC	+/- 2500 ma	CQ-2412-12	G
		+/- 15 VDC	+/- 2000 ma	CQ-2415-15	G
	48 VDC (36-72)	+/- 5 VDC	+/- 6000 ma	CQ-4805-5	G
		+/- 12 VDC	+/- 2500 ma	CQ-4812-12	G
		+/- 15 VDC	+/- 2000 ma	CQ-4815-15	G
TRIPLE OUTPUT	12 VDC (9-18)	+5V/+12V/-12V	6000/2000/500ma	CQ-1205-12D	G
		+5V/+15V/-15V	6000/1500/500ma	CQ-1205-15D	G
		+5V/-5V/+12V	5500/5500/500ma	CQ-1205D-12	G
	24 VDC (18-36)	+5V/+12V/-12V	6000/2000/500ma	CQ-2405-12D	G
		+5V/+15V/-15V	6000/1500/500ma	CQ-2405-15D	G
		+5V/-5V/+12V	5500/5500/500ma	CQ-2405D-12	G
	48 VDC (36-72)	+5V/+12V/-12V	6000/2000/500ma	CQ-4805-12D	G
		+5V/+15V/-15V	6000/1500/500ma	CQ-4805-15D	G
		+5V/-5V/+12V	5500/5500/500ma	CQ-4805D-12	G

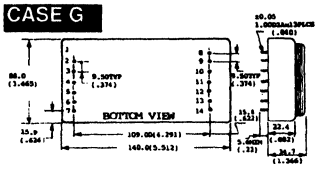
Pin Connections			
Pin No.	Pin Function		
	Singles	Duals	Triples
1	+Input	+Input	+Input
2	-Input	-Input	-Input
3	+Sense/Trim Down	Output V2	Output V2
4	Output Trim	Com2	Com2
5	-Sense/Trim Up	N.C	Output V3
6	+Output	+Output V1	+Output V1
7	-Output	Com1	Com1
8	Remote On/Off	Remote On/Off	Remote On/Off

TOLERANCES X = ±0.50 M.M
XX = ±0.20 M.M

CASE F



CASE G



Pin Connections			
Pin No.	Pin Function		
	Singles	Duals	Triples
1	No Pin	No Pin	No Pin
2	-Input	-Input	-Input
3	-Input	-Input	-Input
4	+Input	+Input	+Input
5	+Input	+Input	+Input
6	Remote Control	Remote Control	Remote Control
7	Case	Case	Case
8	-Output	Ground	-Sense
9	-Output	Ground	Com1
10	+Output	+Output	+Output V1
11	+Output	+Output	-Sense
12	-Sense	Ground	Output V2
13	Trim	-Output	Com2
14	+Sense	-Output	Output V3

TOLERANCES X = ±0.50 M.M
XX = ±0.20 M.M

25-30 WATT DC-DC CONVERTERS

EC6C Series

NOTE: 1. Nominal Input Voltage 12,24 or 48 VDC

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		% EFF	CASE
				NO LOAD	FULL LOAD		
EC6C01	9-18 VDC	5 VDC	5000 mA	30 mA	2675 mA	78	C
EC6C02	9-18 VDC	12 VDC	2500 mA	30 mA	3050 mA	82	C
EC6C03	9-18 VDC	15 VDC	2000 mA	30 mA	3050 mA	82	C
EC6C04	9-18 VDC	±5 VDC	±2500 mA	35 mA	2675 mA	78	C
EC6C05	9-18 VDC	±12 VDC	±1250 mA	35 mA	3050 mA	82	C
EC6C06	9-18 VDC	±15 VDC	±1000 mA	35 mA	3050 mA	82	C
EC6C07	9-18 VDC	5/±12 VDC	3500/±310 mA	35 mA	2640 mA	79	C
EC6C08	9-18 VDC	5/±15 VDC	3500/±250 mA	35 mA	2640 mA	79	C
EC6C09	9-18 VDC	3.3 VDC	5000 mA	30 mA	1860 mA	74	C
EC6C11	18-36 VDC	5 VDC	5000 mA	30 mA	1336 mA	79	C
EC6C12	18-36 VDC	12 VDC	2500 mA	30 mA	1525 mA	82	C
EC6C13	18-36 VDC	15 VDC	2000 mA	30 mA	1525 mA	82	C
EC6C14	18-36 VDC	±5 VDC	±2500 mA	30 mA	1336 mA	79	C
EC6C15	18-36 VDC	±12 VDC	±1250 mA	30 mA	1470 mA	85	C
EC6C16	18-36 VDC	±15 VDC	±1000 mA	30 mA	1470 mA	85	C
EC6C17	18-36 VDC	5/±12 VDC	3500/±310 mA	30 mA	1320 mA	80	C
EC6C18	18-36 VDC	5/±15 VDC	3500/±250 mA	30 mA	1320 mA	80	C
EC6C19	18-36 VDC	3.3 VDC	5000 mA	30 mA	920 mA	75	C
EC6C21	36-72 VDC	5 VDC	5000 mA	20 mA	660 mA	79	C
EC6C22	36-72 VDC	12 VDC	2500 mA	20 mA	765 mA	82	C
EC6C23	36-72 VDC	15 VDC	2000 mA	20 mA	765 mA	82	C
EC6C24	36-72 VDC	±5 VDC	±2500 mA	25 mA	660 mA	79	C
EC6C25	36-72 VDC	±12 VDC	±1250 mA	25 mA	735 mA	85	C
EC6C26	36-72 VDC	±15 VDC	±1000 mA	25 mA	735 mA	85	C
EC6C27	36-72 VDC	5/±12 VDC	3500/±310 mA	25 mA	655 mA	80	C
EC6C28	36-72 VDC	5/±15 VDC	3500/±250 mA	25 mA	655 mA	80	C
EC6C29	36-72 VDC	3.3 VDC	5000 mA	20 mA	460 mA	75	C

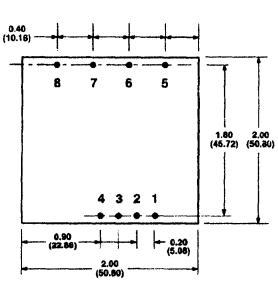
15 WATT WIDE INPUT DC-DC CONVERTERS

EC5B Series

NOTE: 1. Nominal Input Voltage 24 or 48 VDC

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CASE
			MIN.	MAX.	NO LOAD	FULL LOAD		
EC5B11	18-36 VDC	5 VDC	150 mA	3000 mA	20 mA	800 mA	78	B
EC5B12	18-36 VDC	12 VDC	65 mA	1250 mA	20 mA	780 mA	80	B
EC5B13	18-36 VDC	15 VDC	50 mA	1000 mA	20 mA	780 mA	80	B
EC5B14	18-36 VDC	±12 VDC	±35 mA	±625 mA	30 mA	780 mA	80	B
EC5B15	18-36 VDC	±15 VDC	±25 mA	±500 mA	30 mA	780 mA	80	B
EC5B16	18-36 VDC	±5 VDC	±75 mA	±1500 mA	30 mA	780 mA	80	B
EC5B21	36-72 VDC	5 VDC	150 mA	3000 mA	10 mA	390 mA	80	B
EC5B22	36-72 VDC	12 VDC	65 mA	1250 mA	10 mA	380 mA	82	B
EC5B23	36-72 VDC	15 VDC	50 mA	1000 mA	10 mA	380 mA	82	B
EC5B24	36-72 VDC	±12 VDC	±35 mA	±625 mA	15 mA	380 mA	82	B
EC5B25	36-72 VDC	±15 VDC	±25 mA	±500 mA	15 mA	380 mA	82	B
EC5B26	36-72 VDC	±5 VDC	±75 mA	±1500 mA	15 mA	380 mA	82	B

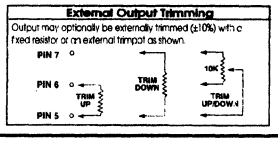
CASE C



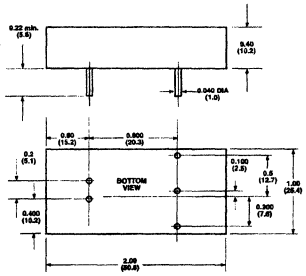
PIN CONNECTION			
Pin	Single	Dual	Triple
1.	Remote On/Off Control		
2.	No Pin	No Pin	No Pin
3.	-Vin	-Vin	-Vin
4.	+Vin	+Vin	+Vin
5.	Trim	Trim	-Aux. Out
6.	-Vout	-Vout	Common
7.	+Vout	Common	+5V out
8.	No Pin	+Vout	+Aux. Out

Remote On/Off Control	
Logic Compatibility	CMOS or Open Collector TTL
EC-On	>+5.5VDC or Open Circuit
EC-Off	<1.8 VDC
Shutdown Idle Current	10 mA
Input Resistance	100K ohms (Ein 0 VDC to 9 VDC)
Control Common	Referenced to Input Minus

External Output Trimming
Output may optionally be externally trimmed (±10%) with a fixed resistor or an external trimpot as shown.



CASE B



PIN CONNECTION	
Pin	Function
1.	+Input
2.	-Input
3.	+Output
4.	Common/NP*
5.	-Output

NP*-NO PIN ON SINGLE OUTPUT

Please see previous page page for additional DC-DC Converters

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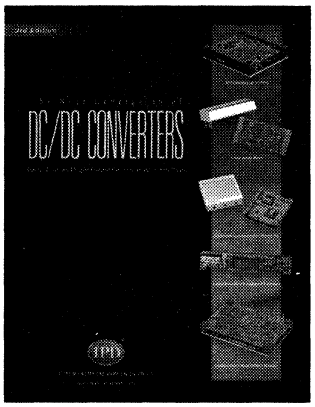

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Single Output Converters

VOUT	IOUT Rated (Amps)	OUTPUT POWER (Watts)	VIN (VDC)	CASE SIZE (Inches)	PRODUCT SERIES
1.2	6	7.2	5	2.50 x 0.25 x 0.55	SIP-E
1.2	6	7.2	5	2.50 x 0.25 x 0.55	SIE
1.2	12	14.4	3.3, 5	2.00 x 1.00 x 0.50	UPM
1.5	6	9	5	2.50 x 0.25 x 0.55	SIP-E
1.5	6	9	5	2.50 x 0.25 x 0.55	SIE
1.5	12	18	3.3, 5	2.00 x 1.00 x 0.50	UPM
1.8	6	10.8	5	2.50 x 0.25 x 0.55	SIP-E
1.8	6	10.8	5	2.50 x 0.25 x 0.55	SIE
1.8	12	21.6	3.3, 5	2.00 x 1.00 x 0.50	UPM
2.1	6	12	5	2.50 x 0.25 x 0.55	SIP-E
2.1	6	12	5	2.50 x 0.25 x 0.55	SIE
2.1	10	21	24, 48	2.00 x 2.00 x 0.37	OES*
2.1	12	25.2	3.3, 5	2.00 x 1.00 x 0.50	UPM
2.1	30	63	48	2.40 x 2.28 x 0.50	HES*
2.5	6	15	5	2.50 x 0.25 x 0.55	SIP-E
2.5	6	15	5	2.50 x 0.25 x 0.55	SIE
2.5	10	25	48	2.28 x 2.40 x 0.50	HES*
2.5	10	25	24, 48	2.00 x 2.00 x 0.37	OES*
2.5	12	30	3.3, 5	2.00 x 1.00 x 0.50	UPM
2.5	15	37.5	48	2.28 x 2.40 x 0.50	HES*
2.5	20	50	48	2.28 x 2.40 x 0.50	HES*
2.5	30	75	48	2.40 x 2.28 x 0.50	HES*
3.3	2	6.6	12, 24, 48	1.00 x 2.00 x 0.42	IAS
3.3	4	13.2	24, 48	1.00 x 2.00 x 0.40	IES*
3.3	6	19.8	5	2.50 x 0.25 x 0.55	SIP-E
3.3	6	19.8	5	2.50 x 0.25 x 0.55	SIE
3.3	6	20	24, 48	2.28 x 2.40 x 0.50	HA
3.3	10	33	24, 48	2.28 x 2.40 x 0.50	HBS
3.3	10	33	48	2.28 x 2.40 x 0.50	HES*
3.3	10	33	24, 48	2.00 x 2.00 x 0.37	OES*
3.3	12	39.6	3.3, 5	2.00 x 1.00 x 0.50	UPM
3.3	15	50	24, 48	2.28 x 2.40 x 0.50	HBS
3.3	15	50	48	2.28 x 2.40 x 0.50	HES*
3.3	20	66	24, 48	2.28 x 2.40 x 0.50	HBS
3.3	20	66	48	2.28 x 2.40 x 0.50	HES*
3.3	30	100	24, 48	2.28 x 2.40 x 0.50	HBS*
3.3	30	100	48	2.40 x 2.28 x 0.50	HES*
5	2	10	12, 24, 48	1.00 x 2.00 x 0.42	IAS
5	4	20	24, 48	1.00 x 2.00 x 0.40	IES*
5	5	25	12, 24, 48	2.00 x 2.00 x 0.42	OBS
5	6	30	24, 48	2.28 x 2.40 x 0.50	HAS
5	8	40	24, 48	2.00 x 2.00 x 0.37	OES*
5	10	50	24, 48	2.28 x 2.40 x 0.50	HBS
5	10	50	48	2.28 x 2.40 x 0.50	HES*
5	15	75	24, 48	2.28 x 2.40 x 0.50	HBS
5	15	75	48	2.28 x 2.40 x 0.50	HES*
5	20	100	24, 48	2.28 x 2.40 x 0.50	HBS
5	20	100	48	2.28 x 2.40 x 0.50	HES*
5	30	150	24, 48	2.28 x 2.40 x 0.50	HBS
5	30	150	48	2.40 x 2.28 x 0.50	HES*
12	1	12	12, 24, 48	1.00 x 2.00 x 0.42	IAS
12	2.1	25	12, 24, 48	2.00 x 2.00 x 0.42	OBS
12	2.5	30	24, 48	2.28 x 2.40 x 0.50	HAS
12	4.2	50	24, 48	2.28 x 2.40 x 0.50	HBS
12	6.3	75	24, 48	2.28 x 2.40 x 0.50	HBS
12	8.3	100	24, 48	2.28 x 2.40 x 0.5J	HBS
12	12.5	150	24, 48	2.28 x 2.40 x 0.50	HBS
15	0.8	12	12, 24, 48	1.00 x 2.00 x 0.42	IAS
15	1.7	25	12, 24, 48	2.00 x 2.00 x 0.42	OBS
15	2	30	24, 48	2.28 x 2.40 x 0.50	HAS
15	3.3	50	24, 48	2.28 x 2.40 x 0.50	HBS
15	5	75	24, 48	2.28 x 2.40 x 0.50	HBS
15	6.7	100	24, 48	2.28 x 2.40 x 0.50	HBS
15	10	150	24, 48	2.28 x 2.40 x 0.50	HBS

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Dual Output Converters — Positive and Negative Outputs

VOUT ±	IOUT Rated (Amps)	OUTPUT POWER (Watts)	VIN (VDC)	CASE SIZE (Inches)	PRODUCT SERIES
5	1	10	12, 24, 48	1.00 x 2.00 x 0.42	IAD
5	2.5	25	12, 24, 48	2.00 x 2.00 x 0.42	OBD
12	0.5	12	12, 24, 48	1.00 x 2.00 x 0.42	IAD
12	1	25	12, 24, 48	2.00 x 2.00 x 0.42	OBD
15	0.4	12	12, 24, 48	1.00 x 2.00 x 0.42	IAD
15	0.85	25	12, 24, 48	2.00 x 2.00 x 0.42	OBD
Dual Positive Output					
+3.3, +2.5	25, 25	85	48	2.40 x 3.45 x 0.50	TQD
+3.3, +2.5	15, 15	40	24, 48	2.28 x 2.40 x 0.50	HBD
+5, +3.3	12, 15	60	24, 48	2.28 x 2.40 x 0.50	HBD
+5, +3.3	20, 25	100	24, 48	2.40 x 3.45 x 0.50	TQD
+5, +3.3	8, 12	40	24 ,48	2.28 x 2.40 x 0.50	HBD

Triple Output Converters

VOUT	AUX. VOUT ±	MAIN IOUT Rated (Amps)	AUX. IOUT Rated (Amps)	TOTAL POWER (Watts)	VIN (VDC)	SIZE (Inches)	PRODUCT SERIES
3.3	12/15	3.5	0.35/0.28	25	24, 48	2.00 x 2.00 x 0.40	OET*
3.3	12	9	1.25	60	24, 48	2.28 x 2.40 x 0.50	HBT
5	12/15	3.5	0.31/0.25	25	24, 48	2.00 x 2.00 x 0.40	OET*
5	12	6	1.25	60	24, 48	2.28 x 2.40 x 0.50	HBT

**High Efficiency*

Ring Generators

VOUT (VAC)	OUTPUT FREQUENCY (Hz)	OUTPUT POWER (VA)	VIN (VDC)	CASE SIZE (Inches)	PRODUCT SERIES
65-85	16.5, 20, 25, 30 40, 50, 60	10	-48	2.52 x 2.50 x 0.65	SRG
65, 75, 85	16.5, 20, 25, 30, 50	12	-48	3.00 x 3.00 x 0.55	CRG
65, 75, 85 or user adjust	16.5, 20, 25, 30, 50 or user adjust	30	-48	3.94 x 3.94 x 0.65	DRG
75	20, 25, 50	7	-48	2.00 x 2.00 x 0.5	URG

ALSO AVAILABLE

Single Output Converters – Encapsulated

VOUT ±	IOUT Rated (Amps)	OUTPUT POWER (Watts)	VIN (VDC)	CASE SIZE (Inches)	PRODUCT SERIES
3.3	3.3	11	5, 12, 24, 48	1.00 x 2.00 x 0.40	IWS
5	0.3	1.5	5	1.25 x 0.80 x 0.52	BRS
5	0.6	3	5	1.25 x 0.80 x 0.52	BUS
5	0.5	2.5	5, 12, 24, 48	1.25 x 0.80 x 0.52	BWS
5	0.1	0.5	5, 12.0	1.25 x 0.80 x 0.40	CRS
5	0.22	1.1	5, 12	1.25 x 0.80 x 0.40	CUS
5	0.25	1.25	5, 12, 24, 28, 48	1.00 x 2.00 x 0.40	DRS
5	1	5	5, 12, 24, 48	1.00 x 2.00 x 0.40	EWS
5	2	10	5, 12, 24, 48	1.00 x 2.00 x 0.40	IWS
5	15	75	48	2.20 x 4.00 x 0.50	TOW*
5	3	15	24, 48	2.00 x 1.60 x 0.46	MWS
5	5	25	12, 24, 48	2.00 x 2.00 x 0.50	OWS
5	20	100	12	3.50 x 5.50 x 0.92	XWS
5	30	150	24, 48	3.50 x 5.50 x 0.92	XWS
9	0.2	1.8	5	1.25 x 0.80 x 0.52	BRS
9	0.33	3	5	1.25 x 0.80 x 0.52	BUS
9	0.25	2.25	5, 12	1.25 x 0.80 x 0.40	CHS
9	0.15	1.35	5, 12	1.25 x 0.80 x 0.40	CUS

**Open Frame*

Single Output Converters – Encapsulated *(Continued)*

VOUT ±	IOUT Rated (Amps)	OUTPUT POWER (Watts)	VIN (VDC)	CASE SIZE (Inches)	PRODUCT SERIES
12	1	12	5, 12, 24, 48	1.00 x 2.00 x 0.40	IWS
12	1.25	15	24, 48	2.00 x 1.60 x 0.46	MWS
12	2.1	25.2	12, 24, 48	2.00 x 2.00 x 0.50	OWS
12	10.4	125	12	3.50 x 5.50 x 0.92	XWS
12	15	180	24, 48	3.50 x 5.50 x 0.92	XWS
15	400mA	6	5, 12, 24, 48	1.00 x 2.00 x 0.40	EWS
15	0.12	1.8	5	1.25 x 0.80 x 0.52	BRS
15	0.24	3.6	5	1.25 x 0.80 x 0.52	BUS
15	0.2	3	5, 12, 24, 48	1.25 x 0.80 x 0.52	BWS
15	0.065	0.98	5, 12	1.25 x 0.80 x 0.40	CRS
15	0.1	1.5	5, 12	1.25 x 0.80 x 0.40	CUS
15	0.13	1.95	5, 12, 24, 28, 48	1.00 x 2.00 x 0.40	DRS
15	0.75	11.25	5, 12, 24, 48	1.00 x 2.00 x 0.40	IWS
15	10	150	24, 48	2.00 x 1.60 x 0.46	MWS
15	1.65	25	12, 24, 48	2.00 x 2.00 x 0.50	OWS
15	8.3	124	12	3.50 x 5.50 x 0.92	XWS
15	12	180	24, 48	3.50 x 5.50 x 0.92	XWS
24	0.5	12	5, 12, 24, 48	1.00 x 2.00 x 0.40	IWS
24	5	120	12	3.50 x 5.50 x 0.92	XWS
24	8	192	24, 48	3.50 x 5.50 x 0.92	XWS
48	0.25	12	5, 12, 24, 48	1.00 x 2.00 x 0.40	IWS

Dual Output Converters – Encapsulated

VOUT	IOUT Rated (Amps)	OUTPUT POWER (Watts)	VIN (VDC)	CASE SIZE (Inches)	PRODUCT SERIES
±5	±0.50	5	5, 12, 24, 48	1.00 x 2.00 x 0.40	EWS
±5	±0.1	1	5	1.25 x 0.80 x 0.52	BRD
±5	±0.3	3	5	1.25 x 0.80 x 0.52	BUD
±5	±0.25	2.5	5, 12, 24, 48	1.25 x 0.80 x 0.52	BWD
±5	±1	10	5, 12, 24, 48	1.00 x 2.00 x 0.40	IWD
±5	±2.5	25	12, 24, 48	2.00 x 2.00 x 0.50	OWD
±5	±10	100	12	3.50 x 5.50 x 0.92	XWD
±5	±15	150	24, 48	3.50 x 5.50 x 0.92	XWD
±12	±0.25	6	5, 12, 24, 48	1.00 x 2.00 x 0.40	EWS
±12	±0.085	2	5	1.25 x 0.80 x 0.52	BRD
±12	±0.15	3.6	5	1.25 x 0.80 x 0.52	BUD
±12	±0.125	3	5, 12, 24, 48	1.25 x 0.80 x 0.52	BWD
±12	±0.04	1	5, 12	1.25 x 0.80 x 0.40	CRD
±12	±0.062	1.5	5, 12	1.25 x 0.80 x 0.40	CUD
±12	±0.08	1.9	5, 12, 24, 28, 48	1.00 x 2.00 x 0.40	DRD
±12	±0.25	6	5, 12	1.00 x 2.00 x 0.40	DUD
±12	±0.5	12	5, 12, 24, 48	1.00 x 2.00 x 0.40	IWD
±12	±1.05	25	12, 24, 48	2.00 x 2.00 x 0.50	OWD
±12	±5.2	125	12	3.50 x 5.50 x 0.92	XWD
±12	±7.5	180	24, 48	3.50 x 5.50 x 0.92	XWD
±15	±0.20	6	5, 12, 24, 48	1.00 x 2.00 x 0.40	EWS
±15	±0.07	2	5	1.25 x 0.80 x 0.52	BRD
±15	±0.12	3	5	1.25 x 0.80 x 0.52	BUD
±15	±0.1	3	5, 12, 24, 48	1.25 x 0.80 x 0.52	BWD
±15	±0.033	1	5, 12	1.25 x 0.80 x 0.40	CRD
±15	±0.05	1.5	5, 12	1.25 x 0.80 x 0.40	CUD
±15	±0.065	2	5, 12, 24, 28, 48	1.00 x 2.00 x 0.40	DRD
±15	±0.2	6	5, 12	1.00 x 2.00 x 0.40	DUD
±15	±0.375	11.25	5, 12, 24, 48	1.00 x 2.00 x 0.40	IWD
±15	±0.83	25	12, 24, 48	2.00 x 2.00 x 0.50	OWD
±15	±4.15	125	12	3.50 x 5.50 x 0.92	XWD
±15	±6	180	24, 48	3.50 x 5.50 x 0.92	XWD
±18	±0.165	6	5, 12	1.00 x 2.00 x 0.40	DUD
+10, +5	0.15, 0.11	2	5, 12	1.25 x 0.80 x 0.40	CHD

Triple Output Converters – Encapsulated

VOUT	IOUT Rated (±Amps)	OUTPUT POWER (Watts)	VIN (VDC)	CASE SIZE (Inches)	PRODUCT SERIES
5, ±12	3.5, ±0.31	25	12, 24, 48	2.00 x 2.00 x 0.50	OWT
5, ±12	5.0, ±1.25	55	12, 24, 48	3.00 x 3.00 x 0.50	RWT
5, ±12	12.0, ±3.00	132	12	3.50 x 5.50 x 0.92	XWT
5, ±12	15.0, ±4.00	171	24, 48	3.50 x 5.50 x 0.92	XWT
5, ±15	3.5, ±0.25	25	12, 24, 48	2.00 x 2.00 x 0.50	OWT
5, ±15	5.0, ±1.00	55	12, 24, 48	3.00 x 3.00 x 0.50	RWT
5, ±15	12.0, ±2.50	135	12	3.50 x 5.50 x 0.92	XWT
5, ±15	15.0, ±3.30	174	24, 48	3.50 x 5.50 x 0.92	XWT

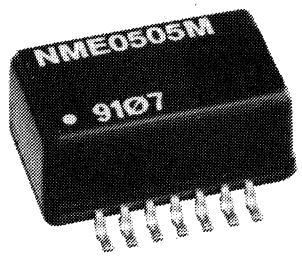
International Power Sources, Inc.

DC/DC Converters
1 to 650 Watts
Switching Power Supplies
15 Watt to 650 Watts

ISO 9002 REGISTERED

DC/DC CONVERTERS

1-Watt-2Watt Epoxy Encapsulated DC/DC Converters Now Available in Surface Mount



- 5, 12, 24 and 48 VDC Inputs
- SIP, DIL and SMT Packages
- 3000 VDC Isolation
- 0.12 in² board space
- 80% Efficiency
- 30 Watts per in³

Output Voltage	Output Current	Part Number 5VDC Input	12VDC Input	24VDC Input	48VDC Input
±5VDC	±100mA	NMA0505	NMA1205	NMA2405	NMA4805
±12VDC	±40mA	NMA0512	NMA1212	NMA2412	NMA4812
±15VDC	±30mA	NMA0515	NMA1215	NMA2415	NMA4815

Output Voltage	Output Currents	Part Number 5VDC Input	12VDC Input
5VDC	200/400mA	NME/NML0505	NME/NML1205
12VDC	84/167mA	NME/NML0512	NME/NML1212
15VDC	67/133mA	NME/NML0515	NME/NML1215

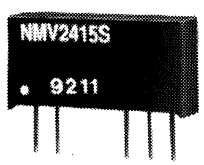
Add suffix "S" for single-in-line package, suffix "D" for dual-in-line package, suffix "TM" for SMT.

Output Voltage	Output Currents	Part Number 5VDC Input	12VDC Input
±5VDC	±200mA	NMH0505	NMH1205
±9VDC	±110mA	NMH0509	NMH1209
±12VDC	±85mA	NMH0512	NMH1212
±15VDC	±65mA	NMH0515	NMH1215

NDL Regulated Series

- 2:1 Input voltage range
- 12, 24 and 48 VDC inputs
- Fully regulated 2 Watt output
- 0.30 in² of board space
- 1000 VDC isolation
- Continuous short circuit protection

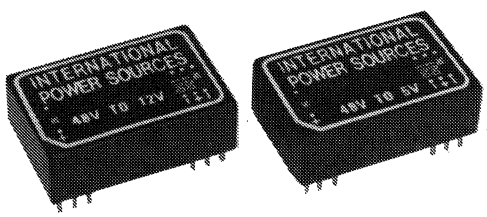
NMV 3000 VDC Isolation Series



- 3000 VDC Isolation
- 1 Watt output
- 5, 12, 24 and 48VDC inputs
- 0.18 in² of board space
- 80% efficiency

BA/BT/BC Series
1.5/3.0/6.0 watt DC/DC Converters
NEW! BT Series Low Cost

- 5, 12, 24, 28 and 48 VDC Inputs
- BA/BT-24 pin DIL Package
- 500VDC Isolation
- Input π Filters
- Fully Regulated Outputs
- Low Cost



BA SERIES

Output Voltage	Output Currents	Input Voltage 5VDC	12VDC	24VDC	28VDC	48VDC
5VDC	300mA	BA101	BA201	BA301	BA401	BA501
12VDC	125mA	BA102	BA202	BA302	BA402	BA502
15VDC	100mA	BA103	BA203	BA303	BA403	BA503
±12VDC	±60mA	BA104	BA204	BA304	BA404	BA504
±15VDC	±50mA	BA105	BA205	BA305	BA405	BA505

BT SERIES

Output Voltage	Output Currents	Input Voltage 5VDC	12VDC	24VDC	48VDC
5VDC	600mA	BT101	BT201	BT301	BT401
12VDC	250mA	BT102	BT202	BT302	BT402
15VDC	200mA	BT103	BT203	BT303	BT403
±12VDC	±120mA	BT104	BT204	BT304	BT404
±15VDC	±100mA	BT105	BT205	BT305	BT405

BC SERIES

Output Voltage	Output Currents	Input Voltage 5VDC	12VDC	24VDC	28VDC	48VDC
5VDC	1.00A	BC101	BC201	BC301	BC401	BC501
12VDC	0.47A	BC102	BC202	BC302	BC402	BC502
15VDC	0.40A	BC103	BC203	BC303	BC403	BC503
±12VDC	±0.23A	BC104	BC204	BC304	BC404	BC504
±15VDC	±0.19A	BC105	BC205	BC305	BC405	BC505

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ISO 9002 REGISTERED

DC/DC CONVERTERS

WA/WB/WC/WD/WH/WT/WU Series
3/5/7.5/10/15 WATT DC/DC Converters

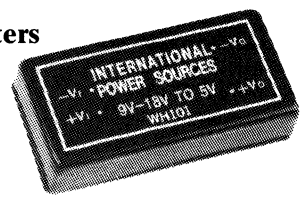
- 2:1 Input Range
- Isolated Outputs
- Efficiency to 80%
- 100 kHz Switching Frequency
- WA/WT—24 Pin DIL Package
- Input π Filter
- Fully Regulated Outputs
- Optional 4:1 Input Range
- Optional 3000VDC Isolation
- WB/WC/WU-2.0" x 2.0" x .4" Package

Model Number	Input Voltage	Output Voltage	Output Current	Input Current No Load	Input Current Full Load	% EFF
WA101	4.5-6.0 VDC	5 VDC	500mA	75mA	730mA	69
WA102	4.5-6.0 VDC	12 VDC	250mA	75mA	874mA	69
WA103	4.5-6.0 VDC	15 VDC	200mA	75mA	869mA	69
WA201	9-18 VDC	5 VDC	500mA	25mA	310mA	67
WA202	9-18 VDC	12 VDC	250mA	25mA	345mA	73
WA203	9-18 VDC	15 VDC	200mA	25mA	357mA	70
WA204	9-18 VDC	±5 VDC	250mA	25mA	320mA	65
WA205	9-18 VDC	±12 VDC	125mA	25mA	370mA	68
WA206	9-18 VDC	±15 VDC	100mA	25mA	370mA	68
WA301	18-36 VDC	5 VDC	500mA	15mA	150mA	70
WA302	18-36 VDC	12 VDC	250mA	15mA	170mA	74
WA303	18-36 VDC	15 VDC	200mA	15mA	174mA	72
WA304	18-36 VDC	±5 VDC	250mA	15mA	170mA	61
WA305	18-36 VDC	±12 VDC	125mA	15mA	186mA	67
WA306	18-36 VDC	±15 VDC	100mA	15mA	182mA	69
WA401	36-72 VDC	5 VDC	500mA	15mA	73mA	71
WA402	36-72 VDC	12 VDC	250mA	15mA	94mA	66
WA403	36-72 VDC	15 VDC	200mA	15mA	92mA	68
WA404	36-72 VDC	±5 VDC	250mA	15mA	85mA	61
WA405	36-72 VDC	±12 VDC	125mA	15mA	94mA	67
WA406	36-72 VDC	±15 VDC	100mA	15mA	94mA	67

NOTE: Nominal Input Voltage 5, 12, 24, or 48 VDC

Input Voltage	Output Voltage	WT Series Output Current	WT Series Model Number	WC Series Output Current	WC Series Model Number
9-18 VDC	5 VDC	1000 mA	WT101	3000 mA	WC101
9-18 VDC	12 VDC	470 mA	WT102	1250 mA	WC102
9-18 VDC	15 VDC	400 mA	WT103	1000 mA	WC103
9-18 VDC	±12 VDC	±230 mA	WT105	±625 mA	WC104
9-18 VDC	±15 VDC	±190 mA	WT106	±500 mA	WC105
18-36 VDC	5 VDC	1000 mA	WT201	3000 mA	WC201
18-36 VDC	12 VDC	470 mA	WT202	1250 mA	WC202
18-36 VDC	15 VDC	400 mA	WT203	1000 mA	WC203
18-36 VDC	±12 VDC	±230 mA	WT205	±625 mA	WC204
18-36 VDC	±15 VDC	±190 mA	WT206	±500 mA	WC205
36-72 VDC	5 VDC	1000 mA	WT301	3000 mA	WC301
36-72 VDC	12 VDC	470 mA	WT302	1250 mA	WC302
36-72 VDC	15 VDC	400 mA	WT303	1000 mA	WC303
36-72 VDC	±12 VDC	±230 mA	WT305	±625 mA	WC304
36-72 VDC	±15 VDC	±190 mA	WT306	±500 mA	WC305

WD Series
15 Watt DC/DC Converters

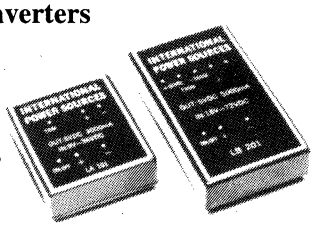


- 2:1 Input Range
- Isolated Outputs
- Single and Dual Outputs
- 1.0" x 2.0" x .4" Package

New!! WJ Series
25 Watt 2.0" x 2.0" DC/DC Converter

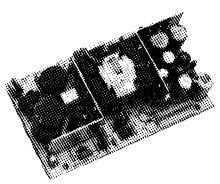
- One to Three Outputs
- Wide Input Range
- 500 VDC Isolation
- Remote On / Off
- Trimmable Outputs
- Six Sided Shield

LA / LB / LP / LT Series
15-30 Watt DC/DC Converters



- 4:1 Input Range
- PCB Mountable
- Efficiency to 86%
- Industry Standard Pinouts
- 500 VDC Isolation
- Remote Sense/Disable

New!! PD Series
40 / 65 / 110 Watt DC/DC Converters



- One to Four Outputs
- 3:1 Input Voltage Ranges
- 1000 VDC Isolation
- 3.0" x 5.0" x 1.5" Package
- Low Cost
- Optional Cover

New!! High Voltage DC/DC Converters
3 / 5 / 10 / 25 / 30 and 40 Watts

- Wide Input Range
- Up to 4,000 VDC Outputs
- 5,000 VDC Isolation
- Single and Dual Outputs
- PCB Mountable
- Custom Outputs

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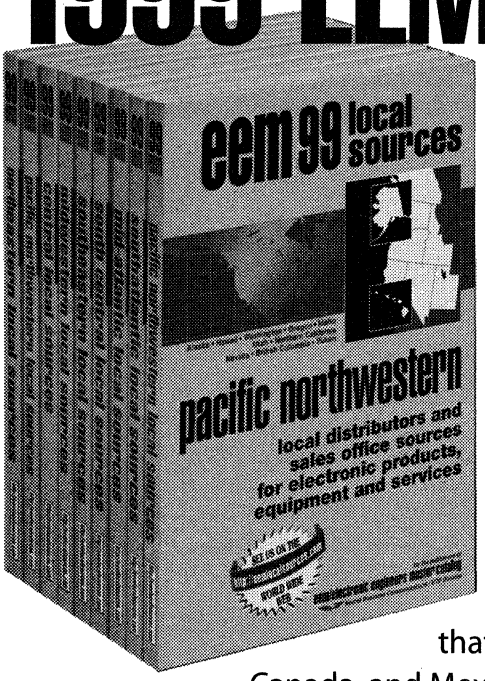

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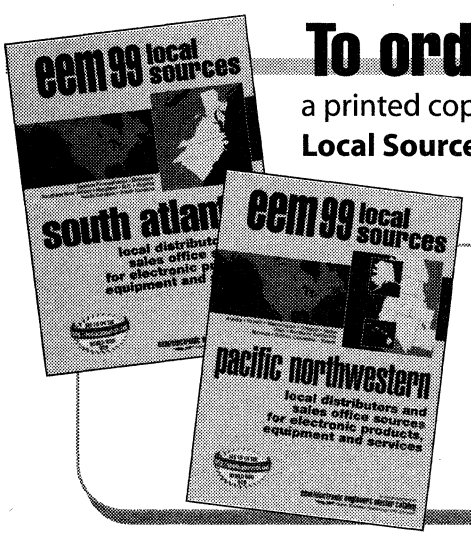

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O: Standard, no radiation guarantee. For system evaluation, electrically and mechanically comparable to H and K level.	OO	HO	Not available
L: Radiation hardened – Tested lots Up to 50 k Rads (Si) total dose No SEU guarantee	Not available	HL	KL
R: Radiation hardened – Tested lots Up to 100 k Rads (Si) total dose SEU guarantee >40 MeV	Not available	HR	KR

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MIL/AEROSPACE DC/DC CONVERTERS (FULL POWER OPERATION -55° TO + 125°C)

MODEL	DATA QUICK #	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT POWER (TOTAL W)	EFF. (TYP.) (%)	CASE FIGURE	HIGHLIGHTS
MFLHP	1002	19 - 40	5, 12, 15 ±5, ±12, ±15	80 - 100 (-55 to +100°C)	80 - 87	A1	Parallel up to 5 units
MFL	1004	16 - 40 18 - 40	3.3, 5, 8, 12, 15 28, ±5, ±12, ±15 2	40 - 65 40	63 - 87 63	A1	Wide variety of Vout Parallel up to 5 MFLs
MTR	1005 1006	16 - 40	5, 12, 15, ±5, ±12, ±15 +5 & ±12, +5 & ±15	25 - 30 30	78 - 84 75	D1 F1	Wide variety of Vout Triple output
MHD	1008	16 - 40	5, 12, 15 ±12, ±15	15 - 20	78 - 84	D1	Up to 50 dB audio rejection
MHV	1013 1012	16 - 50	3.3, 5, 12, 15 ±5, ±12, ±15 +5 & ±12, +5 & ±15	10 - 15 15	69 - 80 75	D1 F2	Low noise Transient: 80V, 120 ms Triple output
MHF+	1009 1010	16 - 40 16 - 48	5, 5.2, 12, 15 28, ±5, ±12, ±15 +5 & ±12, +5 & ±15	12 - 15 15	77 - 84 78	B B	Low noise Transient: 80V, 120 ms Triple output
MHF	1011	16 - 40 19 - 40 (16 - 36)	5, 12, ±12 15, ±15	10 - 12 12	79 - 81 83 (82)	B*	Low profile
MSA	1014	16 - 40	5, 5.2, 12, 15 ±12, ±15	5	71 - 76	C1	Small footprint
MCH	1015	12 - 50 ±5, ±12, ±15	5, 12, 15	1.5	76 - 79	G1	Extended input range Isolated or non-isolated

MIL/AEROSPACE FILTERS

MODEL	DATA QUICK #	INPUT	CURRENT (MAX. A)	MINIMUM ATTENUATION	CASE FIGURE	COMPATIBLE CONVERTER
FM-704A	4001	16 - 40	2.5 @ 16 Vin 1.0 @ 40 Vin	55 dB @ 1 MHZ	D1**	Any Mil/Aerospace converter (except MSR) up to the rated current of the filter.
FMD28-461 FME28-461 FMD270-461 FME270-461	4002	0 - 40 0 - 40 0 - 400 0 - 400	7.0 0.7 15.0 1.5	45 dB @ 1 MHZ 40 dB @ 1 MHZ 45 dB @ 1 MHZ 45 dB @ 1 MHZ	A1 /F3** A1 A1 A1	
FMC-461	4003	0 - 40	2.7	30 dB @ 1 MHZ	D1	
FMH-461	4004	0 - 40	1.5	55 dB @ 1 MHZ	B	
FMSA-461	4005	0 - 40	0.8	50 dB @ 1 MHZ	G1	

*Not available in flanged case

**Available only in flanged case

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CRANE interpoint A CRANE CO. COMPANY

Space-Qualified DC/DC Converters and Filters

SPACE-QUALIFIED AND RADIATION HARDENED DC/DC CONVERTERS

MODEL	DQ #	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT POWER (TOTAL W)	EFF. (TYP.) (%)	CASE FIGURE	HIGHLIGHTS
SSP	1027	20 - 40	±3.3, ±5, ±12, ±15	30	76 - 80	A2	Internal filter meets CE03
SMHF	1026	16 - 40	3.3, 5, 12, 15 ±5, ±12, ±15	15	77 - 84	B	Several protection features
SMSA	1030	16 - 40	5, 12, 15 ±5, ±12, ±15	5	69 - 74	C1	Small footprint, low height

SPACE-QUALIFIED AND RADIATION IMMUNE FILTERS

MODEL	DQ #	INPUT (MAX. A)	CURRENT ATTENUATION	MINIMUM FIGURE	CASE CONVERTER	COMPATIBLE
SFMC	4008	0 - 40	2.7	60 dB @ 1 M HZ	D1	SMHF, SMSA
SFCS	4009	0 - 50	5	60 dB @ 1 M HZ	A2	SMHF, SMSA

CASE FIGURES: TOP VIEW

Note: Case dimensions are maximum for the case style. Individual product dimensions may be up to 0.025" (0.64 mm) less.

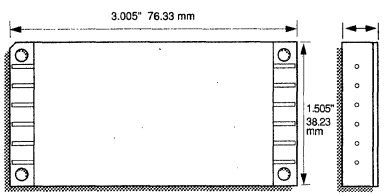

FIGURE A1 AND A2

Figure A1 height is 0.400 (10.16 mm)
Figure A2 height is 0.425 (10.89 mm)
(Some figure A models offer other package options, refer to individual data sheets.)

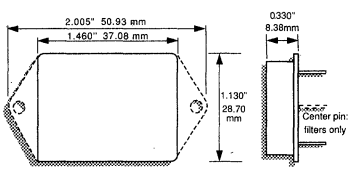

FIGURE B

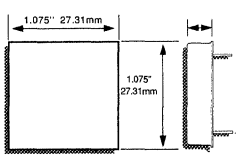

FIGURE C1 AND C2

Figure C1 height is 0.270 (10.89 mm)
Figure C2 height is 0.370 (9.40 mm)

Figure D1 height is 0.417 (10.59 mm)
Figure D2 height is 0.405 (10.16 mm)
Figure D3 height is 0.500 (12.70 mm)

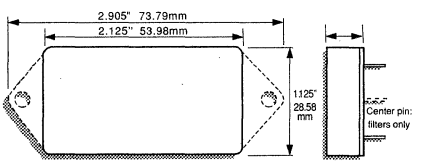

FIGURE D1, D2, AND D3

Figure F1 height is 0.430 (10.92 mm)
Figure F2 height is 0.420 (10.67 mm)
Figure F3 height is 0.460 (11.68 mm)
Figure F4 height is 0.505 (12.83 mm)

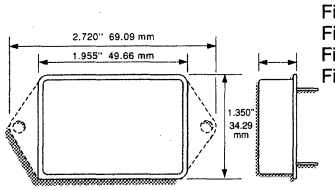

FIGURE F1, F2, AND F3

Figure G1 height is 0.270 (6.86 mm)
Figure G2 height is 0.350 (8.89 mm)

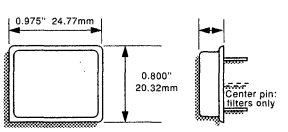

FIGURE G1 AND G2

FIGURE H CASE (NOT SHOWN): 3.200 x 2.55 x 0.595 (81.28 x 62.23 x 15.11 mm)

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Mil/Aerospace Converters and Filters

MIL/AEROSPACE CONVERTERS (FULL POWER OPERATION -55° TO +85°C)

MODEL	DQ #	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT POWER (TOTAL W)	EFF. (TYP.) (%)	CASE FIGURE	HIGHLIGHTS
MFW	1016	19 - 40	3.5, 5, 12, 15, ±12, ±15 +5 & ±12, +5 & ±15	50 - 70 60	76 - 83 84	H	Heat dissipating flange mounting
MTW	1017	19 - 40 18 - 40	5 12, 15, ±12, ±15	30 30	82 84 - 86	F4**	Internal filtering
MHL	1018	4 - 8	±12, ±15	15	78	F4	Low Vin
MHE MLP	1019	17 - 40 10 - 16 16 - 40	5, 12,15, ±12, ±15 5, 12, 15 5, 12,15, ±12, ±15	15 - 20 15 10 - 15	79 - 83 81 - 83 81 - 83	D3 D2	Wide variety of inputs
MRH	1020	16 - 40 16 - 36 19 - 40	5, 12, ±12 15, ±15, +5 & ±12, +5 & ±15 15, ±15	15 15 15	75 - 78 72 - 80 78 - 80	F4	Radiation hardened Triple output
MTO	1021	16 - 36 9 - 16	+5 & ±12, +5 & ±15 +5 & ±12, +5 & ±15	15 15	79 79	F4	Triple output
MSR	1022	16 - 32	5, ±12, ±15 +5 & ±12, +5 & ±15	3.5 - 4.0 3.2	70 70	C2	Small footprint Triple output
MDR	1023	10.8 - 13 20 - 26 24 - 30	±12, ±15 ±12, ±15 ±12, ±15	3.0 3.0 3.0	58 58 58	C2	Small footprint Wide variety of inputs
DCH	1024	4.0 - 6.5 9 - 15	5, 12, ±12, ±15 5, 12, 28, ±12, ±15, ±28	2.0 - 2.5 2.5 - 3.0	67 - 72 70 - 75	G2	Full power operation -55° to +100°C

MIL/AEROSPACE FILTERS (FULL POWER OPERATION -55° TO +85°C)

MODEL	DQ #	INPUT	CURRENT (MAX. A)	MINIMUM ATTENUATION	CASE FIGURE	COMPATIBLE CONVERTER
FM-461 FMA-461 FMB-461	4006	0 - 40	1.75 3.8 5.0	45 dB @ 1 M HZ 45 dB @ 1 M HZ 37 dB @ 1 M HZ	D1 D3	Any converter on this page or any HR converter on the following page (except MSR, MDR, DCH, or HR40) up to the rated current of the filter.
MSF-461	4007	0 - 40	0.420	30 dB @ 1 M HZ	C2	MSR, MDR, DCH, or HR40

*Not available in flanged case

**Available only in flanged case

SCREENING LEVELS

Interpoint offers a variety of screening levels to match your requirements. The most extensive levels are MIL-PRF-38534 Class K and Class H which require element evaluation and stringent end product screening. Space-qualified products are available to Class K or Class H with an additional choice of radiation tolerance levels.

Select products from the -55° to +125°C Mil/Aerospace category offer screening to Class H and are available as DSCC Standard Microcircuit Drawings (SMDs). Both categories of Mil/Aerospace (-55°C to +125°C and -55°C to +85°C) are available with Interpoint's "Environmental Screening" (E/S), referenced to MIL-PRF-38534, or with standard screening.

Other categories offer different screening levels. Specific screening levels are described on individual product data sheets.

CRANE interpoint A CRANE CO. COMPANY

Industrial, Commercial, and Quasi-Military DC/DC Converters

Industrial, Commercial, and Quasi-Military DC/DC Converters

MODEL	DQ #	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT POWER (TOTAL W)	EFF. (TYP.) (%)	CASE FIGURES / DIMENSIONS (MAX.)
HR700	2008	19 - 40	5, 12, 15, ±12, ±15 +5 & ±12, +5 & ±15	60 - 70 60	80 - 83 84	H
HR300	2009	19 - 36 18 - 36	5 12, 15, ±12, ±15	30 30	82 84 - 86	F4**
HR150	2010	18 - 36 10 - 16 4 - 8 18 - 36 9 - 16	5, 12, 15, ±12, ±15 5, 12, 15 ±12, ±15 +5 & ±12, +5 & ±15 +5 & ±12, +5 & ±15	15 - 20 15 15 15 15	79 - 83 81 - 83 78 79 79	D3* F4*
HR120	2011	16 - 40 16 - 36 19 - 40	5, 12, ±12 15, ±15 15, ±15	10 - 12 12 12	77 - 81 82 83	B*
HR40	2012	16 - 32	+5, ±12, ±15 +5 & ±12, +5 & ±15	3.5 - 4.0 3.2	72 - 75 70	C2
DC	2013	4.0 - 6.5 9 - 15 20 - 32 30 - 56	±12, ±15, ±18 5, ±12, ±15, ±18 5, 12, ±15, ±18 5, 12, ±12, ±15, ±18	4.8 6 5 - 6 5 - 6	75 - 77 81 73 - 81 70 - 80	1.755" x 0.880" x 0.380" (44.6 x 22.4 x 9.7 mm)
DDC	2014	4.0 - 6.5 9 - 15 20 - 32 36 - 48	5, ±12, ±15 5, ±12, ±15 5, ±12, ±15 5, ±12, ±15	4 5 5 5	66 - 73 68 - 80 70 - 83 72 - 82	1.255" x 0.705" x 0.375" (31.9 x 17.9 x 9.5 mm)
DDR DDR DDR DDR	2015	4.5 - 5.5 10.8 - 14 20 - 28 24 - 32 44 - 50	5, ±12, ±15 5, ±12, ±15 5, ±12, ±15 5, ±12, ±15 5, ±12, ±15	2.0 - 2.5 2.5 - 3.0 2.5 - 3.0 2.5 - 3.0 2.5 - 3.0	45 - 52 45 - 55 45 - 55 45 - 55 45 - 55	1.255" x 0.705" x 0.375" (31.9 x 17.9 x 9.5 mm)
DIP37 DIP12 DIP24	2016 2017 2018	3 - 7 9 - 15 16 - 32	±5, ±5, +12 & –5, ±15 +5, –5, ±5, –12 & +5, ±12, ±15 ±5, +12 & –5, ±12, ±15	1.75 2 2.5	75 78 72 - 82	1.005" x 0.505" x 0.355" (25.5 x 12.8 x 9.0 mm)
NETCON	2019	5 12	–9 –9	1.26 1.26	62 68	1.255" x 0.705" x 0.375" (31.9 x 17.9 x 9.5 mm)
DIP	2020	4.5 - 5.5 10.8 - 14.0 20 - 28 24 - 32 44 - 56	±12, ±15 ±12, ±15 ±12, ±15 ±12, ±15 ±12, ±15	1.0 1.0 1.0 1.0 1.0	46 46 46 46 46	1.005" x 0.505" x 0.355" (25.5 x 12.8 x 9.0 mm)

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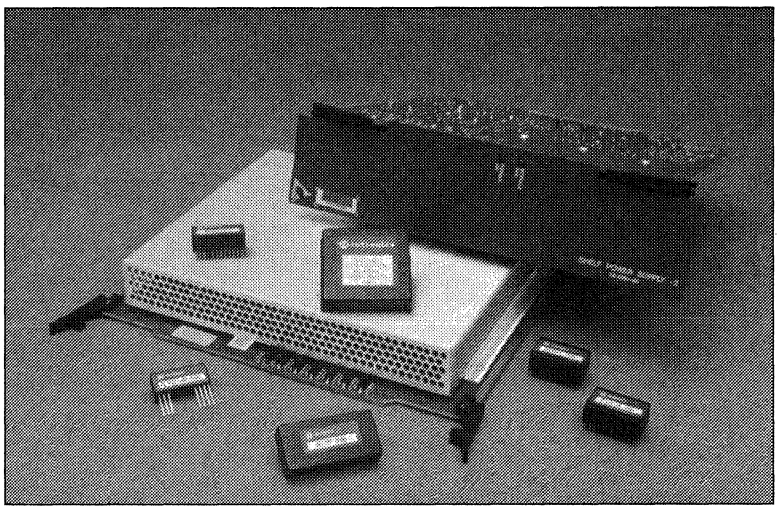

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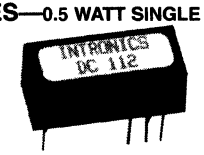
DC-DC CONVERTERS

DC 100 SERIES—0.5 WATT SINGLE OUTPUT

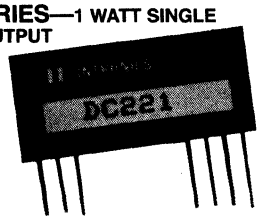


CASE DIMENSIONS: .89" X .39" X .33"

FEATURES
- Ultra-Miniature Package
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolation
- Input Voltage: 5, 12, 24V
- Output Voltage: 5, 12, 15

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-101	5V	5V	100mA
	DC-102	5V	12V	75mA
	DC-103	5V	15V	60mA
	DC-111	12V	5V	100mA
	DC-112	12V	12V	75mA
	DC-113	12V	15V	60mA
	DC-121	24V	5V	100mA
	DC-122	24V	12V	75mA
	DC-123	24V	15V	60mA

DC 200 SERIES—1 WATT SINGLE AND DUAL OUTPUT

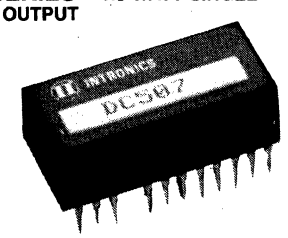


CASE DIMENSIONS: 1.25" X .34" X .57"

FEATURES
- 7 Pin SIP Package
- Fully Regulated (Except 9 Volt Output)
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolation
- Input Voltage: 5, 12, 24V
- Output Voltage: 5, 9, 12, 15, ±12, ±15

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-201	5V	5V	200mA
	DC-202	5V	12V	125mA
	DC-203	5V	15V	100mA
	DC-211	12V	5V	200mA
	DC-212	12V	12V	125mA
	DC-213	12V	15V	100mA
	DC-221	24V	5V	200mA
	DC-222	24V	12V	125mA
	DC-223	24V	15V	100mA
DUAL	DC-208	5V	±12V	±60mA
	DC-209	5V	±15V	±50mA
	DC-218	12V	±12V	±60mA
	DC-219	12V	±15V	±50mA
	DC-228	24V	±12V	±60mA
	DC-229	24V	±15V	±50mA
LAN	DC-206	5V	9V	200mA
	DC-216	12V	9V	200mA

DC 500 SERIES—1.8 WATT SINGLE AND DUAL OUTPUT

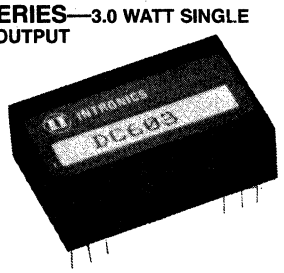


CASE DIMENSIONS: 1.27" X .6" X .475" (SINGLE) 1.25" X .8" X .4" (DUAL)

FEATURES
- Low Profile 24 Pin DIP Package
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolation
- Input Voltage: 5, 12, 24V, 48V
- Output Voltage: 5, 9, 12, 15, ±5, ±12, ±15

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-501	5V	5V	360mA
	DC-502	5V	12V	150mA
	DC-503	5V	15V	120mA
	DC-511	12V	5V	360mA
	DC-512	12V	12V	150mA
	DC-521	24V	5V	360mA
	DC-522	24V	12V	150mA
	DC-523	24V	15V	120mA
	DC-531	48V	5V	360mA
	DC-532	48V	12V	150mA
	DC-533	48V	15V	120mA
DUAL	DC-507	5V	±5V	±100mA
	DC-508	5V	±12V	±75mA
	DC-509	5V	±15V	±60mA
	DC-518	12V	±12V	±75mA
	DC-519	12V	±15V	±60mA
	DC-528	24V	±12V	±75mA
	DC-529	24V	±15V	±60mA
	DC-538	48V	±12V	±75mA
	DC-539	48V	±15V	±60mA
LAN	DC-506	5V	9V	200mA
	DC-516	12V	9V	200mA

DC 600 SERIES—3.0 WATT SINGLE AND DUAL OUTPUT



CASE DIMENSIONS: 1.25" X .8" X .5"

FEATURES
- Full 2:1 Input Range for Battery and Telecommunication Applications
- Low Profile 12 Pin DIP Package
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolation
- Continuous Short Circuit Protection
- Input Voltage: 5, 12, 24, 48V
- Output Voltage: 5, 12, 15, ±5, ±12, ±15

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-601	4.5-6V	5V	500mA
	DC-602	4.5-6V	12V	250mA
	DC-603	4.5-6V	15V	200mA
	DC-611	9-18V	5V	500mA
	DC-612	9-18V	12V	250mA
	DC-613	9-18V	15V	200mA
	DC-621	18-36V	5V	500mA
	DC-622	18-36V	12V	250mA
	DC-623	18-36V	15V	200mA
	DC-631	36-72V	5V	500mA
	DC-632	36-72V	12V	250mA
	DC-633	36-72V	15V	200mA
DUAL	DC-617	9-18V	±5V	±250mA
	DC-618	9-18V	±12V	±125mA
	DC-619	9-18V	±15V	±100mA
	DC-627	18-36V	±5V	±250mA
	DC-628	18-36V	±12V	±125mA
	DC-629	18-36V	±15V	±100mA
	DC-637	36-72V	±5V	±250mA
	DC-638	36-72V	±12V	±125mA
	DC-639	36-72V	±15V	±100mA

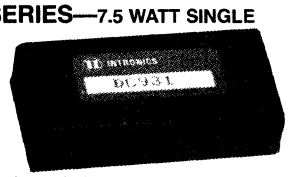
DC 800 SERIES—5 WATT SINGLE AND DUAL OUTPUT

CASE DIMENSIONS: 2" X 2" X .4"

FEATURES
- Full 2:1 Input Range for Battery and Telecommunication Applications
- Continuous Short Circuit Protection
- Overvoltage Protection
- Six-sided Shielding
- Fully Regulated
- Input/Output Isolation
- High Reliability
- Input Voltage: 5, 12, 24, 48V
- Output Voltage: 5, 12, 15, ±12, ±15

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-801	4.5-6V	5V	1000mA
	DC-802	4.5-6V	12V	400mA
	DC-803	4.5-6V	15V	333mA
	DC-811	9-18V	5V	1000mA
	DC-812	9-18V	12V	400mA
	DC-813	9-18V	15V	333mA
	DC-821	18-36V	5V	1000mA
	DC-822	18-36V	12V	400mA
	DC-823	18-36V	15V	333mA
	DC-831	36-72V	5V	1000mA
	DC-832	36-72V	12V	400mA
	DC-833	36-72V	15V	333mA
DUAL	DC-806	4.5-6V	±12V	±200mA
	DC-809	4.5-6V	±15V	±167mA
	DC-818	9-18V	±12V	±200mA
	DC-819	9-18V	±15V	±167mA
	DC-828	18-36V	±12V	±200mA
	DC-829	18-36V	±15V	±167mA
	DC-838	36-72V	±12V	±200mA
	DC-839	36-72V	±15V	±167mA

DC 900 SERIES—7.5 WATT SINGLE OUTPUT



CASE DIMENSIONS: 2" X 1" X .4"

FEATURES
- 2:1 Input Range for Battery and Telecommunication Applications
- High Efficiency/High Reliability
- Fully Regulated and Isolated
- Overvoltage Protection
- Continuous Short Circuit Protection
- Six-sided Shielding

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-911	9.5-18V	5V	1500mA
	DC-912	9.5-18V	12V	625mA
	DC-913	9.5-18V	15V	500mA
	DC-921	18-36V	5V	1500mA
	DC-922	18-36V	12V	625mA
	DC-923	18-36V	15V	500mA
	DC-931	36-72V	5V	1500mA
	DC-932	36-72V	12V	625mA
	DC-933	36-72V	15V	500mA

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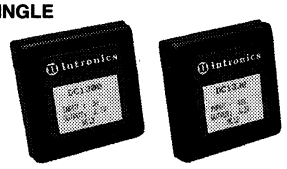
DC-DC CONVERTERS

DC 1300 SERIES—10 WATT
3.3V SINGLE

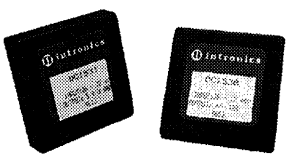


CASE DIMENSIONS:
2.00" X 2.00" X .40"

FEATURES
- 2:1 Input Range
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolation
- Remote On/Off

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
DC-1300	4.5-6V	3.3V	3000
DC-1310	9-18V	3.3V	3000
DC-1320	18-36V	3.3V	3000
DC-1330	36-72V	3.3V	3000

DC 1500 SERIES—15 WATT SINGLE AND DUAL OUTPUT



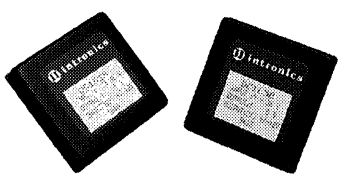
CASE DIMENSIONS: 2.00" X 2.00" X .40"

FEATURES
- 2:1 Input Range for Battery and Telecommunication Applications
- Fully Regulated/Isolated
- High Reliability
- Six-sided Continuous Shield

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
DC-1511	9-18V	5V	3000
DC-1512	9-18V	12V	1250
DC-1513	9-18V	15V	1000
DC-1518	9-18V	±12V	±625
DC-1519	9-18V	±15V	±500
DC-1521	18-36V	5V	3000
DC-1522	18-36V	12V	1250
DC-1523	18-36V	15V	1000
DC-1528	18-36V	±12V	±625
DC-1529	18-36V	±15V	±500
DC-1531	36-72V	5V	3000
DC-1532	36-72V	12V	1250
DC-1533	36-72V	15V	1000
DC-1538	36-72V	12V	±625
DC-1539	36-72V	15V	±500

Consult factory for 4:1 input range

DC 1600 SERIES—15 WATT TRIPLE OUTPUT 2:1/4:1 INPUT RANGE



CASE DIMENSIONS: 2.00" X 2.00" X .40"

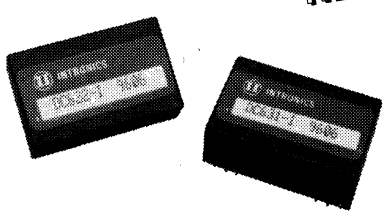
FEATURES
- 2:1/4:1 Input Range
- Remote On/Off

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
DC-1618	9-18V	5/±12V	1500±310
DC-1619	9-18V	5/±15V	1500±250
DC-1617	9-18V	+5/+12/-5V	1500/310/500
DC-1628	18-36V	5/±12V	1500±310
DC-1629	18-36V	5/±15V	1500±250
DC-1627	18-36V	+5/+12/-5V	1500/310/500
DC-1638	36-72V	5/±12V	1500±310
DC-1639	36-72V	5/±15V	1500±250
DC-1637	36-72V	+5/+12/-5V	1500/310/500
DC-1658	9-36V	5/±12V	1500±310
DC-1659	9-36V	5/±15V	1500±250
DC-1657	9-36V	+5/+12/-5V	1500/310/500
DC-1668	20-72V	5/±12V	1500±310
DC-1669	20-72V	5/±15V	1500±250
DC-1667	20-72V	+5/+12/-5V	1500/310/500

HIGH ISOLATION DC-DC CONVERTERS

DC 600- I SERIES—3.0 WATT SINGLE AND DUAL OUTPUT

NEW!

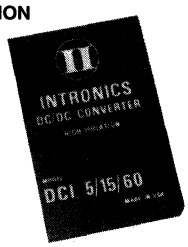


CASE DIMENSIONS: 1.25" X .8" X .5"

FEATURES
- Full 2:1 Input Range for Battery and Telecommunication Applications
- 2000 Vdc Isolation
- Short Circuit Protected
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input Voltage: 5, 12, 24, 48V
- Input Range: 2:1
- Input Filter: LC

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-601-I	4.5-6V	5V	500mA
	DC-602-I	4.5-6V	12V	250mA
	DC-603-I	4.5-6V	15V	200mA
	DC-611-I	9-18V	5V	500mA
	DC-612-I	9-18V	12V	250mA
	DC-613-I	9-18V	15V	200mA
	DC-621-I	18-36V	5V	500mA
	DC-622-I	18-36V	12V	250mA
	DC-623-I	18-36V	15V	200mA
	DC-631-I	36-72V	5V	500mA
	DC-632-I	36-72V	12V	250mA
	DC-633-I	36-72V	15V	200mA

DCI/DUAL OUTPUT—HIGH ISOLATION
8000 VDC ISOLATION



CASE DIMENSIONS: 3.02" X 2.02" X .62"

FEATURES
INPUT: 5, 12, 24, 28VDC
OUTPUT: ±12, ±15VDC
- Meets UL544 Leakage
- High Input/Output Isolation
- Short Circuit Current Limit
- No Heat Sink Required
- Excellent Regulation: 0.05% Line/Load

MODEL	INPUT RANGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (VDC)
5/12/60	5±10%	±12	60
5/15/60	5±10%	±15	60
12/12/60	12±10%	±12	60
12/15/60	12±10%	±15	60
24/12/60	24±10%	±12	60
24/15/60	24±10%	±15	60
28/12/60	28±10%	±12	60
28/15/60	28±10%	±15	60

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DC-DC CONVERTERS

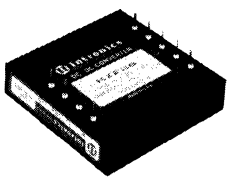
DC 700 SERIES—15-75 WATT

CASE DIMENSIONS: 2.50" X 3.00" X .81"

FEATURES
- Up to 12 Watts/Cubic Inch
- Efficiency to 90%
- Ultra Wide Input Voltage Range
- Thermal Overload Protection
- Six-Sided Shielding, Low Thermal Gradient Copper Case
- Reverse Polarity Protection

MODEL NUMBER	INPUT RANGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (AMPS)
DC-702	8-40	5	3
DC-703	8-40	5	5
DC-705	15-40	12	3
DC-706	15-40	12	5
DC-707	18-40	15	3
DC-708	18-40	15	5

KZ 200 SERIES—25 WATT



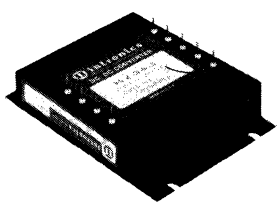
CASE DIMENSIONS: 3.00" X 3.00" X .70"

FEATURES
- Current Mode Control
- 200 KHz Switching Frequency
- Remote Control Shutoff
- Adjustable Output Voltage
- Low Voltage Shutdown
- Available In Two Pin Configurations

MODEL NUMBER	INPUT RANGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (AMPS)
KZ-231	20-60	5	5.0
KZ-232	20-60	12	2.1
KZ-233	20-60	15	1.7
KZ-238	20-60	5, 12, 12	4/0.5/0.5*
KZ-239	20-60	5, 15, 15	4/0.5/0.5*
KZ-241	36-72	5	5.0
KZ-242	36-72	12	2.1
KZ-243	36-72	15	1.7
KZ-248	36-72	5, 12, 12	4/0.5/0.5*
KZ-249	36-72	5, 15, 15	4/0.5/0.5*

*Power limited to 25 watts.

KZ 300 SERIES—40 WATT



CASE DIMENSIONS: 4.225" X 3.00" X .80"

FEATURES
- Current Mode Control
- 200 KHz Switching Frequency
- Remote Control Shutoff
- Adjustable Output Voltage
- Low Voltage Shutdown

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (AMPS)
KZ-331	20-60	5	8.0
KZ-332	20-60	12	3.3
KZ-333	20-60	15	2.7
KZ-338	20-60	5, 12, 12	6, 1, 1*
KZ-339	20-60	5, 15, 15	6, 1, 1*
KZ-341	36-72	5	8.0
KZ-342	36-72	12	3.3
KZ-343	36-72	15	2.7
KZ-348	36-72	5, 12, 12	6, 1, 1*
KZ-349	36-72	5, 15, 15	6, 1, 1*

*Power limited to 40 watts.

KZ 400 SERIES—100 WATT

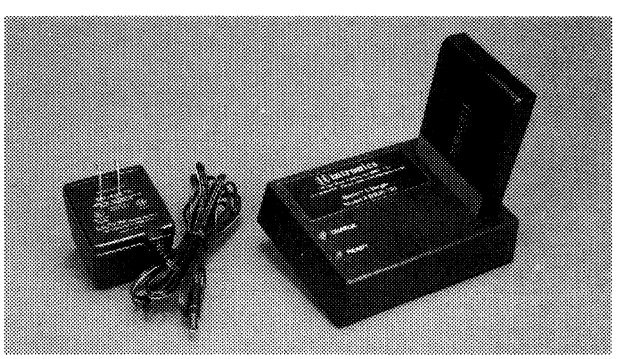
CASE DIMENSIONS: 6.00" X 4.80" X 1.125"

FEATURES
- Current Mode Control
- 200 KHz Switching Frequency
- Remote Control Shutoff
- Adjustable Output Voltage
- Low Voltage Shutdown
- Over 100,000 Hrs MTBF per MIL STD 217D at 50°C + G.B. Environment

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (AMPS)
KZ-431	20-60	5	20.0
KZ-432	20-60	12	8.3
KZ-433	20-60	15	6.7
KZ-434	20-60	24	4.1
KZ-438	20-60	5, 12, 12	15, 2, 2*
KZ-439	20-60	5, 15, 15	15, 2, 2*
KZ-441	36-72	5	20.0
KZ-442	36-72	12	8.3
KZ-443	36-72	15	6.7
KZ-444	36-72	24	4.1
KZ-448	36-72	5, 12, 12	15, 2, 2*
KZ-449	36-72	5, 15, 15	15, 2, 2*

*Power limited to 100 watts.

DR SERIES BATTERY CHARGER—NiMH
Microprocessor Controlled - 1 Hour Charge Time



FEATURES
- 3 Stage Charging
- Microprocessor Based
- Enhanced Battery Life
- Complies With Battery Manufacturers' Requirements
- Worldwide Use Via Wall Plug Adapter Selection
- Supplied With Safety Agency Approved Adapter
- Technology Adaptable For All Battery Chemistries
- Features Rapid Battery Charging
- Cost Effective Solution For Charging Requirements

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DC-DC CONVERTERS

DC 600 HD—5 WATT SINGLE/DUAL OUTPUT (3.3V OUTPUT)

NEW!

FEATURES

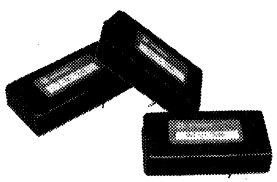
- Std. 1.25" x .8" Package, DOUBLE POWER
- Low Profile 24 Pin DIP Package
- Short Circuit Protected
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolated
- 3.3V Output
- Full 2:1 Input Range for Battery and Telecommunications Applications

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-611-HD	9-18V	5V	1000mA
	DC-612-HD	9-18V	12V	400mA
	DC-613-HD	9-18V	15V	350mA
	DC-621-HD	18-36V	5V	1000mA
	DC-622-HD	18-36V	12V	400mA
	DC-623-HD	18-36V	15V	350mA
	DC-631-HD	36-72V	5V	1000mA
	DC-632-HD	36-72V	12V	400mA
	DC-633-HD	36-72V	15V	350mA
DUAL	DC-617-HD	9-18V	±5V	500/500mA
	DC-618-HD	9-18V	±12V	200/200mA
	DC-619-HD	9-18V	±15V	175/175mA
	DC-627-HD	18-36V	±5V	500/500mA
	DC-628-HD	18-36V	±12V	200/200mA
	DC-629-HD	18-36V	±15V	175/175mA
	DC-637-HD	36-72V	±5V	500/500mA
	DC-638-HD	36-72V	±12V	200/200mA
	DC-639-HD	36-72V	±15V	175/175mA
3.3V	DC-610-HD	9-18V	3.3V	1500mA
	DC-620-HD	18-36V	3.3V	1500mA
	DC-630-HD	36-48V	3.3V	1500mA

CASE DIMENSIONS: 1.25" X .8" X .5"

DC 1700—15 WATT SINGLE/DUAL OUTPUT (3.3V OUTPUT)

NEW!



FEATURES

- Std. 1x2 Package, DOUBLE POWER
- Outputs: 3.3, 5, 12, 15
- 500Vdc Isolation
- Short Circuit Protected
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolated
- 2:1 Input Range

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-1711	9-18V	5V	3A
	DC-1712	9-18V	12V	1.25A
	DC-1713	9-18V	15V	1A
	DC-1721	18-36V	5V	3A
	DC-1722	18-36V	12V	1.25A
	DC-1723	18-36V	15V	1A
	DC-1731	36-72V	5V	3A
	DC-1732	36-72V	12V	1.25A
	DC-1733	36-72V	15V	1A
DUAL	DC-1718	9-18V	±12V	625/625mA
	DC-1719	9-18V	±15V	520/520mA
	DC-1728	18-36V	±12V	625/625mA
	DC-1729	18-36V	±15V	520/520mA
	DC-1738	36-72V	±12V	625/625mA
	DC-1739	36-72V	±15V	520/520mA
3.3V	DC-1710	9-18V	3.3V	4.5A
	DC-1720	18-36V	3.3V	4.5A
	DC-1730	36-72V	3.3V	4.5A

CASE DIMENSIONS: 2" X 1" X .4"

DC 1800—25 WATT SINGLE DUAL OUTPUT (3.3V OUTPUT)

NEW!

FEATURES

- Std. 2x2 Package, DOUBLE POWER
- Outputs: 3.3, 5, 12, 15
- 500Vdc Isolation
- Short Circuit Protected
- Fully Regulated
- Low Output Ripple and Noise
- High Reliability
- Input/Output Isolated
- 2:1 Input Range

	MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
SINGLE	DC-1811	9-18V	5V	5000mA
	DC-1812	9-18V	12V	2000mA
	DC-1813	9-18V	15V	1500mA
	DC-1821	18-36V	5V	5000mA
	DC-1822	18-36V	12V	2000mA
	DC-1823	18-36V	15V	1500mA
	DC-1831	36-72V	5V	5000mA
	DC-1832	36-72V	12V	2000mA
	DC-1833	36-72V	15V	1500mA
DUAL	DC-1818	9-18V	±12V	1000/1000mA
	DC-1819	9-18V	±15V	750/750mA
	DC-1828	18-36V	±12V	1000/1000mA
	DC-1829	18-36V	±15V	750/750mA
	DC-1838	36-72V	±12V	1000/1000mA
	DC-1839	36-72V	±15V	750/750mA
3.3V	DC-1810	9-18V	3.3V	7.5A
	DC-1820	18-36V	3.3V	7.5A
	DC-1830	36-72V	3.3V	7.5A

CASE DIMENSIONS: 2" X 2" X .4"

ISOLATION AMPLIFIERS

IA175 ULTRA-LINEAR ISOLATION AMPLIFIER WITH EXTERNAL SYNC CAPABILITY

Fully Compatible with 12-Bit Acquisition Systems

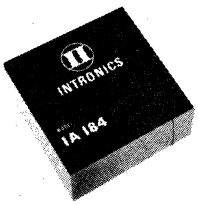
CASE DIMENSIONS: 3.5" X 2.5" X 0.62"

FEATURES

- UL Component Recognized
- Provision for External Synchronization
- High Linearity: 0.005% Peak, Typical
- High Input/Output Isolation: 5000 VDC Continuous 3000 VAC RMS
- 1000:1 Programmable Gain
- Input Voltage Noise: 1μV RMS, 10Hz-1KHz
- 126 dB CMRR
- Low Drift: ±0.01%/°C Maximum
- Common Mode Input Voltage: 5000 VDC
- Isolated Power: ±14 VDC, ±15mA

IA184 LOW-COST, HIGH LINEARITY ISOLATION AMPLIFIER WITH EXTERNAL SYNC CAPABILITY

Fully Compatible with 10-Bit Data Acquisition Systems



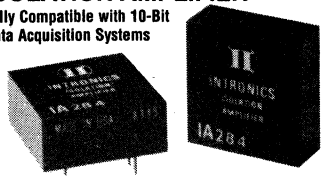
CASE DIMENSIONS: 1.5" X 1.5" X 0.62"

FEATURES

- UL Component Recognized
- Provision for External Synchronization
- High Linearity: 0.025% Peak, Typical
- High Input/Output Isolation: 2500 VDC or VAC, Continuous
- 1000:1 Programmable Gain
- Input Voltage Noise: 1μV RMS, 10Hz-1KHz
- 126 dB CMRR
- Isolated Power: ±15 VDC, ±15mA

IA284 LOW-COST, HIGH-LINEARITY ISOLATION AMPLIFIER

Fully Compatible with 10-Bit Data Acquisition Systems



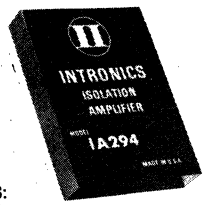
CASE DIMENSIONS: 1.5" X 1.5" X 0.62"

FEATURES

- UL Component Recognized
- High Linearity: 0.025% Peak, Typical
- Input/Output Isolation: 2500 VDC or VAC, Continuous
- 10:1 Programmable Gain
- 100:1 Programmable Gain (Optional)
- Input Voltage Noise: 10μV RMS, 10Hz-1KHz
- 126 dB CMRR
- Isolated Power: ±15 VDC, ±15mA

IA294 MEDICAL ISOLATION AMPLIFIER

Low Noise, with Active Input Reference and Shield Drives



CASE DIMENSIONS: 3.0" X 2.0" X 0.62"

FEATURES

- UL Component Recognized
- Provision for External Synchronization
- High Linearity: 0.1% Peak, Typical
- High Input/Output Isolation: 5000 VDC, Continuous
- 10:1 Fixed Gain
- Input Voltage Noise: 5μV RMS, 10Hz-1KHz
- 126 dB CMRR
- True Instrumentation Front-End
- Active Input Reference
- Active Shield Drives
- Differential Input Protection for Defibrillators: 6500 VDC
- Input to Output Leakage Current: < 10μV
- Isolated Power: ±15 VDC, ±15mA

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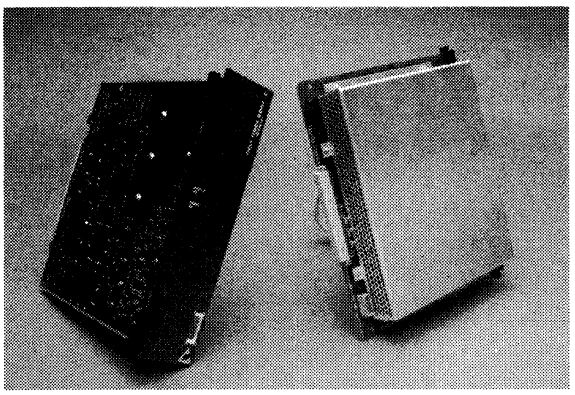
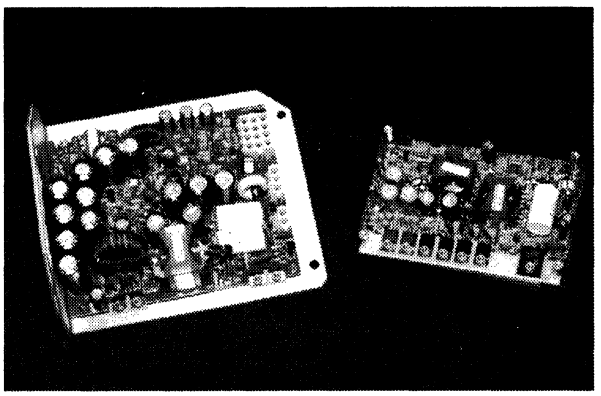
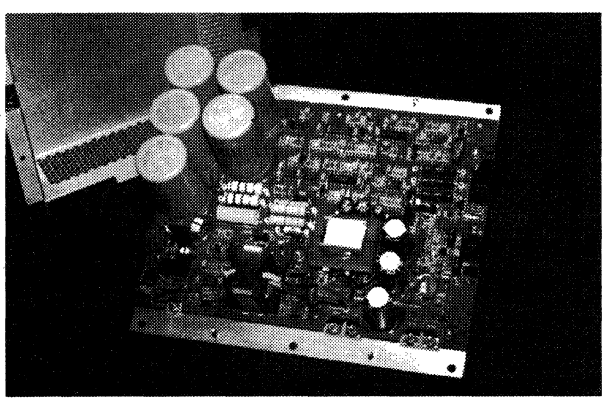


Telecom:
Mechanical Compatibility
Redundancy/Load Sharing
Hot Swapping
Design to Meet Bellcore



Mobile/Transportation:
Custom Config. Mechs.
User Defined Connections
Ruggedized Design
Power Protection Ckts.
Industry Input Ranges



Industrial Controls:
Expanded Temp Range
Extended Hold Up Time
Redundancy
Load Share
Alarm Circuitry

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KAPPA® TECHNOLOGIES INC.

DC-DC CONVERTERS

10Base2 CheaperNet/10Base5 Thick Ethernet

IC Mfr's Name	Station or DTE Controller Chip Part#	Associated CTI Chip Part#		Topology	Kappa P/N (applies to all Chip Sets Listed)			
					16-pin DIL	24-pin DIL	24-pin DIP	24-pin SMD
AMD	Am7990/Am7992	Am7996	Standard **Kappa** Converter	10Base2	DC216U0509SP	N/A	DC2U0509SP	DC2U0509SG
AMD	Am7990/Am7992	Am7997						
AMD	Am79C90/Am7992	Am7996		10Base5	N/A	N/A	DC2U0509SP2	DC2U0509SG2
Crystal	CS8005/CS8023A	CS83C92C						
Fujitsu	MB86950/51	MBL8392A						
Fujitsu	MB86950/51	MB502A						
Fujitsu	MB86960	MBL8392A	*Enhanced* **Kappa** Converter	10Base2	N/A	N/A	DC2E0509SP	DC2E0509SG
Intel	82586/590/596	82C501AD						
National	DP8390/8391	DP8392C		10Base5	N/A	DC1036W	DC2E0509SP2	DC2E0509SG2
National	DP8390/83910	DP8392C						
National	DP83901	DP8392C						
National	DP83916	DP8392C	*Enhanced* **Kappa** Converter w/HI-Enable	10Base2	N/A	N/A	DC2E0509HP	DC2E0509HG
National	DP83932	DP8392C						
Symbios Logic	92C901	NCR92C392		10Base5	N/A	DC1017W	DC2E0509HP2	DC2E0509HG2
Symbios Logic	92C390/91	NCR92C392						
Philips	86950/NE502A	NE8392A						
Seeq	8005/8020	83C92	*Enhanced* **Kappa** Converter w/LO-Enable	10Base2	N/A	N/A	DC2E0509LP	DC2E0509LG
Seeq	83C90/83C91	83C92						
Silicon Sys.	78Q8360	78Q8330		10Base5	N/A	DC1010W	DC2E0509LP2	DC2E0509LG2
SMC	SMC83C690	SMC83B692						
SMC	SMC91C90	SMC83B692						

3-Watt DC-DC Converters (w/continuous output short-circuit protection, ±1% worst-case line/load regulation)

Kappa Part Number (*)=Insert Enable Code	Input Voltage (V_{IN}), V_{DC}	Input Current (mA_{DC}) I_{IN} (min)	Input Current (mA_{DC}) I_{IN} (max)	Nom. Output Voltage (V_{OUT}), V_{DC}	Max. Output Current (I_{OUT}), mA_{DC}	Enable/Pin# (*): "**S**"=N/A; "**H**"=HI; "**L**"=LO S	H	L	Typical Ripple & Noise (mVp-p)
DC31C0505(*)W	4.5 - 5.5	100	870	5	600	N/A	22	3	25
DC31C0509(*)W	4.5 - 5.5	100	900	9	333	N/A	22	3	35
DC31C0512(*)W	4.5 - 5.5	100	930	12	250	N/A	22	3	50
DC31C0515(*)W	4.5 - 5.5	100	910	15	200	N/A	22	3	70
DC31C1205(*)W	10.8 - 13.2	25	320	5	600	N/A	22	3	25
DC31C1209(*)W	10.2 - 15.8	25	370	9	333	N/A	22	3	35
DC31C1212(*)W	10.8 - 13.2	25	370	12	250	N/A	22	3	50
DC31C1215(*)W	10.8 - 13.2	25	910	15	200	N/A	22	3	70
DC31C2405(*)W	21.6 - 26.4	15	170	5	600	N/A	22	3	25
DC31C2409(*)W	21.6 - 26.4	15	186	9	333	N/A	22	3	35
DC31C2412(*)W	21.6 - 26.4	15	186	12	250	N/A	22	3	50
DC31C2415(*)W	21.6 - 26.4	15	182	15	200	N/A	22	3	70

5-Watt DC-DC Converters (w/continuous output short-circuit and reverse voltage protection)

Kappa Part# §=Insert V_{IN} Code {*): **S**=Single; **D**=Dual	Nominal Input Voltage, V_{IN} (V_{DC}) "§"=DC51	"§"=DC52	"§"=DC53	Input Current, I_{IN} (mA_{DC}) No Load	Full Load	V_{OUT} (V_{DC}) ±1% Single	Dual	I_{OUT} (mA_{DC}) max Single	Dual	Typical Efficiency (%)
(§)R0505(*)W	5.0 ±10%	4.5 – 6.0	4.5 – 15.0	140	1680	5	–	1000	–	60
(§)R0512(*)W	5.0 ±10%	4.5 – 6.0	4.5 – 15.0	140	1600	12	±12	400	±200	63
(§)R0515(*)W	5.0 ±10%	4.5 – 6.0	4.5 – 15.0	140	1540	15	±15	333	±167	67
(§)R1205(*)W	12 ±10%	9 – 18	9 – 27	68	640	5	–	1000	–	65
(§)R1212(*)W	12 ±10%	9 – 18	9 – 27	68	620	12	±12	400	±200	65
(§)R1215(*)W	12 ±10%	9 – 18	9 – 27	68	630	15	±15	333	±167	69
(§)R2405(*)W	24 ±10%	18 – 36	12 – 36	35	300	5	–	1000	–	69
(§)R2412(*)W	24 ±10%	18 – 36	12 – 36	35	290	12	±12	400	±200	71
(§)R2415(*)W	24 ±10%	18 – 36	12 – 36	35	300	15	±15	333	±167	77
(§)R4805(*)W	48 ±10%	36 – 72	24 – 72	20	150	5	–	1000	–	69
(§)R4812(*)W	48 ±10%	36 – 72	24 – 72	20	150	12	±12	400	±200	71
(§)R4815(*)W	48 ±10%	36 – 72	24 – 72	20	145	15	±15	333	±167	78

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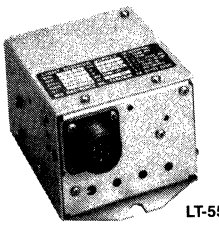
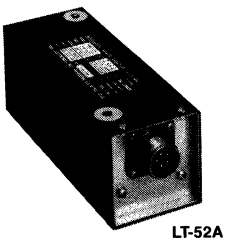
AIRBORNE TSO'D DC POWER CONVERTERS

MODEL LT-SERIES SPECIFICATIONS

Input Voltage: 28 VDC nominal, 20 to 40 VDC
Output Voltage: Adjustable with external rheostat or potentiometer and most models have DC voltage control.
Regulation: 2% for line, 2% for load and 2% temperature.
Output Ripple: 50 mVpp max.
Altitude: 55,000 ft.
Protection: (Overvoltage) Output voltage is limited to approximately 125% of rating even though remote control rheostat opens or shorts, or internal failure occurs.
Temperature: −55°C to +71°C (sufficient cooling required at +71°C ambient)
Protection: (Overload) Input and output current limit when overload exceeds approximately 125% or rating.

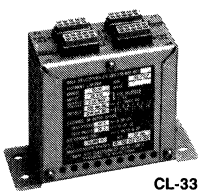

LT-55


LT-52A

MODEL	OUTPUT (TOTAL) VOLT DC	AMPS	WATTS	RIPPLE	INPUT CURR. at 28 VDC, at Full Load	EFFICIENCY % Typical at Full Load	SIZE (INCH) W x L x H	WEIGHT (LBS.)
LF10	0 to 5	20	100	25 mVpp	4.7A	75	3.18 x 5.25 x 2.0	1
LH14	0 to 28	5	140	50 mVpp	5.88 A	85	3.18 x 5.25 x 2.0	0.95
LT-45	0 to 28	2.5	70	25 mVpp	3.0 A	83	2.03 x 5.03 x 1.63	.60
LT-45(D)	0 to 28	3.6	100	25 mVpp	4.3 A	83	2.33 x 5.03 x 1.63	.62
LT-48	0 to 5	7.5	38	25 mVpp	1.7 A	75	2.03 x 5.03 x 1.63	.60
LT-246(C)	12	12	144	50 mVpp	6.2 A	84	4.0 x 5.0 x 1.65	1.20
LT-46(C)	12	4.2	50	50 mVpp	2.2A	83	2.00 x 5.03 x 1.63	.60
LT-50	0 to 5	7.5	40	8 mVpp	1.7 A	75	2.3 x 6.9 x 2.0	1.2
LT-52A, 53	0 to 5	10	50	25 mVpp	2.5 A	75	3.43 x 5.8 x 2.3	1.5
LT-55(A)(D)	0 to 5	15	75	25 mVpp	3.6 A	75	3.43 x 5.1 x 2.6	1.2
LT-57(F)	13.75	10	138	50 mVpp	5.6 A	81	3.4 x 5.1 x 2.6	1.3
LT-70, 73	0 to 12	5.8	70	25 mVpp	3.2 A	78	2.3 x 5.8 x 2.3	1.5
LT-71, 71A	14	8	112	50 mVpp	4.7A	80	2.4 x 6.9 x 2.2	1.5
LT-100, 103	0 to 28	3.6	100	25 mVpp	4.2 A	84	2.3 x 5.8 x 2.3	1.5
LT-352	0 to 5 (Three)	28	150	25 mVpp	7.5 A	73	6.7 x 6.5 x 2.35	3.6

BATTERY CHARGERS, CURRENT LIMITERS, REGULATED & UNREGULATED DC CONVERTERS FOR AIRBORNE APPLICATIONS

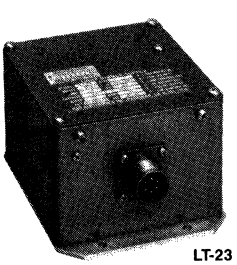
Input: 28 VDC & 14 VDC
Output: Fixed DC Voltage
Altitude: 50,000 ft.
Temperature: −55°C to +71°C
Environmental: Per RTCA DO-160C Env.

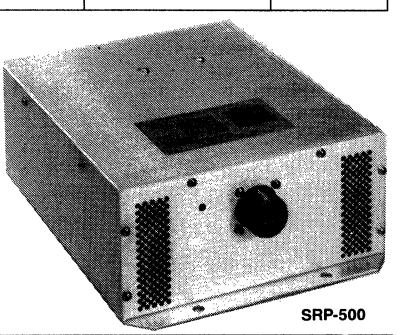

CL-33

MODEL	Vin	Vout	AMPS	WATTS	INPUT CURRENT	EFFIC.	SIZE	WT. (LBS.)
BC-14	28	14±1	5.0±1	70	3.1 A	80	2.3 x 5.8 x 2.3	1.5
BC-28	28	28±2	2.5±.5	70	3.0 A	85	2.3 x 5.8 x 2.3	1.5
CL-33	28	32 ind outputs	200 mADC 250 mADC	60	2.5 A	85	1.56 x 4 x 3.05	0.57
RB125	11-14	28	5	140	14-11A	87	2.3 x 2.3 x 5.75	1.5
UC14-28	14	28	10	280	23 A	90	4.5 x 2.8 x 8.25	3.4
UC28-14	28	14	16	220	8.8 A	90	4.5 x 2.8 x 8.25	3.4
RG40	28	14	30	420	17.0	80	6.2 x 9.5 x 3.4	3.5

AC TO DC AIRBORNE AND MILITARY POWER SUPPLIES

Input: 115 VAC 400Hz Single Phase
*115/208 VAC 60-400Hz 4 Wire WYE
Output: Adjustable DC Output.
Output Ripple: 500 MvTyp., 2 Vpp Max. @ 800 Hz
Altitude: 50,000 ft.
Temperature: −55°C to +70°C
Environmental: per RTCA DO-160C Env.


LT-23


SRP-500

MODEL	Vin	FREQ.	Vout	AMPS	INPUT CURRENT	EFFIC.	SIZE	WT. (LBS.)
LT-23	115	400 Hz	.5–5	0–10A	.70 A	63%	4.0 x 4.0 x 3.0	3.2
LT-25	115	400 Hz	1–28	0–10 A	2.9 A	84%	4.0 x 4.0 x 7.0	6.0
PFA1	115	47-400Hz	7.5	1.34A	0.23A	45%	2.03 x 5.03 x1.56	0.6
* SRP500-14	120 3PH	60–400 Hz	14.0	36A	2A/Phase	75%	7.75 x 3.6 x 10.7	7.0
PH100	115/230	50–400 Hz	28	35A	12A/6A	74%	7.75 x 10.6 x 3.6	8.5
WH120	120 3PH	300–450 Hz	28	42A	4.2A/Phase	81%	7.75 x 10.6 x 3.6	8.0

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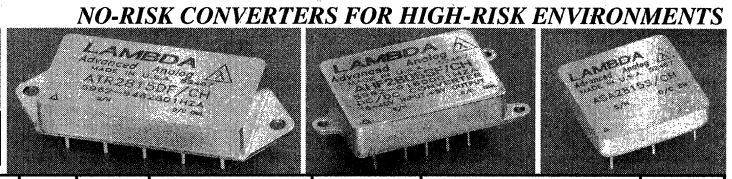
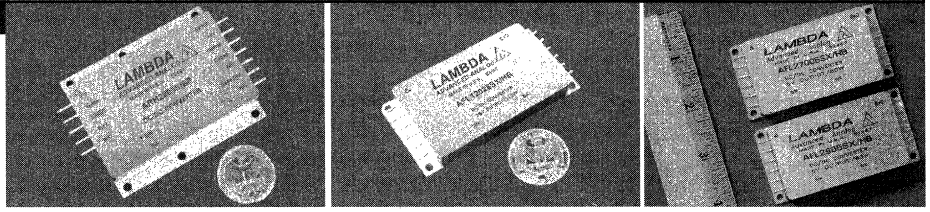


HYBRID DC/DC CONVERTERS

Model	SMD	Pout	Vout	Vin	N/O	Max. Reg.	Typical Ripple	Typ. Efficiency	Package (F=Flange)	Weight (gm)
ASA2805S	5962-94629	5	5V, 1A	16-40	1	±1%	125mV p-p	70%		20
ASA2812S	5962-94631	5	12V, 0.417A	16-40	1	±1%	50mV p-p	74%		20
ASA2815S	5962-94630	5	15V, 0.333A	16-40	1	±1%	100mV p-p	74%	1.065 x 1.075 x 0.27	20
ASA2812D	5962-95648	5	±12V, ±0.208A	16-40	2	±1%	125mV p-p	72%		20
ASA2815D	5962-94649	5	±15V, ±0.167A	16-40	2	±1%	125mV p-p	72%		20
AHF2805S	5962-91600	12	5V, 2.4A	16-40	1	±1%	25mV p-p	78%		35
AHF2812S	5962-94568	12	12v, 1A	16-40	1	±1%	25mV p-p	80%		35
AHF2815S	5962-94563	12	15V, 0.3A	16-40	1	±1%	25mV p-p	80%	1.45 x 1.125 x 0.33	35
AHF2812D	5962-92111	12	±12V, ±0.50A	16-40	2	±1%	25mV p-p	80%	1.91 x 1.125 x 0.33 (F)	35
AHF2815D	5962-92351	12	±15V, ±0.40A	16-40	2	±1%	25mV p-p	80%		35
AHF2815T*	5962-94623	8	5V, 1A and ±15V, ±0.10A	16-40	3	±1%	50mV p-p(Main) 100mV p-p(Dual)	75%	1.45 x 1.125 x 0.33	35
AHE2805S	5962-89683	15	5V, 3A	17-40	1	±1%	20mV p-p	82%		65
AHE2812S	5962-91580	20	12V, 1.667A	17-40	1	±1%	30mV p-p	83%		65
AHE2815S	5962-91625	20	15V, 1.333A	17-40	1	±1%	30mV p-p	84%	2.11 x 1.12 x 0.495	65
AHE2812D	5962-92040	15	±12V, ±0.625A	17-40	2	±1%	25mV p-p	82%	2.87 x 1.12 x 0.495(F)	65
AHE2815D	5962-91575	15	±15V, ±0.50A	17-40	2	±1%	25mV p-p	82%		65
AHV2805S	5962-91773	15	5V, 3A	16-40	1	±1%	20mV p-p	76%		60
AHV2812S	5962-92112	15	12V, 1.25A	16-40	1	±1%	30mV p-p	76%		60
AHV2815S	5962-92113	15	15V, 1.0A	16-40	1	±1%	30mV p-p	76%	2.88 x 1.12 x 0.405(F)	60
AHV2812D	5962-92114	15	±12V, ±0.625A	16-40	2	±1%	30mV p-p	76%		60
AHV2815D	5962-91774	15	±15V, ±0.50A	16-40	2	±1%	30mV p-p	76%		60
AHV2812T	5962-92115	15	5V, 2A and 12V, 0.208A or	16-40	3	±1%	40mV p-p(Main) 30mV p-p(Dual)	76%	2.70 x 1.35 x 0.5(F)	60
AHV2815T	5962-92116	15	15V, 0.167A	16-40	3	±1%	30mV p-p(Dual)	76%		60
ATO2812T	5962-91602	15	5V, 2A and		3	±1%	40mV p-p(Main)	78%	1.95 x 1.35 x 0.5	73
ATO2815T	5962-90954	15	±12V, ±0.208A or ±15V, ±0.167A	16-40	3	±0.5%	25mV p-p(Dual) 25mV p-p(Dual)	78%	2.70 x 1.35 x 0.5(F)	73
ATR2805S	5962-94624	30	5V, 6A	16-40	1	±1%	20mV p-p	78%		58
ATR2812S	5962-94625	30	12V, 2.5A	16-40	1	±1%	25mV p-p	80%		58
ATR2815S	5962-94626	30	15V, 2A	16-40	1	±1%	25mV p-p	80%	2.12 x 1.12 x 0.405	58
ATR2812D	5962-94627	30	±12V, ±1.250A	16-40	2	±1%	25mV p-p	80%	2.87 x 1.12 x 0.405(F)	58
ATR2815D	5962-94628	30	±15V, ±0.1A	16-40	2	±1%	25mV p-p	80%		58
ATR2812T	5962-93158	30	5V, 3A and ±12V, ±0.625A or	16-40	3	±1%	30mV p-p(Main) 25mV p-p(Dual)	76%	1.95 x 1.345 x .405	58
ATR2815T	5962-92159	30	±15V, ±0.5A	16-40	3	±1%	25mV p-p(Dual)	76%	2.7 x 1.345 x 0.410(F)	58
ATW2805S	5962-91579	30	5V, 6A	19-40	1	±1%	15mV p-p	81%		75
ATW2812S	5962-92110	30	12V, 2.5A	19-40	1	±1%	15mV p-p	82%		75
ATW2815S	5962-91599	30	15V, 2A	19-40	1	±1%	15mV p-p	83%		75
ATW2812D	5962-92109	30	±12V, ±1.25A	19-40	2	±1%	35mV p-p	83%	2.7 x 1.35 x 0.5(F)	75
ATW2815D	5962-91613	30	±15V, ±1A	19-40	2	±1%	45mV p-p	83%		75
ATW2824D	5962-95645	30	±24V, ±.625A	19-40	2	±1%	300mV p-p	80%		75
ATW2870D	5962-95644	30	±40V, ±.214A	19-40	2	±1%	300mV p-p	80%		75

LEGEND

SMD = Standard Military Drawing
P_{OUT} = Total Output (W)
V_{OUT} = Output Voltage Range (V)
V_{IN} = Input Voltage Range (V)
N/O = Number of Outputs
Reg = Load Regulation



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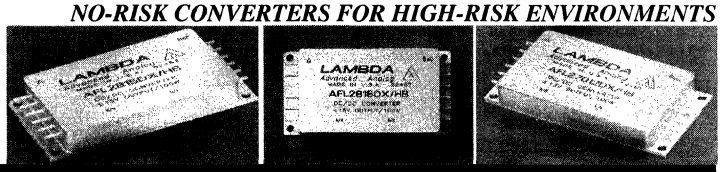


HYBRID DC/DC CONVERTERS (High-Power Solutions)

Model	SMD	Pout	Vout	Vin	N/O	Max. Reg.	Typical Ripple	Typ. Efficiency	Package (F=Flange)	Weight (gm)
AFL2805S*	5962-94721	80	5V, 16A	16-40	1	±2%	15mV p-p	75%		95
AFL2808S*	5962-96659	80	8V, 13.5A	16-40	1	±2%	40mV p-p	82%		95
AFL2809S	N/A	90	9V, 10A	16-40	1	±2%	40mV p-p	82%		95
AFL2812S*	5962-94722	108	12V, 9A	16-40	1	±2%	25mV p-p	83%		95
AFL2815S*	5962-94723	120	15V, 8A	16-40	1	±2%	25mV p-p	84%	3.0 x 1.55 x 0.375	95
AFL2828S*	5962-96899	112	28V, 4A	16-40	1	±2%	100mV p-p	85%		95
AFL2805D*	5962-95795	80	±5V, 12.8A	16-40	2	±2%	60mV p-p	81%		95
AFL2812D*	5962-95796	96	±12V, ±4.16A	16-40	2	±2%	35mV p-p	83%		95
AFL2815D*	5962-94724	100	±15V, ±3.33A	16-40	2	±2%	35mV p-p	83%		95
AFL120XXS	N/A	80-120	5-28V, 4-16A	85-200	1	±2%	15-70mV p-p	87%	3.0 x 1.55 x 0.375	95
AFL27005S*	5962-94569	80	5V, 16A	160-400	1	±2%	15mV p-p	82%		95
AFL27006S*	5962-95534	81	6V, 13.5A	160-400	1	±2%	20mV p-p	83%		95
AFL27009S*	5962-95535	90	9V, 10A	160-400	1	±2%	25mV p-p	84%		95
AFL27012S*	5962-94753	108	12V, 9A	160-400	1	±2%	25mV p-p	85%		95
AFL27015S*	5962-94570	120	15V, 8A	160-400	1	±2%	25mV p-p	84%	3.0 x 1.55 x 0.375	95
AFL27028S*	5962-95565	112	28V, 4A	160-400	1	±2%	70mV p-p	85%		95
AFL27005D*	5962-95501	80	±5V, 12.8A	160-400	2	±2%	60mV p-p	82%		95
AFL27012D	N/A	96	±12V, ±6.4A	160-400	2	±2%	35mV p-p	85%		95
AFL27015D*	5962-95532	100	±15V, ±5.3A	160-400	2	±2%	35mV p-p	87%		95

** At the time of publication, DSCC approval of these devices was pending. Consult factory for current status.*

HYBRID DC/DC CONVERTERS FOR SPACE APPLICATIONS (Over 100 Krad)

Model	SMD	Pout	Vout	Vin	N/O	Max. Reg.	Typical Ripple	Typ. Efficiency	Package (F=Flange)	Weight (gm)
ART2812T	Rad Hard	3-30	5V, 3A and	19-50	3	±5% (Main)	50mV p-p	80%	2.7 x 2.2 x 0.5	120
ART2815T	Over 100 Krad		+12V, ±0.9A +15V, ±0.750A		3	±5% (Dual)	50mV p-p	80%		120
ARH2803S	Rad Hard	30	3.3V, 9A	18-50	1	±2%	20mV p-p	70%		120
ARH2805S	Rad Hard	30	5V, 6A	18-50	1	±2%	30mV p-p	80%		120
ARH2812S	Rad Hard	30	12V, 2.5A	18-50	1	±2%	30mV p-p	81%		120
ARH2815S	Rad Hard	30	15V, 2A	18-50	1	±2%	30mV p-p	82%	2.7 x 2.2 x 0.5	120
ARH2805D	Rad Hard	30	±5V, ±3A	18-50	2	±2%	25mV p-p	80%		120
ARH2812D	Rad Hard	30	±12V, ±1.25A	18-50	2	±2%	50mV p-p	81%		120
ARH2815D	Rad Hard	30	±15V, ±1A	18-50	2	±2%	50mV p-p	82%		120

HYBRID EMI Filters (Meet MIL-STD-461, CEO3)

Filter	SID	Compatibility	Input Voltage Range	Input current	Noise Reduction	Package (F = Flange) (N = Non-Flange)	Weight (gm)
AFC461	91020	ATW, AHF, AHV ATR, ATO, AHE	0-40	4A(max.)	40dB	2.12 x 1.12 x 0.38 2.87 x 1.12 x 0.38(F)	60
AFV461	91020	AHV, ATW, AHF ATR, ATO, AHE	0-80	4A (max.)	40dB	2.12 x 1.12 x 0.38 2.87 x 1.12 x 0.38(F)	39 45
ASF461	N/A	ASA, AHF	0-50	920mA (max.)	40dB	1.075 x 1.075 x 0.37	26
AME28-461	N/A	AFL28XX	0-40	15A	500KHz-1MHz>30dB	3.0 x 1.55 x 0.375	80
AME270-461	N/A	AFL270XX	0-400	1.5A	1-50MHz>60dB		80
AFM704A	95010	All Converter Except AFL Series	0-40 400 (Transient)	5mA (No Load) 2mA (Inhibit)	100KHz>40dB 200KHz-50MHz>50dB	2.12 x 1.12 x 0.38(N) 2.87 x 1.11 x 0.38(F)	65

For Other Variations Please Consult Lambda Advanced Analog With Your Specific Requirements

LAMBDA Novatronics Inc.
2855 W. McNab Road • Pompano Beach, FL 33069
HOTLINE: 800 942 5205 • FAX: 954 984 2479 • EMAIL: LNIMARKET@aol.com
WEBSITE: www.lambdanovatronics.com

MIL-28-100 SERIES — 100 Watt Military DC-DC Modules

100 Watt Single Output from 2 to 28 VDC

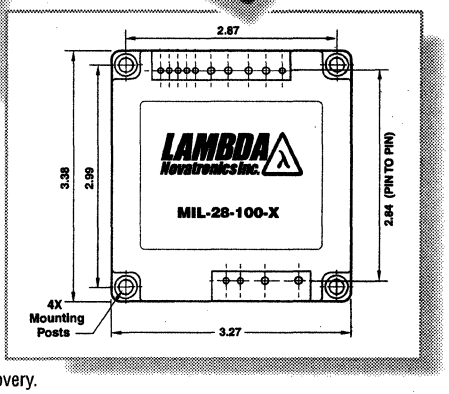
- Rugged package meets MIL-STD-810 Vibration And Shock Requirements
- Operating Temperature -40°C to +85°C
- Meets NAVMAT Derating at 85°C
- Series And Parallel Capability For Higher Power Or Fault Tolerant Applications
- Up to 18 Watts Per Cubic Inch
- Off-The-Shelf/Non-Developmental
- Competitive Price

DC INPUT CHARACTERISTICS
Input: 18-36 VDC.
DC OUTPUT CHARACTERISTICS
Output Power: 100 Watts Maximum.

Ripple Noise/Efficiency:

Output Voltage	2V	3.3V	5V	12V	15V	24V	28V
Ripple (mVpk-pk typ.)	100	100	150	250	250	250	300
Efficiency (% typ.)	68	73	82	85	86	89	90

Regulated Voltage
Line & Load Regulation: The greater of 0.8% or 40 mV from no load to full load with constant input line.
Temperature Coefficient: 0.02%/ °C.
DC Output Range: Programmable from +20 to -60%.
Isolation Rating: 3000VAC input to output.
1200 VAC input to baseplate.
100MOhm at 500 VDC output to baseplate.
Overvoltage Protection: 150-180% on 2V and 3V models. 125-145% on all other models. Input voltage must be recycled to less than 4.5 VDC to restore operation.
Overcurrent Protection: 105-140% with automatic recovery.
Thermal Protection • Remote On/Off • Monitoring Signals



MIL-270-300 SERIES — 300 Watt Military DC-DC Modules

300 Watt Single Output from 2 to 28 VDC

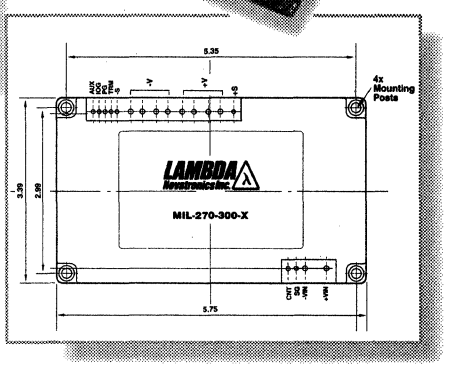
- Rugged package meets MIL-STD-810 Vibration And Shock Requirements
- Operating Temperature -40°C to +85°C
- Meets NAVMAT Derating at 85°C
- Series And Parallel Capability For Higher Power Or Fault Tolerant Applications
- Up to 30 Watts Per Cubic Inch
- Off-The-Shelf/Non-Developmental
- Competitive Price

DC INPUT CHARACTERISTICS
Input: 200-400 VDC.
DC OUTPUT CHARACTERISTICS
Output Power: 300 Watts Maximum.

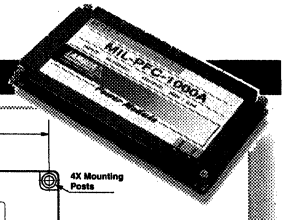
Ripple Noise/Efficiency:

Output Voltage	2V	3V	5V	12V	15V	24V	28V
Ripple (mVpk-pk typ.)	100	100	150	250	250	250	300
Efficiency (% typ.)	68	73	82	85	86	89	90

Regulated Voltage:
Line & Load Regulation: The greater of 0.8% or 40 mV from no load to full load with constant input line.
Temperature Coefficient: 0.02%/ °C.
DC Output Range: Programmable from +20 to -60%.
Isolation Rating: 3000VAC input to output.
2500VAC input to baseplate.
100MOhm at 500 VDC output to baseplate.
Overvoltage Protection: 150-180% on 2V and 3V models. 125-145% on all other models. Input voltage must be recycled to less than 25 VDC to restore operation.
Overcurrent Protection: 105-140% with automatic recovery.
Thermal Protection • Remote On/Off • Monitoring Signals



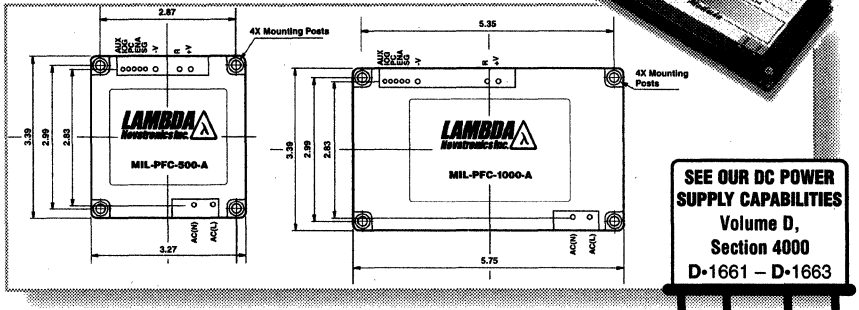
MIL-PHC-REC SERIES — Power Factor/Rectification Military AC-DC Modules



500/1000 Watt Modular AC-DC Front Ends

- Rugged Package Meets MIL-STD-810 Vibration And Shock Requirements
- Operating Temperature -40°C to +85°C
- Meets NAVMAT Derating at 85°C
- Parallel Capability For Higher Power Or Fault Tolerant Applications
- Off-The-Shelf/Non-Development
- Competitive Price

AC INPUT CHARACTERISTICS
Input: *MIL PFC:* 85-265 VAC, 47-63 Hz
MIL REC: 85-132 or 170-265 VAC (manual Selectable) 47-63 Hz
DC OUTPUT CHARACTERISTICS
Output Voltage: *MIL PFC:* 360 VDC ±2% fixed
MIL REC: 270 VDC unregulated



SEE OUR DC POWER SUPPLY CAPABILITIES Volume D, Section 4000 D•1661 – D•1663

Output Power:

Model	Power	Current
MIL-PFC-500A-360		
85-265 VAC	504	1.4
170-265 VAC	756	2.1
MIL-PFC-1000A-360		
85-265 VAC	1008	2.8
170-265 VAC	1512	4.2

Output Power: (CONTINUED)

Model	Power	Current
MIL-REC-500-270		
85-132 VAC	500	2.1
170-265 VAC	750	3.15

Power Factor/Harmonic Correction: 95% minimum at full load. **Regulation:** *MIL-PFC:* **Line Regulation:** 5 V typical on MIL-PFC modules with constant load.

Specifications Subject to Change Without Notice

LOGITEK INC.™
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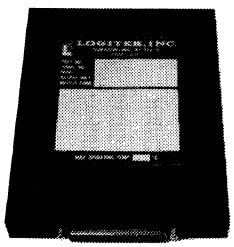
DC/DC Power Supplies
PS Series
25 Watts to 150 Watts



FEATURES

- *FULL MIL * MIL SPEC * INDUSTRIAL GRADE*
- *SINGLE * DUAL * TRIPLE * QUAD OUTPUTS*
- *NAV MAT P-4855 48 Hr Burn-In/Vibration/Derating*
- *HIGH DENSITY - LOW PROFILE*
- *3 YEAR WARRANTY*

SPECIFICATIONS

Vin	Vout Volts	Iout Amps	Watts	No. Outputs	Case Size	Model
14-36 vdc	5.0	5.0	25	1	A	PS( )25DS5
	12.0	2.1	25	1	A	PS( )25DS12
	15.0	1.7	25	1	A	PS( )25DS15
	24.0	1.1	25	1	A	PS( )25DS24
	28.0	0.9	25	1	A	PS( )25DS28
	5.0	10.0	50	1	B	PS( )50DS5
	12.0	4.2	50	1	B	PS( )50DS12
	15.0	3.4	50	1	B	PS( )50DS15
	24.0	2.0	50	1	B	PS( )50DS24
	28.0	2.0	50	1	B	PS( )50DS28
	±5.0	5.0	50	2	C	PS( )50DD5
	±12.0	2.1	50	2	C	PS( )50DD12
	±15.0	1.7	50	2	C	PS( )50DD15
16-36 vdc	5.0	15.0	75	1	D	PS( )75DS5
	12.0	6.3	75	1	D	PS( )75DS12
	15.0	5.0	75	1	D	PS( )75DS15
	28.0	2.7	75	1	D	PS( )75DS28
	±12.0	3.1	75	2	E	PS( )75DD12
	±15.0	2.5	75	2	E	PS( )75DD15
	5, ±12	10.0, 1.0	75	3	E	PS( )75DT5/12
	5, ±15	9.0, 1.0	75	3	E	PS( )75DT5/15
	5, 12, 28	8, 0.9, 0.5	75	4	E	PS( )75DQ5/12
	5, 15, 28	7, 0.9, 0.5	75	4	E	PS( )75DQ5/15
18-36 vdc (15 pin connector for 100W units)	5.0	20.0	100	1	E	PS( )100DS5
	12.0	8.4	100	1	E	PS( )100DS12
	15.0	6.7	100	1	E	PS( )100DS15
	24.0	4.2	100	1	E	PS( )100DS24
	29.0	3.6	100	1	E	PS( )100DS28
	12.0	12.5	150	1	F	PS( )150DS12
	15.0	10.0	150	1	F	PS( )150DS15
	24.0	6.3	150	1	F	PS( )150DS24
	28.0	5.4	150	1	F	PS( )150DS28
	±12.0	6.25	150	2	G	PS( )150DD12
	±15.0	5.0	150	2	G	PS( )150DD15
	5, ±12	20.0, 2.1	150	3	G	PS( )150DT5/12
	5, ±15	20.0, 1.7	150	3	G	PS( )150DT5/15
	5, 12, 28	20, 1, 1	150	4	G	PS( )150DQ5/12
	5, 15, 28	20, 1, 0.7	150	4	G	PS( )150DQ5/15

Enter model type X, M, or I in parenthesis.

OUTPUT CHARACTERISTICS

LINE REGULATION: Within 0.1% for input change from low line to high line, at constant load. For single, dual and main outputs 100 mV maximum for auxiliary outputs.
LOAD REGULATION: 0.1% for 0-100% of rated load at nominal input line for single, dual and main outputs. 150 mV for auxiliary outputs with 20% minimum main load.
PARD (Noise and Ripple): 50 mV p-p typical, 100 mV p-p maximum for 5V outputs (20 MHz bandwidth). 1% of the output voltage, with a maximum of 200 mV p-p, for all other outputs (20 MHz bandwidth).
CURRENT LIMITING: Constant current, limited to 130% of rated setting for single, dual and main outputs. And 160% of rated auxiliary outputs. (typical)
INRUSH CURRENT: Limited to 800% of nominal input current.
LOAD TRANSIENT RECOVERY TIME: Output voltage returns to regulation limits within 0.5 mSec from half load to full load.
LOAD TRANSIENT OVER/UNDER SHOOT: 0.5 volt maximum from nominal output voltage set point.
SHORT CIRCUIT PROTECTION: Under any short circuit condition, output voltage drops to less than one volt, with automatic recovery.
HOLD UP TIME (AC/DC only): 16mSec at DC to 67Hz, 2.5mSec above 380Hz.
REMOTE ERROR SENSING: Sensing pins compensate for up to 0.5 volt drop on output leads.
AUXILIARY OUTPUT CROSS REGULATION: 1.0% maximum deviation when main output load changes from half load to full load.
OVERVOLTAGE PROTECTION: Automatic electronic shutdown if voltage exceeds 30% of single and triple (main) output.
AUXILIARY OUTPUT TRACKING: Within 2%.
EMI/RFI CHARACTERISTICS: Designed to conform to the requirements of MIL-STD 461C. Meets most requirements when tested IAW MIL-STD462.
REMOTE TURN ON/OFF (TTL INHIBIT): Provides for remote on/off control. A TTL (logic 1) sign will inhibit the output.

*** PSX, PSM, PSI, PSC** are Fit/Form/Function Interchangeable.
PSX = Mil Spec components where available. Others are screened to applicable portions of MIL STD 883B. • All semi-conductors are herm sealed where available. • Mil PC boards. • Operating temp. -55°C to +100°C.
PSM = Components are screened to applicable portions of MIL STD 883B. • Mil PC boards. • Operating temp. -55°C to +100°C.
PSI = Industrial grade components. • Commercial PC boards. • Operating temp. -40°C to +85°C.
PSC = All Commercial components. • Commercial PC boards. • Operating temp. -20°C to +70°C.
INPUT TRANSIENT PROTECTION: Per MIL-STD-704A

ISOLATION: 1000 vdc input to output & case. 200 vdc, output to case.
TEMPERATURE COEFFICIENT: 0.01% per °C.
INSULATION RESISTANCE: 50 Megohms at 50 vdc.
EFFICIENCY: 70% to 83% depending on number of outputs and levels.
VIBRATION: Per MIL-STD-810C Method 514.2 Procedure 1A.
SHOCK: 30 g's ea. axis per MIL-STD-810C Method 516.2 Procedure 1. Hammer shock per MIL-STD-901C.
ACCELERATION: 6 g's per MIL-STD-810C Method 513.2, Procedure 11 & 14 g's per Procedure 1.
ENCLOSURE: Aluminum housing/baseplate.

HUMIDITY: 95% at 71°C per MIL-STD-810C, Method 507.1.
ALTITUDE: To 40,000 ft per MIL-STD-810C, Method 504.1, category 6 equipment.
SALT FOG: Per MIL-STD-810C, Method 509.1.
SAND, DUST, FUNGUS: Per MIL-STD-810C.
QUALITY: MIL-STD-45208.

See our MC Series DC-DC Converters in Volume D, pages D•2007-2008

See Page D•2006 for Case Dimensions and Pinouts.

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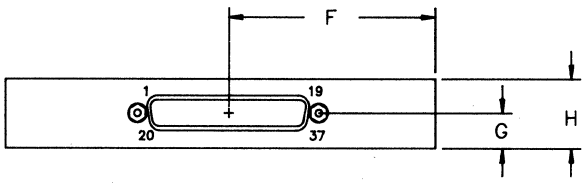
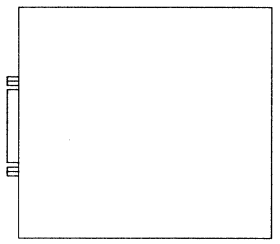
DC/DC Power Supplies
PS Series
Case Styles & Pinouts

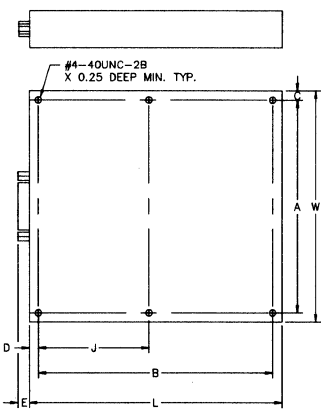




CASE DIMENSIONS

STYLE	W	L	H	A	B	F	J	
A	2.20	2.80	0.8	1.850	2.450	1.10		Inches
	55.9	71.1	20.3	46.99	62.13	27.9		mm
B	2.50	3.50	0.8	2.100	3.100	1.25		Inches
	63.5	88.9	20.3	53.34	78.74	31.8		mm
C	3.00	3.85	0.8	2.600	3.450	1.50		Inches
	76.20	97.79	20.32	66.04	87.63	38.10		mm
D	3.00	3.85	0.8	2.60	3.45	1.5		Inches
	76.2	97.8	20.3	66.04	87.63	38.1		mm
E	3.25	4.25	0.8	2.850	3.850	1.63		Inches
	82.6	108.0	20.3	72.39	97.79	41.3		mm
F	3.50	4.50	0.8	3.100	4.100	1.75		Inches
	88.9	114.3	20.3	78.74	104.14	44.5		mm
G	4.25	5.50	0.8	3.850	5.100	2.13	2.550	Inches
	108.0	139.7	20.3	97.79	129.54	54.0	64.77	mm

Dim C&D = 0.2", 5.1mm Dim. G = 0.455", 11.56mm. Dim E = 0.23", 5.84mm.



PINOUTS

	25 Watt		50 Watt		75 Watt				100 Watt	150 Watt			
	Single	Dual	Single	Dual	Single	Dual	Triple	Quad	Single	Single	Dual	Triple	Quad
1.	-Input		-Input	-Input	-Input	-Input	+Input	+Input	-Input	+Input	+Input	+Input	+Input
2.	-TTL		NC	NC	NC	NC	+Input	+Input	NC	+Input	+Input	+Input	+Input
3.	+TTL		-TTL	-TTL	-TTL	-TTL	NC	NC	-TTL	+Input	+Input	+Input	+Input
4.	+Sense		+TTL	+TTL	+TTL	+TTL	-TTL	-TTL	+TTL	+NC	NC	+TTL	+TTL
5.	+Output		NC	+Sense 1	NC	+Sense 1	+TTL	+TTL	+Sense	+NC	NC	-TTL	-TTL
6.	+Input		+Sense	+Output 1	+Sense	+Output 1	+AUX	+AUX	+Output	+Output	+TTL	+AUX	+AUX
7.	Ground		+Output	+Sense 2	+Output	+Sense 2	+AUX CM	+AUX CM	+Output	+Output	-TTL	+AUX CM	+AUX CM
8.	-Sense		+Output	+Output 2	+Output	+Output 2	-AUX CM	-AUX CM	+Output	+Output	+Output 1	-AUX CM	-AUX CM
9.	-Output		+Input	+Input	+Input	+Input	-AUX	-AUX	+Input	+Output	+Output 1	-AUX	-AUX
10.			NC	NC	NC	NC	+Sense	+Sense	NC	+Output	+Sense 1	+Sense	+Sense
11.			Ground	Ground	Ground	Ground	+Output	+Output	Ground	-Output	-Sense 1	+Output	+Output
12.			NC	-Sense 1	NC	-Sense 1	+Output	+Output	-Sense	-Output	-Output 1	+Output	+Output
13.			-Sense	-Output 1	-Sense	-Output	+Output	+Output	-Output	-Sense	-Output 1	+Output	+Output
14.			-Output	-Sense 2	-Output	-Sense 2	-Input	-Input	-Output	-Input	-Input	-Input	-Input
15.			-Output	-Output 2	-Output	-Output 2	-Input	-Input	-Output	-Input	-Input	-Input	-Input
16.							NC	NC		-Input	-Input	-Input	-Input
17.							Ground	Ground		Ground	Ground	Ground	Ground
18.							NC	NC		-TTL	NC	-Output	-Output
19.							NC	+AUX Q		+TTL	+Output 2	-Output	-Output
20.							NC	-AUX Q		+Output	+Output 2	-Output	-Output
21.							NC	NC		+Sense	+Sense 2	-Output	-Output
22.							-Sense	-Sense		-Output	-Sense 2	-Output	-Sens.
23.							-Output	-Output		-Output	-Output 2	-Sense	-AUX Q
24.							-Output	-Output		-Output	-Output 2	+Output	+AUX Q
25.							-Output	-Output		-Output	NC	+Output	+Output

CONNECTOR SPECIFICATION

	25 Watt (Single)	50 Watt (Single & Dual)	75 Watt (Single & Dual)	75 Watt (Triple & Quad)	100 Watt (Single)	150 Watt (Single, Dual, Triple & Quad)
CONNECTOR:	DEMME9PR	DAMME15PR	DBMME15PR	DBMME25PR	DBMME15PR	DBMME25PR
MATE:	DEMM9S	DAMM15S	DBMM15S	DBMM25S	DBMM15S	DBMM25S

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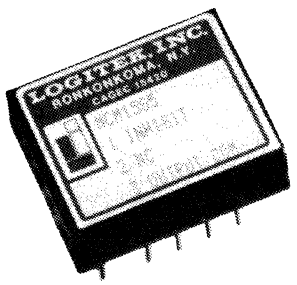
DC/DC Converters
MC Series
PCB Mount
5, 15 and 30 Watts
EMI COMPLIANT: MIL-STD-461C



GENERAL

The MC series converter is ideally suited for PC board mount applications offering up to 30 watts of output power at 28 vdc over its specified temperature range without derating. These units deliver efficiencies of up to 83% depending on the number of outputs and voltage levels. Design and construction of the MC series power modules utilizes Surface Mount Technology (SMT).

FEATURES

- *FULL MIL * MIL SPEC * INDUSTRIAL*
- *SINGLE * DUAL * TRIPLE OUTPUTS*
- *NAV MAT P-4855 48 Hr Burn-In/Vibration/Derating*
- *CURRENT LIMITING & SHORT CIRCUIT PROTECTION*
- *REMOTE POWER INHIBIT*
- *3 YEAR WARRANTY*
- *EMI COMPLIANT, MIL-STD-461C: CEO1, CEO3, CEO7, CS01, CS02, CS06 (Add "E" to end of part number for built in EMI filter)*

SPECIFICATIONS

Vin Volts	Vout Amps	Iout	Watts Outputs	No. Size	Case	Model	With EMI
	5	1	5	1	A	MC( )5S5	MC( )5S5E
	12	0.4	5	1	A	MC( )5S12	MC( )5S12E
	15	0.333	5	1	A	MC( )5S15	MC( )5S15E
	5	3.0	15	1	A	MC( )15S5	MC( )15S5E
	12	1.25	15	1	A	MC( )15S12	MC( )15S12E
	15	1.0	15	1	A	MC( )15S15	MC( )15S15E
	±5	1.5/1.5	15	2	A	MC( )15D5	MC( )15D5E
16-36	±12	0.63/0.63	15	2	A	MC( )15D12	MC( )15D12E
vdc	±15	0.5/0.5	15	2	A	MC( )15D15	MC( )15D15E
	5	6.0	30	1	B	MC( )30S5	MC( )30S5E
	12	2.5	30	1	B	MC( )30S12	MC( )30S12E
	15	2.0	30	1	B	MC( )30S15	MC( )30S15E
	±12	1.25/1.25	30	2	B	MC( )30D12	MC( )30D12E
	±15	1.0/1.0	30	2	B	MC( )30D15	MC( )30D15E
	5 & ±12	4 & ±0.4	30	3	B	MC( )30T5/12	MC( )30T5/12E
	5 & ±15	4 & ±0.33	30	3	B	MC( )30T5/15	MC( )30T5/15E

Enter model type X, M, or I in parenthesis.

OUTPUT CHARACTERISTICS

LINE REGULATION: Within 0.5% for input change from low line to high line, at constant load for single, dual and main outputs. 100 mV maximum for auxiliary outputs.
LOAD REGULATION: Main Output ±0.5% no load to full load. (MCI 20% to full load) Aux outputs ±2% for 20-100% of rated load.
CROSS REGULATION: (AUXILIARY OUTPUTS): 1.0% maximum deviation when main output load changes from half load to full load.
PARD (Noise and Ripple): 50 mV p-p typical, 100 mV p-p maximum for 5V outputs. 1% of the output voltage, with a maximum of 200 mV p-p, for all other outputs.
SHORT CIRCUIT PROTECTION: Under any short circuit condition, output voltage drops to less than one volt, with automatic recovery.

SPECIFICATIONS

*** MCX, MCM, MCI** are Fit/Form/Function Interchangeable
MCX = Full Mil (–55°C to 85°C) Screened to MIL-STD-883B and Mil PC boards.
MCM = Mil Spec (–55°C to 85°C) Factory screened MIL-STD-883B components and industrial PC boards.
MCI = Industrial Grade (–20°C to 71°C) Industrial grade components and PC boards.
INPUT TRANSIENT PROTECTION: Per MIL-STD-704D
ISOLATION: 1000 VRMS Terminal to case.
EFFICIENCY: 75% to 83% depending on number of outputs and levels.
VIBRATION: Per MIL-STD-810C Method 514.2 Procedure 1A.
SHOCK: 30 g's ea. axis per MIL-STD-810C Method 516.2 Procedure 1. Hammer shock per MIL-STD-901C.
ACCELERATION: 6 g's per MIL-STD-810C Method 513.2, Procedure 11 & 14 g's per Procedure 1.
ENCLOSURE: Aluminum housing/baseplate.
HUMIDITY: 95% at 71°C per MIL-STD-810C, Method 507.1.
ALTITUDE: To 70,000 ft per MIL-STD-810C, Method 504.1, category 6 equipment.
SALT FOG: Per MIL-STD-810C, Method 509.1.
SAND, DUST, FUNGUS: Per MIL-STD-810C.
QUALITY: MIL-STD-45208, MIL-STD-2000 available.

See Page D•2008 for Case Dimensions and Pinouts.

LOGITEK INC.™
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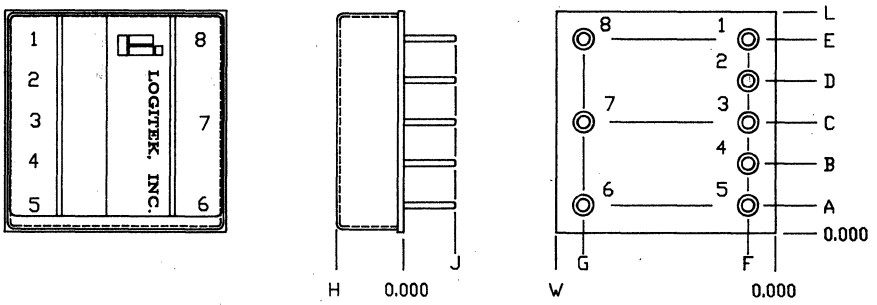
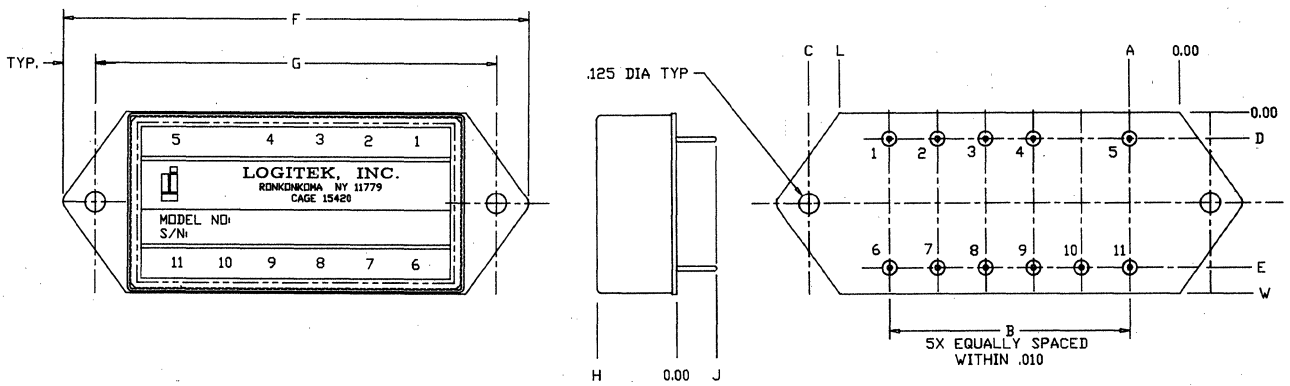
MC Series DC/DC Converter
Case Styles & Pinouts

CASE STYLE A



CASE STYLE B



CASE DIMENSIONS

5 Watt	Output	W	L	H	A	B	C	D	E	F	G	J	
Case	Single	1.065	1.065	0.325	.133	.333	.533	.733	.933	.133	.933	0.205	inches
Style		27.05	27.05	8.26	3.37	8.45	1.353	18.62	23.70	3.37	23.70	5.20	mm
A	Dual	1.065	1.065	0.500	.133	.333	.533	.733	.933	.133	.933	0.205	inches
		27.05	27.05	12.70	3.37	8.45	1.353	18.62	23.70	3.37	23.70	5.20	mm
15 Watt	**Output**	**W**	**L**	**H**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**J**	
Case	Single	1.12	1.43	0.325	0.205	0.505	0.705	0.905	1.105	0.160	0.960	0.250	inches
Style		28.45	36.32	8.26	5.21	12.83	17.91	23.00	28.07	4.06	24.38	6.35	mm
A	Dual	1.12	1.43	0.500	0.205	0.505	0.705	0.905	1.105	0.160	0.960	0.250	inches
		28.45	36.32	12.70	5.21	12.83	17.91	23.00	28.07	4.06	24.38	6.35	mm
30 Watt	**Output**	**W**	**L**	**H**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**J**	
Case	Single/	1.12	2.12	0.50	0.31	1.500	2.31	0.16	0.96	2.90	2.50	0.25	inches
Style	Dual	28.5	53.8	12.7	7.9	38.1	58.7	4.1	24.4	73.66	63.5	6.4	mm
B	Triple	1.35	2.70	0.50	0.35	2.000	2.85	0.18	1.18	3.40	3.00	0.25	inches
		34.3	68.6	12.7	8.9	50.80	72.4	4.6	30.0	86.4	76.2	6.4	mm

PIN DESIGNATIONS

	1	2	3	4	5	6	7	8	9	10	11
5 Watt Single	Positive Output	Output Common			Inhibit	Positive Input	Input Common	Case Ground			
15 Watt Single	Inhibit	NC	Output Common	Positive Output	NC	Case Ground	Input Common	Input Positive			
15 Watt Dual	Inhibit	Positive Output	Output Common	Negative Output	NC	Case Ground	Input Common	Input Positive			
30 Watt Single	Input Positive	Input Positive	Input Common	Input Common	Case Ground	+Sense	Positive Output	Output Common	-Sense	NC (+ trim)	NC
30 Watt Dual	Input Positive	Input Positive	Input Common	Input Common	Case Ground	Positive Output	+Output Common	NC (+ trim)	Negative Output	-Output Common	NC (+ trim)
30 Watt Triple	Input Positive	Input Positive	Input Common	Input Common	Case Ground	Positive Output	+Output Common	+Aux.	±Aux Ret.	-Aux.	NC

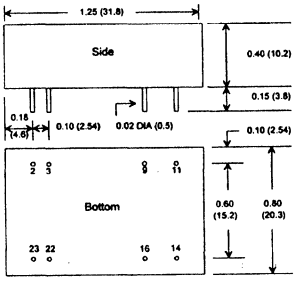
DC/DC CONVERTERS 3-10 WATTS

3 WATT — SINGLE & DUAL OUTPUTS • SIZE: 1.25" X 0.8" X 0.4"

Wide Input Range 2:1 • Isolation: 1500 VDC

MODEL NUMBER	INPUT VOLTAGE VDC	OUTPUT VOLTAGE VDC	OUTPUT CURRENT mA Max.	OUTPUT CURRENT mA Min.	INPUT CURRENT mA (Typ.)	INPUT CURRENT NO LOAD mA (Typ.)	REFLECTED RIPPLE CURRENT mA (Typ.)	EFF. %(Typ.)
LZDCA00300	5 (4.5 ~ 9)	3.3	600	60	566	40	57	70
LZDCA00301	5 (4.5 ~ 9)	5	500	50	685	40	69	73
LZDCA00302	5 (4.5 ~ 9)	12	250	25	779	40	78	77
LZDCA00303	5 (4.5 ~ 9)	15	200	20	779	40	78	77
LZDCA00320	5 (4.5 ~ 9)	±5	±250	±25	694	40	69	72
LZDCA00321	5 (4.5 ~ 9)	±12	±125	±12.5	800	40	80	75
LZDCA00322	5 (4.5 ~ 9)	±15	±100	±10	800	40	80	75
LZDCB00300	12 (9 ~ 18)	3.3	600	60	223	20	22	74
LZDCB00301	12 (9 ~ 18)	5	500	50	267	20	27	78
LZDCB00302	12 (9 ~ 18)	12	250	25	305	20	30	82
LZDCB00303	12 (9 ~ 18)	15	200	20	305	20	30	82
LZDCB00320	12 (9 ~ 18)	±5	±250	±25	271	20	27	77
LZDCB00321	12 (9 ~ 18)	±12	±125	±12.5	313	20	31	80
LZDCB00322	12 (9 ~ 18)	±15	±100	±10	313	20	31	80
LZDCC00300	24 (18 ~ 36)	3.3	600	60	109	5	11	76
LZDCC00301	24 (18 ~ 36)	5	500	50	132	5	13	79
LZDCC00302	24 (18 ~ 36)	12	250	25	149	5	15	84
LZDCC00303	24 (18 ~ 36)	15	200	20	149	5	15	84
LZDCC00320	24 (18 ~ 36)	±5	±250	±25	132	5	13	79
LZDCC00321	24 (18 ~ 36)	±12	±125	±12.5	152	5	15	82
LZDCC00322	24 (18 ~ 36)	±15	±100	±10	152	5	15	82
LZDCD00300	48 (36 ~ 72)	3.3	600	60	55	3	6	76
LZDCD00301	48 (36 ~ 72)	5	500	50	66	3	7	79
LZDCD00302	48 (36 ~ 72)	12	250	25	75	3	8	84
LZDCD00303	48 (36 ~ 72)	15	200	20	75	3	8	84
LZDCD00320	48 (36 ~ 72)	±5	±250	±25	65	3	7	80
LZDCD00321	48 (36 ~ 72)	±12	±125	±12.5	75	3	8	84
LZDCD00322	48 (36 ~ 72)	±15	±100	±10	75	3	8	84

MECHANICAL CONFIGURATION



PIN CONNECTION		
Pin #	Single	Dual
2,3	- Vin	- Vin
9	No Pin	Common
11	NC	- Vout
14	+ Vout	+ Vout
16	- Vout	Common
22,23	+ Vin	+ Vin

NC: No Connection

All dimensions are typical in inches (mm).

Tolerance X.XX = ±0.01 (±0.25)

ABSOLUTE MAXIMUM RATINGS

Exceeding these values can damage the module. These are not continuous operating ratings.

PARAMETER		MIN.	MAX.	UNIT.
Input Surge Voltage [1000 mS]	5VDC Input Model	-0.7	11	VDC
	12VDC Input Model	-0.7	21	VDC
	24VDC Input Model	-0.7	42	VDC
	48VDC Input Model	-0.7	84	VDC
Internal Power Dissipation		—	2000	mW

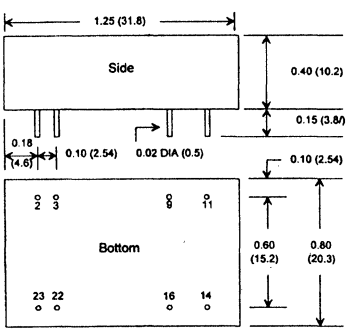
Specifications typical at Ta = +25°C, nominal input voltage, rated output current.
No derating up to 71°C

5-6 WATT — SINGLE & DUAL OUTPUTS • SIZE: 1.25" X 0.8" X 0.4"

Wide Input Range 2:1 • Isolation: 1500 VDC

MODEL NUMBER	INPUT VOLTAGE VDC	OUTPUT VOLTAGE VDC	OUTPUT CURRENT mA Max.	OUTPUT CURRENT mA Min.	INPUT CURRENT mA (Typ.)	INPUT CURRENT NO LOAD mA (Typ.)	REFLECTED RIPPLE CURRENT mA (Typ.)	EFF. %(Typ.)
LZDCB00500	12 (9 ~ 18)	3.3	1200	60	429	20	43	77
LZDCB00501	12 (9 ~ 18)	5	1000	50	514	20	51	81
LZDCB00502	12 (9 ~ 18)	12	500	25	595	20	60	84
LZDCB00503	12 (9 ~ 18)	15	400	20	595	20	60	84
LZDCB00520	12 (9 ~ 18)	±5	±500	±25	514	20	51	81
LZDCB00521	12 (9 ~ 18)	±12	±250	±12.5	595	20	60	84
LZDCB00522	12 (9 ~ 18)	±15	±200	±10	595	20	60	84
LZDCC00500	24 (18 ~ 36)	3.3	1200	60	209	5	21	79
LZDCC00501	24 (18 ~ 36)	5	1000	50	251	5	25	83
LZDCC00502	24 (18 ~ 36)	12	500	25	291	5	29	86
LZDCC00503	24 (18 ~ 36)	15	400	20	291	5	29	86
LZDCC00520	24 (18 ~ 36)	±5	±500	±25	251	5	25	83
LZDCC00521	24 (18 ~ 36)	±12	±250	±12.5	291	5	29	86
LZDCC00522	24 (18 ~ 36)	±15	±200	±10	291	5	29	86
LZDCD00500	48 (36 ~ 72)	3.3	1200	60	104	3	10	79
LZDCD00501	48 (36 ~ 72)	5	1000	50	126	3	13	83
LZDCD00502	48 (36 ~ 72)	12	500	25	145	3	15	86
LZDCD00503	48 (36 ~ 72)	15	400	20	145	3	15	86
LZDCD00520	48 (36 ~ 72)	±5	±500	25	126	3	13	83
LZDCD00521	48 (36 ~ 72)	±12	±250	±12.5	145	3	15	86
LZDCD00522	48 (36 ~ 72)	±15	±200	±10	145	3	15	86

MECHANICAL CONFIGURATION



PIN CONNECTION		
Pin #	Single	Dual
2,3	- Vin	- Vin
9	No Pin	Common
11	NC	- Vout
14	+ Vout	+ Vout
16	+ Vout	Common
22,23	+ Vin	+ Vin

NC: No Connection

All dimensions are typical in inches (mm).

Tolerance X.XX = ±0.01 (±0.25)

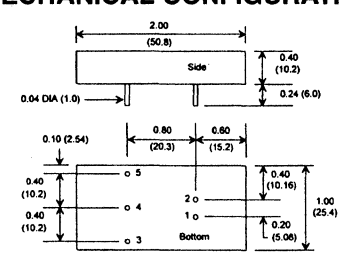
Specifications typical at Ta = +25°C, nominal input voltage, rated output current.
No derating up to 71°C

10 WATT — SINGLE & DUAL OUTPUTS • SIZE: 2.00" X 1.00" X 0.4"

Wide Input Range 2:1 • Isolation: 1500 VDC

MODEL NUMBER	INPUT VOLTAGE VDC	OUTPUT VOLTAGE VDC	OUTPUT CURRENT mA Max.	OUTPUT CURRENT mA Min.	INPUT CURRENT mA (Typ.)	INPUT CURRENT NO LOAD mA (Typ.)	REFLECTED RIPPLE CURRENT mA (Typ.)	EFF. %(Typ.)
LZDCB01000	12 (9 ~ 18)	3.3	2400	120	917	30	120	72
LZDCB01001	12 (9 ~ 18)	5	2000	100	1082	30	120	77
LZDCB01002	12 (9 ~ 18)	12	830	42	1038	30	120	80
LZDCB01003	12 (9 ~ 18)	15	670	34	1047	30	120	80
LZDCB01004	12 (9 ~ 18)	24	416	21	1027	30	120	81
LZDCB01020	12 (9 ~ 18)	±5	±1000	±50	1068	30	120	78
LZDCB01021	12 (9 ~ 18)	±12	±416	±21	1027	30	120	81
LZDCB01022	12 (9 ~ 18)	±15	±333	±17	1041	30	120	80
LZDCC01000	24 (18 ~ 36)	3.3	2400	120	434	20	70	76
LZDCC01001	24 (18 ~ 36)	5	2000	100	534	20	70	78
LZDCC01002	24 (18 ~ 36)	12	830	42	506	20	70	82
LZDCC01003	24 (18 ~ 36)	15	670	34	511	20	70	82
LZDCC01004	24 (18 ~ 36)	24	416	21	501	20	70	83
LZDCC01020	24 (18 ~ 36)	±5	±1000	±50	521	20	70	80
LZDCC01021	24 (18 ~ 36)	±12	±416	±21	507	20	70	82
LZDCC01022	24 (18 ~ 36)	±15	±333	±17	507	20	70	82
LZDCD01000	48 (36 ~ 75)	3.3	2400	120	217	10	20	76
LZDCD01001	48 (36 ~ 75)	5	2000	100	260	10	20	80
LZDCD01002	48 (36 ~ 75)	12	830	42	253	10	20	82
LZDCD01003	48 (36 ~ 75)	15	670	34	252	10	20	83
LZDCD01004	48 (36 ~ 75)	24	416	21	251	10	20	83
LZDCD01020	48 (36 ~ 75)	±5	±1000	±50	257	10	20	81
LZDCD01021	48 (36 ~ 75)	±12	±416	±21	251	10	20	83
LZDCD01022	48 (36 ~ 75)	±15	±333	±17	251	10	20	83

MECHANICAL CONFIGURATION



PIN CONNECTION		
Pin #	Single	Dual
1	+ Vin	+ Vin
2	- Vin	- Vin
3	+ Vout	+ Vout
4	No Pin	Common
5	- Vout	- Vout

All dimensions are typical in inches (mm).

Tolerance X.XX = ±0.01 (±0.25)

ABSOLUTE MAXIMUM RATINGS

Exceeding these values can damage the module. These are not continuous operating ratings.

PARAMETER		MIN.	MAX.	UNIT.
Input Surge Voltage [1000 mS]	12VDC Input Model	-0.7	21	VDC
	24VDC Input Model	-0.7	42	VDC
	48VDC Input Model	-0.7	84	VDC
Internal Power Dissipation		—	5000	mW

Specifications typical at Ta = +25°C, nominal input voltage, rated output current.
No derating up to 71°C

LZRelectronics,inc. 8051 Cessna Ave., Gaithersburg, MD 20879
Telephone (301) 921-4600 Fax (301) 670-0436 LZR

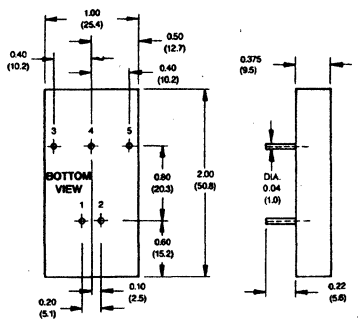
DC/DC CONVERTERS 15-60 WATTS

15 WATT — SINGLE & DUAL OUTPUTS • SIZE: 2.0" X 1.0" X 0.375

High Density • 2:1 Input Range • Isolation: 1600 VDC

MODEL NUMBER	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	% EFF.
LZDCB01500	9-18 VDC	3.3 VDC	4000 mA	84
LZDCB01501	9-18 VDC	5 VDC	3000 mA	82
LZDCB01502	9-18 VDC	12 VDC	1250 mA	84
LZDCB01503	9-18 VDC	15 VDC	1000 mA	80
LZDCB01520	9-18 VDC	±12 VDC	± 635 mA	84
LZDCB01521	9-18 VDC	±15 VDC	± 500 mA	83
LZDCC01500	18-36 VDC	3.3 VDC	4000 mA	85
LZDCC01501	18-36 VDC	5 VDC	3000 mA	86
LZDCC01502	18-36 VDC	12 VDC	1250 mA	86
LZDCC01503	18-36 VDC	15 VDC	1000 mA	81
LZDCC01520	18-36 VDC	±12 VDC	± 625 mA	85
LZDCC01521	18-36 VDC	±15 VDC	± 500 mA	84
LZDCD01500	36-72 VDC	3.3 VDC	4000 mA	82
LZDCD01501	36-72 VDC	5 VDC	3000 mA	87
LZDCD01502	36-72 VDC	12 VDC	1250 mA	87
LZDCD01503	36-72 VDC	15 VDC	1000 mA	82
LZDCD01520	36-72 VDC	±12 VDC	± 625 mA	86
LZDCD01521	36-72 VDC	±15 VDC	± 500 mA	86

MECHANICAL CONFIGURATION



PIN CONNECTION					
Pin #	1	2	3	4	5
Single	+ Vin	- Vin	+ Vout	No Pin	- Vout
Dual	+ Vin	- Vin	+ Vout	Common	- Vout

SPECIFICATIONS:

- Switching Frequency: 200 kHz, min.
- Isolation Voltage: 1600 VDC, min.
- Isolation Resistance: 10^9 Ohms, min.
- Operating Temp. Range: -25°C to +71°C
- Storage Temp. Range: -55°C to +125°C
- Cooling: Free-air Convection
- EMI/RFI: Six-sided Continuous Shield
- Case Material: Nickel-Coated Copper with Non-Conductive Base
- Dimensions: 2.0x1.0x0.375 Inches (50.8x25.4x9.5mm)

40 WATT — SINGLE DUAL & TRIPLE OUTPUTS • SIZE: 3.0" X 2.56" X 0.375

High Density • 2:1 Input Range • Isolation: 1600 VDC

MODEL NUMBER	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	% EFF.
LZDCB04000	9-18 VDC	3.3 VDC	10A	77
LZDCB04001	9-18 VDC	5 VDC	8A	80
LZDCB04002	9-18 VDC	12 VDC	3.4A	81
LZDCB04003	9-18 VDC	15 VDC	2.7A	82
LZDCB04020	9-18 VDC	±5 VDC	+7A/-1A	80
LZDCB04021	9-18 VDC	±12 VDC	±1.8A	81
LZDCB04022	9-18 VDC	±15 VDC	±1.4A	82
LZDCB04023	9-18 VDC	3.3 / 5.0 VDC	4A/4A	77
LZDCB04030	9-18 VDC	5/±12 VDC	4000/±850mA	80
LZDCB04031	9-18 VDC	5/±15 VDC	4000/±680mA	80
LZDCC04000	18-36 VDC	3.3 VDC	10A	77
LZDCC04001	18-36 VDC	5 VDC	8000mA	81
LZDCC04002	18-36 VDC	12 VDC	3400mA	82
LZDCC04003	18-36 VDC	15 VDC	2700mA	83
LZDCC04020	18-36 VDC	±5 VDC	+7A/-1A	81
LZDCC04021	18-36 VDC	±12 VDC	±1800A	82
LZDCC04022	18-36 VDC	±15 VDC	±1400A	83
LZDCC04023	18-36 VDC	3.3 , 5.0 VDC	4A/4A	77
LZDCC04030	18-36 VDC	5/±12 VDC	4000/±850mA	81
LZDCC04031	18-36 VDC	5/±15 VDC	4000/±680mA	81
LZDCD04000	36-72 VDC	3.3 VDC	10A	77
LZDCD04001	36-72 VDC	5 VDC	8000A	82
LZDCD04002	36-72 VDC	12 VDC	3400A	83
LZDCD04003	36-72 VDC	15 VDC	2700A	84
LZDCD04020	36-72 VDC	±5 VDC	+7A/-1A	82
LZDCD04021	36-72 VDC	±12 VDC	±1800A	83
LZDCD04022	36-72 VDC	±15 VDC	± 1400A	84
LZDCD04023	36-72 VDC	3.3 , 5.0 VDC	4A/4A	77
LZDCD04030	36-72 VDC	5/±12 VDC	4000/±850mA	82
LZDCD04031	36-72 VDC	5/±15 VDC	4000/±680mA	82

SPECIFICATIONS:

- Switching Frequency: 300 kHz, typ.
- Isolation Voltage: 1600 VDC, min.
- Isolation Resistance: 10^9 Ohms, min.
- Operating Temp. Range: -25°C to +71°C
- Storage Temp. Range: -55°C to +125°C
- Cooling: Free-air Convection
- EMI/RFI: Six-sided Continuous Shield
- Case Material: Nickel-Coated Copper with Non-Conductive Base
- Dimensions: 2.56x3.0x0.375 Inches (66x76.2x9.5mm)

PIN CONNECTION				
Pin No.	Single Output	Dual Output	Triple Output	3.3VDC 5.0VDC
1	Remote On/Off	Remote On/Off	Remote On/Off	Remote On/Off
2	+ Input	+ Input	+ Input	+ Input
3	- Input	- Input	- Input	- Input
4	Sync	Sync	Sync	Sync
5	+ OutputSense/ Trim (Down)	+ Output	+ Output (Aux)	+3.3VDC
6	Output Trim	Common	Common(Aux)	Common(Aux)
7	- OutputSense/ Trim (Up)	- Output	- Output (Aux)	+ 5.0VDC
8	+ Output *	Output Trim	+ Output (Primary)	Trim
9	- Output *	No Pin	- Output (Primary)	No Pin
10	No Pin	No Pin	Output Trim (Primary)	No Pin

*Connections for single output models without sensing or external trimming: For proper operation, externally connect Pin5(+Output Sense) to Pin8(+output) and Pin7(-output Sense to Pin9(-Output).

REMOTE ON/OFF CONTROL

- Control Voltage Referenced to Negative (-) Input
- Compatibility: Cmos, TTL
- On-Control: 4.8V min. or Open
- Off-Control: 0.4V max. or Short

60 WATT — SINGLE & DUAL OUTPUTS • SIZE: 3.94" X 2.76" X 0.71

High Density • 2:1 Input Range • Isolation: 1600 VDC

MODEL NUMBER	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	% EFF.
LZDCB06000	9-18 VDC	3.3 VDC	15A	78
LZDCB06001	9-18 VDC	5 VDC	12A	81
LZDCB06002	9-18 VDC	12 VDC	5A	82
LZDCB06003	9-18 VDC	15 VDC	4A	82
LZDCB06020	9-18 VDC	±5 VDC	+ 10A/-2A	81
LZDCB06021	9-18 VDC	±12 VDC	± 2.5A	82
LZDCB06022	9-18 VDC	±15 VDC	± 2.0A	82
LZDCB06023	9-18 VDC	3.3, 5VDC	6A/6A	79
LZDCC06000	18-36 VDC	3.3 VDC	15A	79
LZDCC06001	18-36 VDC	5 VDC	12A	83
LZDCC06002	18-36 VDC	12 VDC	5A	84
LZDCC06003	18-36 VDC	15 VDC	4A	84
LZDCC06020	18-36 VDC	±5 VDC	+ 10A/-2A	83
LZDCC06021	18-36 VDC	±12 VDC	± 2.5A	84
LZDCC06022	18-36 VDC	±15 VDC	± 2.0A	84
LZDCC06023	18-36 VDC	3.3, 5 VDC	6A/6A	80
LZDCD06000	36-72 VDC	3.3 VDC	15A	80
LZDCD06001	36-72 VDC	5 VDC	12A	84
LZDCD06002	36-72 VDC	12 VDC	5A	85
LZDCD06003	36-72 VDC	15 VDC	4A	85
LZDCD06020	36-72 VDC	±5 VDC	+ 10A/-2	84
LZDCD06021	36-72 VDC	±12 VDC	± 2.5A	85
LZDCD06022	36-72 VDC	±15 VDC	± 2.0A	85
LZDCD06023	36-72 VDC	3.3, 5 VDC	6A/6A	81

PIN CONNECTION										
Pin #	1	2	3	4	5	6	7	8	9	10
Single	+ Vin	- Vin	ON/OFF	Trim	+ Vout	+ Vout	Ground	Ground	N/P	N/P
Dual	+ Vin	- Vin	ON/OFF	Trim	+ Vout	+ Vout	Ground	Ground	- Vout	- Vout
3.3 VDC/5.0VDC	+ Vin	- Vin	ON/OFF	Trim	+3.3Vout	+3.3Vout	Ground	Ground	+5.0Vout	+5.0Vout

SPECIFICATIONS:

- Switching Frequency: 200 kHz, typ.
- Isolation Voltage: 1600 VDC, min.
- Isolation Resistance: 10^9 Ohms, min.
- Operating Temperature Range: -25°C to +71°C
- Storage Temperature Range: -55°C to +125°C
- Cooling: Free-air Convection
- EMI/RFI: Six-sided Continuous Shield
- Case Material: Nickel-Coated Copper with Non-Conductive Base
- Dimensions: 3.94x2.76x0.71 Inches (100x70x18mm)

REMOTE ON/OFF CONTROL

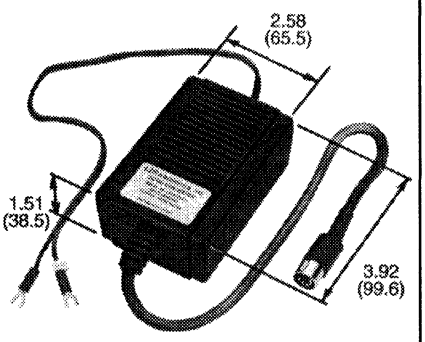
- Control Voltage Referenced to Negative (-) Input
- Compatibility: Cmos, TTL
- On-Control: 4.8V min. or Open
- Off-Control: 0.4V max. or Short

LZRelectronics,inc. 8051 Cessna Ave., Gaithersburg, MD 20879
Telephone (301) 921-4600 Fax (301) 670-0436 LZR

EXTERNAL DC/DC CONVERTERS

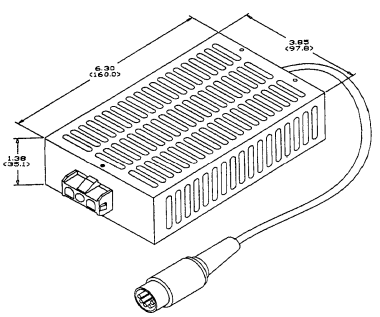
DC 3600 Series DC/DC Converters

Enclosed



NO OF OUTPUTS	INPUT: 18-36VDC MODEL NO.	INPUT: 36-60VDC MODEL NO.	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZDSD02000	LZDSD02010	+3.3V	0-5A	16.5W
	LZDSD02001	LZDSD02011	+5V	0-3.6A	18W
	LZDSD02002	LZDSD02012	+9V	0-2A	18W
	LZDSD02003	LZDSD02013	+12V	0-1.6A	19.2W
	LZDSD02004	LZDSD02014	+15V	0-1.3A	19.5W
	LZDSD02005	LZDSD02015	+18V	0-1.1A	19.8W
	LZDSD02006	LZDSD02016	+24V	0-0.85A	20.4W
		LZDSD02017	+48V	0-.45A	21.6W
DUAL	LZDSD02021	LZDSD02041	+5V +12V	0-2A 0-1A	18W
TRIPLE	LZDSD02031	LZDSD02051	+5V +12V -12V	0-2A 0-0.9A 0-0.3A	18W
	LZDSD02032	LZDSD02052	+5V +12V -5V	0-2A 0-0.6A 0-0.2A	18W

DC 4500 Series DC/DC Converters



NO OF OUTPUTS	INPUT: 18-36VDC MODEL NO.	INPUT: 36-72VDC MODEL NO.	OUTPUT VOLTAGE	OUTPUT CURRENT	OUTPUT POWER (RATED)
SINGLE (1)	LZDSD04500	LZDSD04510	+3.3V	0-8A	26W
	LZDSD04501	LZDSD04511	+5V	0-8.0A	40W
	LZDSD04502	LZDSD04512	+9V	0-5.0A	45W
	LZDSD04503	LZDSD04513	+12V	0-3.75A	45W
	LZDSD04504	LZDSD04514	+15V	0-3.0A	45W
	LZDSD04505	LZDSD04515	+18V	0-2.5A	45W
	LZDSD04506	LZDSD04516	+24V	0-1.875A	45W
	LZDSD04507	LZDSD04517	+48V	0-0.94A	45W
DUAL	LZDSD04521	LZDSD04541	+5V +12V	0-4A 0-2A	45W
	LZDSD04522	LZDSD04542	+5V +3.3V	0-4A 0-4A	35W
TRIPLE	LZDSD04531	LZDSD04551	+5V +12V -12V	0-4A 0-1.5A 0-0.5A	45W
	LZDSD04532	LZDSD04552	+5V +15V -1.5V	0-4A 0-1.35A 0-0.3A	45W

Custom output available upon request

GENERAL SPECIFICATIONS:

Input Voltage: 18 VDC to 72 VDC
Input Current: Less than 2.0 Amps
Output Current: No load to full load (no minimum load required).
Output Ripple/Noise Peak to Peak: 1% maximum
Output Regulation (line/load): ±5% for single output Enclosed units measured at the end of the output connector; ±5% for main output; ±5% for second output, and ±10%* for third output for multiple output units.
Turn-On/Turn-Off Over-shooting: 5% maximum
Turn-On Delay: 0.5 seconds maximum
Inrush Current: Less than 20 Amps peak at cold start
Efficiency: 85% typical at full load, nominal line. (24VDC and 48VDC)
Switching Frequency: 50KHz typical
Current/Short Circuit Protection: Hiccup, automatic recovery
MTBF: Greater than 100,000 hours calculated
Operating Temperature: 0°C to 50°C.
Humidity: 0 to 90% relative humidity, non condensing
Storage Temperature: -10°C to 80°C.
Input/Output Isolation: 500 VDC (minimum)*

**10% minimum load on the main output is required.*

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Power Supplies

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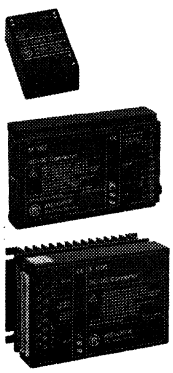
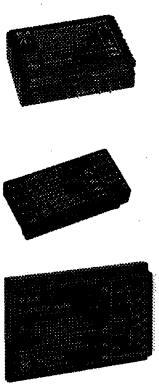
Three Different Environments Classes



Rugged Environment Class

Ideal for mobile applications, or where equipment is subjected to high levels of EMI, bump, shock and vibration, or where extremes of temperature are seen. The products are suitable for transportation, quasi-military, marine, industrial, remote telemetry, reliability critical applications such as signalling and control or monitoring systems. The products meet military, aerospace, railway, power generation and industrial specifications as standard.
Units in this class offer excellent immunity to severe transients, surges, and conducted/radiated emissions, and offer the highest level of dynamic performance, with very broad input voltage ranges, and high levels of safety isolation.

Performance	
Input range:	2:1 to 10:1
Isolation:	up to 8 kV DC
Transient protection[1]:	4 kV
EMC Emissions[2]:	<B
EMC Immunity[1]:	Level 3/4
Temperature range:	−40°C to 71°C (85°C [3])
Vibration:	5 g
Shock:	100 g

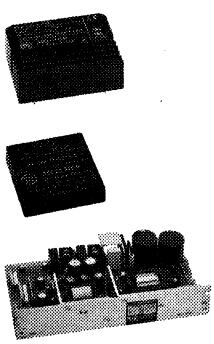


Industrial Environment Class

For general industrial applications, where operating temperature range and mechanical durability are still important, and where units must provide good dynamic and EMC performance.
These products are suitable for industrial manufacturing equipment, process control and monitoring systems, portable and hand held instruments, safety/alarm systems, broadcast, telecom as well as data transmission equipment.
Units in this class are of compact, solid construction. They comply with railway, telecom and industrial standards and provide an excellent power to volume ratio.

[1] According to IEC 801, IEC 1000-4
[2] According to EN 55022, CISPR 22, FCC Part 15
[3] With derating

Performance	
Input range:	2:1 to 5:1
Isolation:	up to 5.3 kV DC
Transient protection[1]:	2 kV
EMC Emissions[2]:	<B
EMC Immunity[1]:	Level 2/3
Temperature range:	−25°C to 71°C
Vibration:	5 g
Shock:	50 g



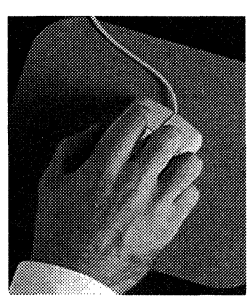
Benign Environment Class

For use in applications which are generally fixed location, and where environmental conditions such as temperature, EMC and mechanical durability are to moderate levels.
Ideally suited to higher volume, price sensitive applications such as instrumentation, displays, alarm systems, commercial equipment, ticketing systems, light industrial apparatus and test equipment.
Units in this class comply with international standards for safety and EMC but with lower performance levels than those seen in industrial and rugged environments. Generally, products in this class feature narrower input voltage ranges as well as limited transient and surge protection. They are characterized by an excellent price to cost ratio and unrestricted Melcher quality.

Performance	
Input range:	2:1 to 3:1
Isolation:	up to 5.3 kV DC
Transient protection[1]:	0.5 kV
EMC Emissions[2]:	<A
EMC Immunity[1]:	Level 1/2
Temperature range:	−10°C to 50°C (70°C [3])
Vibration:	2 g
Shock:	15 g

The Melcher Databook detailing 60 different product families within 860 full-colour pages, this is the most comprehensive databook in the industry, providing a clear structure to assist engineers to select products from Melcher's three product classes: Rugged, Industrial and Benign. The databook contains important information on CE marking, and statements of conformity to underline Melcher's compliance to the latest standards for safety and EMC.

The Melcher Databook is also available on CD-ROM in a PC/Mac version including a multi-media company presentation in English, German, French, Dutch and Japanese. This format provides users with the added flexibility of a fast search engine, and the facility to cut and paste information directly into other applications such as procurement specifications and design drawings.



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Power Supplies

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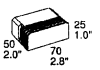
PSA-Family

Single output of 12...48 V DC, Input voltage up to 144 V DC,
No input to output isolation, PCB or chassis mount

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [A]	Input voltage U_i [V DC]	Input voltage $U_{i\,nom}$ [V DC]	Efficiency η [%]	Type
12	1.5	18...144	60	86	PSA 121.5-7iR
15	1.5	22...144	60	89	PSA 151.5-7iR
24	1.5	31...144	60	93	PSA 241.5-7iR
36	1.2	44...144	80	94	PSA 361-7iR
48	1.0	58...144	80	95	PSA 481-7iR

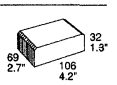


- Extremely wide input voltage range
- Very good dynamic properties
- Input undervoltage cut-out
- Inhibit and output voltage control (iR)
- Temperature range -7: −25...71°C
- No derating over temperature
- Output no-load and short-circuit proof
- Safety according to IEC 950, EN 60950

PSB-Family

Single output of 5.1...48 V DC, Input voltage up to 144 V DC
No input to output isolation, PCB or chassis mount

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [A]	Input voltage U_i [V DC]	Input voltage $U_{i\,nom}$ [V DC]	Efficiency η [%]	Type
5.1	4...5	15...144	60	80	PSB 5A4-7iR
12	3...4	18...144	60	89	PSB 123-7iR
15	3...4	22...144	60	90	PSB 153-7iR
24	3...4	31...144	60	94	PSB 243-7iR
36	3...4	44...144	80	95	PSB 363-7iR
48	3...4	58...144	80	96	PSB 483-7iR

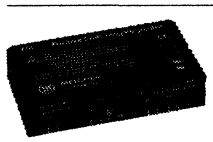


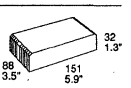
- Extremely wide input voltage range
- Very good dynamic properties
- Input undervoltage cut-out
- Inhibit and output voltage control (iR)
- Temperature range -7: −25...71°C
- No derating over temperature
- Output no-load and short-circuit proof
- Safety according to IEC 950, EN 60950

PSC-Family

Single output of 12...48 V DC, Input voltage up to 144 V DC
No input to output isolation, PCB or chassis mount

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [A]	Input voltage U_i [V DC]	Input voltage $U_{i\,nom}$ [V DC]	Efficiency η [%]	Type
12	6	18...144	60	89	PSC 126-7iR
15	6	22...144	60	90	PSC 156-7iR
24	6	31...144	60	94	PSC 246-7iR
36	6	44...144	80	95	PSC 366-7iR
48	6	58...144	80	96	PSC 486-7iR



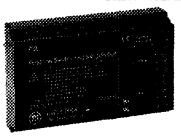


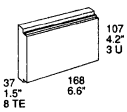
- Extremely wide input voltage range
- Very good dynamic properties
- Input undervoltage cut-out
- Temperature range -7: −25...71°C
- Inhibit and output voltage control (iR)
- No derating over temperature
- Output no-load and short-circuit proof
- Safety according to IEC 950, EN 60950

PSL-Family

Single output of 12...48 V DC, Input voltage up to 144 V DC
No input to output isolation, 19" rack or chassis mount

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [A]	Input voltage U_i [V DC]	Input voltage $U_{i\,nom}$ [V DC]	Efficiency η [%]	Type
12	6	18...144	60	89	PSL 126-7R
15	6	22...144	60	90	PSL 156-7R
24	6	31...144	60	94	PSL 246-7R
36	6	44...144	80	95	PSL 366-7R
48	6	58...144	80	96	PSL 486-7R



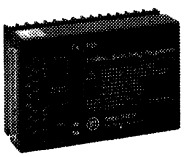


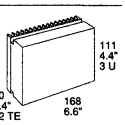
- Extremely wide input voltage range
- Very good dynamic properties
- Input undervoltage cut-out
- Output voltage control (R)
- Temperature range -7: −25...71°C
- No derating over temperature
- Output no-load and short-circuit proof
- Safety according to IEC 950, EN 60950

PSS-Family

Single output of 12...48 V DC, Input voltage up to 144 V DC
No input to output isolation, 19" rack or chassis mount

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [A]	Input voltage U_i [V DC]	Input voltage $U_{i\,nom}$ [V DC]	Efficiency η [%]	Type
12 (15)	9	18...144	60	90	PSS 129-7
24	9	31...144	60	94	PSS 249-7
36	9	44...144	80	94	PSS 369-7
48	9	58...144	80	96	PSS 489-7



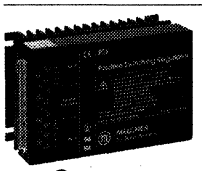


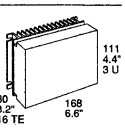
- Input undervoltage cut-out
- Output sense lines
- Current sharing
- Fast dynamic response
- Temperature range -7: −25...71°C
- No derating over temperature
- Output no-load and short-circuit proof
- Ext. output voltage adjustment and inhibit
- Safety according to IEC 950, EN 60950

PSK-Family

Single output of 12...48 V DC, Input voltage up to 144 V DC
No input to output isolation, 19" rack or chassis mount

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [A]	Input voltage U_i [V DC]	Input voltage $U_{i\,nom}$ [V DC]	Efficiency η [%]	Type
12 (15)	12	18...144	60	90	PSK 1212-7
24	12	31...144	60	94	PSK 2412-7
36	12	44...144	80	94	PSK 3612-7
48	12	58...144	80	96	PSK 4812-7





- Input undervoltage cut-out
- Output sense lines
- Current sharing
- Fast dynamic response
- Temperature range -7: −25...71°C
- No derating over temperature
- Output no-load and short-circuit proof
- Ext. output voltage adjustment and inhibit
- Safety according to IEC 950, EN 60950

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IMX 4-Family

4 watt DC-DC converters, Input to output isolation
1 and 2 outputs up to 15 V DC, Input voltage up to 121 V DC

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [mA]	Type Input voltage 8.4...36 V DC	Type Input voltage 16.8...75 V DC	Type Input voltage 40...121 V DC
3.3	900	20 IMX 4-03-7	40 IMX 4-03-7	70 IMX 4-03-7
5	700	20 IMX 4-05-7	40 IMX 4-05-7	70 IMX 4-05-7
12	340	20 IMX 4-12-7	40 IMX 4-12-7	70 IMX 4-12-7
15	280	20 IMX 4-15-7	40 IMX 4-15-7	70 IMX 4-15-7
+5, −5	+350, −350	20 IMX 4-0505-7	40 IMX 4-0505-7	70 IMX 4-0505-7
+12, −12	+170, −170	20 IMX 4-1212-7	40 IMX 4-1212-7	70 IMX 4-1212-7
+15, −15	+140, −140	20 IMX 4-1515-7	40 IMX 4-1515-7	70 IMX 4-1515-7

- Very wide input voltage range
- Efficient input filter
- Temperature range -7: −25...71°C
- I/O electric strength test:
  1500 V DC 20/40 IMX 4
  2000 V DC 70 IMX 4
- Outputs no-load and short-circuit proof
- High reliability
- Supplementary insulation (70 IMX 4 types)
- Safety according to IEC 950, EN 60950

IMX 7-Family

7 watt DC-DC converters, Input to output isolation
1 and 2 outputs up to 48 V DC, Input voltage up to 150 V DC

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [mA]	Type Input voltage 8.4...36 V DC	Type Input voltage 16.8...75 V DC
3.3	1500	20 IMX 7-03-7	40 IMX 7-03-7
5.1	1200	20 IMX 7-05-7	40 IMX 7-05-7
5, 5	700, 700	20 IMX 7-05-05-7	40 IMX 7-05-05-7
12, 12	300, 300	20 IMX 7-12-12-7	40 IMX 7-12-12-7
15, 15	240, 240	20 IMX 7-15-15-7	40 IMX 7-15-15-7
24, 24	150, 150	20 IMX 7-24-24-7	40 IMX 7-24-24-7

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [mA]	Type Input voltage 40...121 V DC	Type Input voltage 66...150 V DC
3.3	1500	70 IMX 7-03-7	110 IMX 7-03-7
5.1	1200	70 IMX 7-05-7	110 IMX 7-05-7
5, 5	700, 700	70 IMX 7-05-05-7	110 IMX 7-05-05-7
12, 12	300, 300	70 IMX 7-12-12-7	110 IMX 7-12-12-7
15, 15	240, 240	70 IMX 7-15-15-7	110 IMX 7-15-15-7
24, 24	150, 150	70 IMX 7-24-24-7	110 IMX 7-24-24-7

- Very wide input voltage range
- Efficient input filter
- Temperature range -7: −25...71°C
- I/O electric strength test:
  1500 V DC 20/40 IMX 7
  2000 V DC 70 IMX 7
  2500 V DC 110 IMX 7
- Inhibit input
- Adjustable output voltage
- Outputs no-load and short-circuit proof
- High reliability
- Supplementary insulation
- Safety according to IEC 950, EN 60950
- 20 IMX 7 have reduced output power

IMP 1-Family

1 watt DC-DC converter, Input to output isolation
1 and 2 outputs up to 30 V DC, Input voltage up to 5.5 V DC

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [mA]	Input voltage $U_{i\,nom}$ [V DC]	Input voltage range U_i [V DC]	Type
5	200	5	4.5...5.5	5 IMP 1-05-7
12	84	5	4.5...5.5	5 IMP 1-12-7
15	66	5	4.5...5.5	5 IMP 1-15-7
±5	±100	5	4.5...5.5	5 IMP 1-0505-7
±12	±42	5	4.5...5.5	5 IMP 1-1212-7
±15	±33	5	4.5...5.5	5 IMP 1-1515-7

- Input voltage 5 V DC +10%
- High efficiency up to 58%
- Temperature range -7: −25...71°C
- No derating over temperature
- Outputs no-load and short-circuit proof
- I/O electric strength test 1500 V DC/1060 V_{rms}

IMP 3-Family

3 watt DC-DC converter, Input to output isolation
1 and 2 outputs up to 30 V DC, Input voltage up to 72 V DC

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [mA]	Rated power T_A = 71°C $P_{o\,tot}$ [W]	Type Input voltage 9...36 V DC	Type Input voltage 18...72 V DC
5	500	2.5	24 IMP 3-05-7	48 IMP 3-05-7
12	250	3	24 IMP 3-12-7	48 IMP 3-12-7
15	200	3	24 IMP 3-15-7	48 IMP 3-15-7
±5	±250	2.5	24 IMP 3-0505-7	48 IMP 3-0505-7
±12	±125	3	24 IMP 3-1212-7	48 IMP 3-1212-7
±15	±100	3	24 IMP 3-1515-7	48 IMP 3-1515-7
5, 5	250, 250	2.5	24 IMP 3-05-05-7	48 IMP 3-05-05-7
12, 12	125, 125	3	24 IMP 3-12-12-7	48 IMP 3-12-12-7
15, 15	100, 100	3	24 IMP 3-15-15-7	48 IMP 3-15-15-7
5	500	2.5	24 IXP 3-05-7	48 IXP 3-05-7
12	250	3	24 IXP 3-12-7	48 IXP 3-12-7
15	200	3	24 IXP 3-15-7	48 IXP 3-15-7
±5	±250	2.5	24 IXP 3-0505-7	48 IXP 3-0505-7
±12	±125	3	24 IXP 3-1212-7	48 IXP 3-1212-7
±15	±100	3	24 IXP 3-1515-7	48 IXP 3-1515-7
5, 5	250, 250	2.5	24 IXP 3-05-05-7	48 IXP 3-05-05-7
12, 12	125, 125	3	24 IXP 3-12-12-7	48 IXP 3-12-12-7
15, 15	100, 100	3	24 IXP 3-15-15-7	48 IXP 3-15-15-7

- Wide input voltage range
- Efficient input filter
- Temperature range -7: −25...71°C
- I/O electric strength test:
  IMP: 1.5 kV DC/1060 V_{rms}
  IXP: 3.5 k V DC/2500 V_{rms}
- No derating over temperature
- High reliability
- Outputs no-load and short-circuit proof
- SD shutdown input

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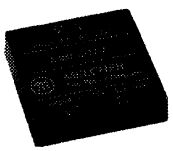
IMP 6-Family

5/6 watt DC-DC converter, Input to output isolation
1 and 2 outputs up to 30 V DC, Input voltage up to 5.5 V DC

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [mA]	Input voltage $U_{i\,nom}$ [V DC]	Input voltage range U_i [V DC]	Rated power T_A = 71°C $P_{o\,tot}$ [W]	Type
5	1000	5	4.5...5.5	5	5 IMP 6-05-7
12	500	5	4.5...5.5	6	5 IMP 6-12-7
15	400	5	4.5...5.5	6	5 IMP 6-15-7
±5	±500	5	4.5...5.5	5	5 IMP 6-0505-7
±12	±250	5	4.5...5.5	6	5 IMP 6-1212-7
±15	±200	5	4.5...5.5	6	5 IMP 6-1515-7

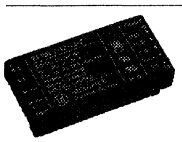


- Input voltage 5 V DC +10%
- Input filter built-in
- High efficiency up to 58%
- I/O electric strength test 1500 V DC/1060 V_{rms}
- Temperature range -7: −25...71°C
- No derating over temperature
- Outputs no-load and short-circuit proof

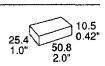
IMS 7-Family

7 watt DC-DC converters, Input to output isolation
1 and 2 outputs up to 48 V DC, Input voltage up to 75 V DC

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [mA]	Type Input voltage 14...36 V DC	Type Input voltage 36...75 V DC
3.3	1200	24 IMS 7-03-7	48 IMS 7-03-7
5	1200	24 IMS 7-05-7	48 IMS 7-05-7
5, 5	700, 700	24 IMS 7-05-05-7	48 IMS 7-05-05-7
12, 12	300, 300	24 IMS 7-12-12-7	48 IMS 7-12-12-7
15, 15	240, 240	24 IMS 7-15-15-7	48 IMS 7-15-15-7
24, 24	150, 150	24 IMS 7-24-24-7	48 IMS 7-24-24-7



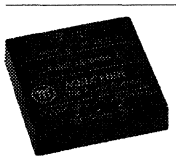
- High reliability and no derating
- I/O electric strength test 1.5 kV DC
- Temperature range -7: −25...71°C
- Inhibit input
- Adjustable output voltage
- Outputs no-load and short-circuit proof
- Supplementary insulation
- Safety according to IEC 950, EN 60950



IMP 12-Family

12 watt DC-DC converter, Input to output isolation
1 and 2 outputs up to 30 V DC, Input voltage up to 72 V DC

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [mA]	Input voltage $U_{i\,nom}$ [V DC]	Type Input voltage 10...36 V DC	Type Input voltage 18...72 V DC
5	2400	24	24 IMP 12-05-7	48 IMP 12-05-7
12	1000	24	24 IMP 12-12-7	48 IMP 12-12-7
15	800	24	24 IMP 12-15-7	48 IMP 12-15-7
±5	±1200	24	24 IMP 12-0505-7	48 IMP 12-0505-7
±12	±500	24	24 IMP 12-1212-7	48 IMP 12-1212-7
±15	±400	24	24 IMP 12-1515-7	48 IMP 12-1515-7



- Wide input voltage range
- Efficient input filter
- Temperature range -7: −25...71°C
- No derating over temperature
- I/O electric strength test 1500 V DC/1060 V_{rms}
- High reliability
- Outputs no-load and short-circuit proof

IMR 3-Family

3 watt DC-DC converters, Input to output isolation
1 and 2 outputs up to 30 V DC, Input voltage up to 72 V DC

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [mA]	Type Input voltage 9...18 V DC	Type Input voltage 18...36 V DC	Type Input voltage 20...60 V DC	Type Input voltage 36...72 V DC
5	500	12 IMR 3-05-2	24 IMR 3-05-2	40 IMR 3-05-2	48 IMR 3-05-2
12	250	12 IMR 3-12-2	24 IMR 3-12-2	40 IMR 3-12-2	48 IMR 3-12-2
15	200	12 IMR 3-15-2	24 IMR 3-15-2	40 IMR 3-15-2	48 IMR 3-15-2
±5	±250	12 IMR 3-0505-2	24 IMR 3-0505-2	40 IMR 3-0505-2	48 IMR 3-0505-2
±12	±125	12 IMR 3-1212-2	24 IMR 3-1212-2	40 IMR 3-1212-2	48 IMR 3-1212-2
±15	±100	12 IMR 3-1515-2	24 IMR 3-1515-2	40 IMR 3-1515-2	48 IMR 3-1515-2

- High efficiency up to 75%
- I/O electric strength test 500 V DC
- Temperature range -2: −10...50°C
  wider temperature range on request
- Outputs no-load and short-circuit proof
- No derating over temperature
  (except 12 IMR 3 → 80%)

IMR 6-Family

6 watt DC-DC converters, Input to output isolation
1 and 2 outputs up to 30 V DC, Input voltage up to 72 V DC

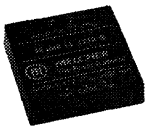
Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [mA]	Type Input voltage 9...18 V DC	Type Input voltage 18...36 V DC	Type Input voltage 20...60 V DC	Type Input voltage 36...72 V DC
5	1000	12 IMR 6-05-2	24 IMR 6-05-2	40 IMR 6-05-2	48 IMR 6-05-2
12	500	12 IMR 6-12-2	24 IMR 6-12-2	40 IMR 6-12-2	48 IMR 6-12-2
15	400	12 IMR 6-15-2	24 IMR 6-15-2	40 IMR 6-15-2	48 IMR 6-15-2
±5	±500	12 IMR 6-0505-2	24 IMR 6-0505-2	40 IMR 6-0505-2	48 IMR 6-0505-2
±12	±250	12 IMR 6-1212-2	24 IMR 6-1212-2	40 IMR 6-1212-2	48 IMR 6-1212-2
±15	±200	12 IMR 6-1515-2	24 IMR 6-1515-2	40 IMR 6-1515-2	48 IMR 6-1515-2

- High efficiency up to 75%
- I/O electric strength test 500 V DC
- Temperature range -2: −10...50°C
  wider temperature range on request
- Outputs no-load and short-circuit proof
- No derating over temperature

IMR 15-Family

15 watt DC-DC converters, Input to output isolation
1 and 2 outputs up to 30 V DC, Input voltage up to 72 V DC

Output voltage $U_{o\,nom}$ [V]	Output current $I_{o\,nom}$ [mA]	Type Input voltage 9...18 V DC	Type Input voltage 18...36 V DC	Type Input voltage 36...72 V DC
5	3000	12 IMR 15-05-2	24 IMR 15-05-2	48 IMR 15-05-2
12	1250	12 IMR 15-12-2	24 IMR 15-12-2	48 IMR 15-12-2
15	1000	12 IMR 15-15-2	24 IMR 15-15-2	48 IMR 15-15-2
±12	±625	12 IMR 15-1212-2	24 IMR 15-1212-2	48 IMR 15-1212-2
±15	±500	12 IMR 15-1515-2	24 IMR 15-1515-2	48 IMR 15-1515-2



- High efficiency up to 82%
- I/O electric strength test 500 V DC
- Temperature range -2: −10...50°C
- Outputs no-load and short-circuit proof
- No derating over temperature
  (except 12 IMR 15 → 67%)

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G-Family

25 watt DC-DC converters, Input to output isolation
1, 2 and 3 outputs of 3.3 to 24 V DC, Input voltage from 8.4...75 V DC

Output voltage 1, 2, 3 $U_{o\,nom}$ [V]	Output current 1, 2, 3 $I_{o\,nom}$ [mA]	Type Input voltage 8.4...36 V DC	Type Input voltage 14...36 V DC	Type Input voltage 36...75 V DC
3.3, 5.05	3.3, 5.05	AG 2001-7	BG 2001-7	CG 2001-7
12, 12		AG 2320-7	AG 2320-7	AG 2320-7
15, 15		AG 2540-7	AG 2540-7	AG 2540-7
24,24		AG 2660-7	AG 2660-7	AG 2660-7
3.3, ±12		AG 3120-7	AG 3120-7	AG 3120-7
3.3, ±15		AG 3140-7	AG 3140-7	AG 3140-7
5.05, ±12.5	2, ±0.6	AG 3020-7	AG 3020-7	AG 3020-7
5.05, ±15	2, ±0.5	AG 3040-7	AG 3040-7	AG 3040-7
5.05, ±24	±500	AG 3060-7	AG 3060-7	AG 3060-7

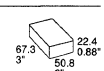
- Very high efficiency up to 88%
- Temperature range -7: −40...71°C
- 8 bit communications interface
- High reliability
- Inhibit input
- Very good dynamic regulation (magnetic feedback)
- Outputs no-load and short-circuit proof
- Adjustable output voltage for dual output modules (60...110%)
- Very compact

IMR 25-Family

25 watt DC-DC converters, Input to output isolation
1, 2 or 3 outputs up to 30 V DC, Input voltage up to 72 V DC

Output voltage 1, 2, 3 $U_{o\,nom}$ [V]	Output current 1, 2, 3 $I_{o\,nom}$ [A]	Type Input voltage 9...18 V DC	Type Input voltage 18...36 V DC
5	5	12 IMR 25-05-2	24 IMR 25-05-2
12	2.1		24 IMR 25-12-2
+5, −5	+4.7, −0.3	12 IMR 25-0505-2	24 IMR 25-0505-2
+12, −12	+1.8, −0.3	12 IMR 25-1212-2	24 IMR 25-1212-2
+5, ±12	+4, ±0.3	12 IMR 25-051212-2	24 IMR 25-051212-2
+5, ±15	+3.5, ±0.3	12 IMR 25-051515-2	24 IMR 25-051515-2

Output voltage 1, 2, 3 $U_{o\,nom}$ [V]	Output current 1, 2, 3 $I_{o\,nom}$ [A]	Type Input voltage 36...72 V DC
5	5	48 IMR 25-05-2
12	2.1	48 IMR 25-12-2
15	1.7	48 IMR 25-15-2
+5, −5	+4.7, −0.3	48 IMR 25-0505-2
+12, −12	+1.8, −0.3	48 IMR 25-1212-2
+15, −15	+1.4, −0.3	48 IMR 25-1515-2
+5, ±12	+4, ±0.3	48 IMR 25-051212-2
+5, ±15	+3.5, ±0.3	48 IMR 25-051515-2



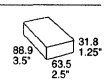
- High efficiency up to 82%
- Temperature range -2: −10...50°C
- I/O electric strength test 1.5 kV DC
- No derating
- Short-circuit proof

IMR 40-Family

48 watt DC-DC converters, Input to output isolation
1, 2 or 3 outputs up to 30 V DC, Input voltage up to 72 V DC

Output voltage 1, 2, 3 $U_{o\,nom}$ [V]	Output current 1, 2, 3 $I_{o\,nom}$ [A]	Type Input voltage 9...18 V DC	Type Input voltage 18...36 V DC
5	8	12 IMR 40-05-2	24 IMR 40-05-2
12	3.5		24 IMR 40-12-2
24	2	12 IMR 40-24-2	
+5, −5	+8, −0.5	12 IMR 40-0505-2	24 IMR 40-0505-2
+12, −12	+3, −0.5	12 IMR 40-1212-2	24 IMR 40-1212-2
+5, ±12	+6, ±0.5	12 IMR 40-051212-2	24 IMR 40-051212-2
+5, ±15	+6, ±0.5	12 IMR 40-051515-2	24 IMR 40-051515-2
+5, −5, +12	+6, ±0.5	12 IMR 40-050512-2	24 IMR 40-050512-2

Output voltage 1, 2, 3 $U_{o\,nom}$ [V]	Output current 1, 2, 3 $I_{o\,nom}$ [A]	Type Input voltage 36...72 V DC
5	8	48 IMR 40-05-2
12	3.5	48 IMR 40-12-2
15	3	48 IMR 40-15-2
24	2	48 IMR 40-24-2
+5, −5	+8, −0.5	48 IMR 40-0505-2
+12, −12	+3, −0.5	48 IMR 40-1212-2
+15, −15	+2, −0.5	48 IMR 40-1515-2
+5, ±12	+6, ±0.5	48 IMR 40-051212-2
+5, ±15	+6, ±0.5	48 IMR 40-051515-2
+5, −5, +12	+6, ±0.5	48 IMR 40-050512-2



- High efficiency up to 84%
- Temperature range -2: −10...50°C
- I/O electric strength test 1.5 kV DC
- No derating
- Short-circuit proof

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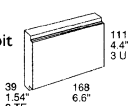
M-Family

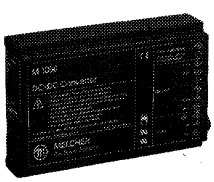
50 watt DC-DC converters, Input to output isolation
1, 2 or 3 output up to 48 V DC, Input voltage up to 372 V DC

Output voltage 1, 2, 3 $U_{o\,nom}$ [V]	Output current 1, 2, 3 $I_{o\,nom}$ [A]	Type Input voltage 8...35 V DC	Type Input voltage 14...70 V DC	Type Input voltage 20...100 V DC	Options
5.1	8	AM 1001-7R	BM 1001-7R	FM 1001-7R	-9, P, D, V, A, H, F
12	4	AM 1301-7R	BM 1301-7R	FM 1301-7R	-9, P, D, A, H, F
15	3.4	AM 1501-7R	BM 1501-7R	FM 1501-7R	-9, P, D, A, H, F
24	2	AM 1601-7R	BM 1601-7R	FM 1601-7R	-9, P, D, A, H, F
48	1	AM 1901-7R	BM 1901-7R	FM 1901-7R	-9, P, D, A, H, F
12, 12	2, 2	AM 2320-7	BM 2320-7	FM 2320-7	-9, P, D, A, H, F
15, 15	1.7, 1.7	AM 2540-7	BM 2540-7	FM 2540-7	-9, P, D, A, H, F
5.1, 12, 12	5, 0.7, 0.7	AM 3020-7	BM 3020-7	FM 3020-7	-9, P, D, V, A, H, F
5.1, 15, 15	5, 0.6, 0.6	AM 3040-7	BM 3040-7	FM 3040-7	-9, P, D, V, A, H, F

Output voltage 1, 2, 3 $U_{o\,nom}$ [V]	Output current 1, 2, 3 $I_{o\,nom}$ [A]	Type Input voltage 28...140 V DC	Type Input voltage 44...220 V DC	Type Input voltage 88...372 V DC	Options
5.1	8	CM 1001-7R	DM 1001-7R	LM 1001-7R	-9, P, D, V, A, H, F
12	4	CM 1301-7R	DM 1301-7R	LM 1301-7R	-9, P, D, A, H, F
15	3.4	CM 1501-7R	DM 1501-7R	LM 1501-7R	-9, P, D, A, H, F
24	2	CM 1601-7R	DM 1601-7R	LM 1601-7R	-9, P, D, A, H, F
48	1	CM 1901-7R	DM 1901-7R	LM 1901-7R	-9, P, D, A, H, F
12, 12	2, 2	CM 2320-7	DM 2320-7	LM 2320-7	-9, P, D, A, H, F
15, 15	1.7, 1.7	CM 2540-7	DM 2540-7	LM 2540-7	-9, P, D, A, H, F
5.1, 12, 12	5, 0.7, 0.7	CM 3020-7	DM 3020-7	LM 3020-7	-9, P, D, V, A, H, F
5.1, 15, 15	5, 0.6, 0.6	CM 3040-7	DM 3040-7	LM 3040-7	-9, P, D, V, A, H, F



- Extremely wide input voltage range
- Output voltage control (R) and inhibit
- Temperature range -7: −25...71°C
- I/O electric strength test 4 kV_{rms}
- CM, DM, LM types available as CMZ, DMZ, LMZ class II equipment ⧈
- Surge and transient suppression circuitry
- Outputs individually isolated, controlled
- Outputs fully protected against overload
- Safety according to IEC 950, EN 60950



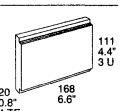
Description of options
-9 Ambient temperature range −40...71°C
H Increased electric strength test voltage
F Input fuse internally (not accessible)
E Inrush current limitation (CM, EM, LM)
A Output voltage test sockets
P Potentiometer for U_o
D Save data signal
V ACFAIL signal

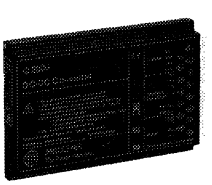
Q-Family

100 (150) watt DC-DC converters, Input to output isolation
1 or 2 outputs up to 48 V DC, Input voltage up to 168 V DC

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Output current T_A = 50°C $I_{o\,max}$ [A]	Type Input voltage 14.4...36 V DC	Type Input voltage 22...54 V DC	Type Input voltage 35...75 V DC	Opt
5.1	16	20	BQ 1001-7R	GQ 1001-7R	CQ 1001-7R	-9, P
12	8	10	BQ 2320-7R	GQ 2320-7R	CQ 2320-7R	-9, P
15	6.6	8	BQ 2540-7R	GQ 2540-7R	CQ 2540-7R	-9, P
24	4.4	6	BQ 2660-7R	GQ 2660-7R	CQ 2660-7R	-9, P
24	4	5	BQ 2320-7R	GQ 2320-7R	CQ 2320-7R	-9, P
30	3.3	4	BQ 2540-7R	GQ 2540-7R	CQ 2540-7R	-9, P
48	2.2	3	BQ 2660-7R	GQ 2660-7R	CQ 2660-7R	-9, P
5.1, 5.1	8, 8	10, 10	BQ 2001-7R	GQ 2001-7R	CQ 2001-7R	-9, P
12, 12	4, 4	5, 5	BQ 2320-7R	GQ 2320-7R	CQ 2320-7R	-9, P
15, 15	3.3, 3.3	4, 4	BQ 2540-7R	GQ 2540-7R	CQ 2540-7R	-9, P
24, 24	2.2, 2.2	3, 3	BQ 2660-7R	GQ 2660-7R	CQ 2660-7R	-9, P

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Output current T_A = 50°C $I_{o\,max}$ [A]	Type Input voltage 43...108 V DC	Type Input voltage 65...150 V DC	Opt
5.1	16	20	DQ 1001-7R	EQ 1001-7R	-9, P
12	8	10	DQ 2320-7R	EQ 2320-7R	-9, P
15	6.6	8	DQ 2540-7R	EQ 2540-7R	-9, P
24	4.4	6	DQ 2660-7R	EQ 2660-7R	-9, P
24	4	5	DQ 2320-7R	EQ 2320-7R	-9, P
30	3.3	4	DQ 2540-7R	EQ 2540-7R	-9, P
48	2.2	3	DQ 2660-7R	EQ 2660-7R	-9, P
5.1, 5.1	8, 8	10, 10	DQ 2001-7R	EQ 2001-7R	-9, P
12, 12	4, 4	5, 5	DQ 2320-7R	EQ 2320-7R	-9, P
15, 15	3.3, 3.3	4, 4	DQ 2540-7R	EQ 2540-7R	-9, P
24, 24	2.2, 2.2	3, 3	DQ 2660-7R	EQ 2660-7R	-9, P





- Extremely high efficiency up to 91%
- I/O electric strength test 2 kV_{rms}
- Temperature range -7: −25...71°C
- Redundant operation
- Auto current sharing
- Output voltage control (R) and inhibit
- Extremely low inrush current, hot plug-in
- Safety according to IEC 950, EN 41003

Description of options
-9 Ambient temperature range −40...71°C
P Potentiometer for U_o

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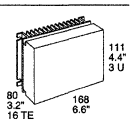
K-Family

150 watt DC-DC converters, Input to output isolation
1 or 2 outputs up to 48 V DC, Input voltage up to 385 V DC

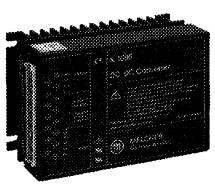
Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Type Input voltage 8...35 V DC	Type Input voltage 14...70 V DC	Type Input voltage 20...100 V DC	Options
5.1	25	AK 1001-7R	BK 1001-7R	FK 1001-7R	-9, D, V, P, T, B1
12	12	AK 1301-7R	BK 1301-7R	FK 1301-7R	-9, D, P, T, B1
15	10	AK 1501-7R	BK 1501-7R	FK 1501-7R	-9, D, P, T, B1
24	6	AK 1601-7R	BK 1601-7R	FK 1601-7R	-9, D, P, T, B1
24	6	AK 2320-7R	BK 2320-7R	FK 2320-7R	-9, D, P, T, B1
30	5	AK 2540-7R	BK 2540-7R	FK 2540-7R	-9, D, P, T, B1
48	3	AK 2660-7R	BK 2660-7R	FK 2660-7R	-9, D, P, T, B1
12, 12	6, 6	AK 2320-7R	BK 2320-7R	FK 2320-7R	-9, D, P, T, B1
15, 15	5, 5	AK 2540-7R	BK 2540-7R	FK 2540-7R	-9, D, P, T, B1
24, 24	3, 3	AK 2660-7R	BK 2660-7R	FK 2660-7R	-9, D, P, T, B1

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Type Input voltage 28...140 V DC	Type Input voltage 44...220 V DC	Type Input voltage 85...264 V DC	Options
5.1	25	CK 1001-7R	DK 1001-7R	LK 4003-6R	-9, D, V, P, T, B1
12	12	CK 1301-7R	DK 1301-7R	LK 4301-7R	-9, D, P, T, B1
15	10	CK 1501-7R	DK 1501-7R	LK 4501-7R	-9, D, P, T, B1
24	6	CK 1601-7R	DK 1601-7R	LK 4601-7R	-9, D, P, T, B1
24	6	CK 2320-7R	DK 2320-7R	LK 5320-7R	-9, D, P, T, B1
30	5	CK 2540-7R	DK 2540-7R	LK 5540-7R	-9, D, P, T, B1
48	3	CK 2660-7R	DK 2660-7R	LK 5660-7R	-9, D, P, T, B1
12, 12	6, 6	CK 2320-7R	DK 2320-7R	LK 5320-7R	-9, D, P, T, B1
15, 15	5, 5	CK 2540-7R	DK 2540-7R	LK 5540-7R	-9, D, P, T, B1
24, 24	3, 3	CK 2660-7R	DK 2660-7R	LK 5660-7R	-9, D, P, T, B1

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Type Input voltage 67...385 V DC	Options
5.1	25	EK 1001-7R	-9, D, V, P, T, B1
12	12	EK 1301-7R	-9, D, P, T, B1
15	10	EK 1501-7R	-9, D, P, T, B1
24	6	EK 1601-7R	-9, D, P, T, B1
24	6	EK 2320-7R	-9, D, P, T, B1
30	5	EK 2540-7R	-9, D, P, T, B1
48	3	EK 2660-7R	-9, D, P, T, B1
12, 12	6, 6	EK 2320-7R	-9, D, P, T, B1
15, 15	5, 5	EK 2540-7R	-9, D, P, T, B1
24, 24	3, 3	EK 2660-7R	-9, D, P, T, B1



- Extremely wide input voltage range
- Temperature range -7: −25...71°C
- I/O electric strength test 4 kV_{rms}
- Fully isolated outputs
- AK have reduced output power)
- Input over-/undervoltage lock-out
- Output voltage control (R) and inhibit
- Surge and transient suppression circuitry
- Outputs open- and short-circuit proof
- Safety according to IEC 950, EN 60950



Description of options
-6 Ambient temperature range −25...60°C
-9 Ambient temperature range −40...71°C
V ACFAIL signal (for 5.1 V output)
D Save data signal
P Potentiometer for U_o
T Current sharing
B1 Cooling plate small

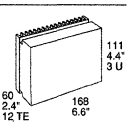
S-Family

100 watt DC-DC converters, Input to output isolation
1 or 2 output up to 48 V DC, Input voltage up to 385 V DC

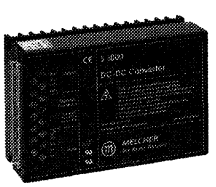
Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Type Input voltage 8...35 V DC	Type Input voltage 14...70 V DC	Type Input voltage 20...100 V DC	Options
5.1	16	AS 1001-7R	BS 1001-7R	FS 1001-7R	-9, D, V, P, T, B1
12	8	AS 1301-7R	BS 1301-7R	FS 1301-7R	-9, D, P, T, B1
15	6.5	AS 1501-7R	BS 1501-7R	FS 1501-7R	-9, D, P, T, B1
24	4.2	AS 1601-7R	BS 1601-7R	FS 1601-7R	-9, D, P, T, B1
24	4	AS 2320-7R	BS 2320-7R	FS 2320-7R	-9, D, P, T, B1
30	3.2	AS 2540-7R	BS 2540-7R	FS 2540-7R	-9, D, P, T, B1
48	2	AS 2660-7R	BS 2660-7R	FS 2660-7R	-9, D, P, T, B1
12, 12	4, 4	AS 2320-7R	BS 2320-7R	FS 2320-7R	-9, D, P, T, B1
15, 15	3.2, 3.2	AS 2540-7R	BS 2540-7R	FS 2540-7R	-9, D, P, T, B1
24, 24	2, 2	AS 2660-7R	BS 2660-7R	FS 2660-7R	-9, D, P, T, B1

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Type Input voltage 28...140 V DC	Type Input voltage 44...220 V DC	Type Input voltage 88...264 V DC	Options
5.1	16	CS 1001-7R	DS 1001-7R	LS 4001-7R	-9, D, V, P, T, B1
12	8	CS 1301-7R	DS 1301-7R	LS 4301-7R	-9, D, P, T, B1
15	6.5	CS 1501-7R	DS 1501-7R	LS 4501-7R	-9, D, P, T, B1
24	4.2	CS 1601-7R	DS 1601-7R	LS 4601-7R	-9, D, P, T, B1
24	4	CS 2320-7R	DS 2320-7R	LS 5320-7R	-9, D, P, T, B1
30	3.2	CS 2540-7R	DS 2540-7R	LS 5540-7R	-9, D, P, T, B1
48	2	CS 2660-7R	DS 2660-7R	LS 5660-7R	-9, D, P, T, B1
12, 12	4, 4	CS 2320-7R	DS 2320-7R	LS 5320-7R	-9, D, P, T, B1
15, 15	3.2, 3.2	CS 2540-7R	DS 2540-7R	LS 5540-7R	-9, D, P, T, B1
24, 24	2, 2	CS 2660-7R	DS 2660-7R	LS 5660-7R	-9, D, P, T, B1

Output voltage 1, 2 $U_{o\,nom}$ [V]	Output current 1, 2 $I_{o\,nom}$ [A]	Type Input voltage 67...385 V DC	Options
5.1	16	ES 1001-7R	-9, D, V, P, T, B1
12	8	ES 1301-7R	-9, D, P, T, B1
15	6.5	ES 1501-7R	-9, D, P, T, B1
24	4.2	ES 1601-7R	-9, D, P, T, B1
24	4	ES 2320-7R	-9, D, P, T, B1
30	3.2	ES 2540-7R	-9, D, P, T, B1
48	2	ES 2660-7R	-9, D, P, T, B1
12, 12	4, 4	ES 2320-7R	-9, D, P, T, B1
15, 15	3.2, 3.2	ES 2540-7R	-9, D, P, T, B1
24, 24	2, 2	ES 2660-7R	-9, D, P, T, B1



- Extremely wide input voltage range
- I/O electric strength test 4 kV_{rms}
- Fully isolated outputs
- Temperature range -7: −25...71°C
- No derating over temperature
- Input over-/undervoltage lock-out
- Output voltage control (R) and inhibit
- Surge and transient suppression circuitry
- Outputs open- and short-circuit proof
- Safety according to IEC 950, EN 60950



Description of options
-9 Ambient temperature range −40...71°C
V ACFAIL signal (for 5.1 V output)
D Save data signal
P Potentiometer for U_o
T Current sharing
B1 Cooling plate small

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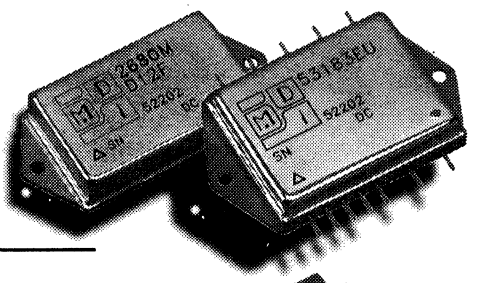

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Modular Devices Inc (MDI) designs and manufactures a wide range of standard and custom power supplies for aerospace, military and industrial use. MDI has a complete thick film hybrid capacity on site, which permits us to produce unique power electronic functions for our customers quickly and efficiently. MDI can also meet challenging radiation and aerospace requirements. With its high technology power supply capability and custom hybrid facility, MDI is uniquely positioned to apply the best and most appropriate packaging technology to your diverse and challenging requirements.

MDI offers the optimum technology for each application.

Full Hybrid Power Supplies using thick film, chip and wire/surface mount components within hermetic hybrid enclosures allows ultimate power density. Low tooling and set up costs and availability of unique hybrid enclosures make power hybrid technology economical for small production runs. Careful computer aided thermal analysis and proven thermal management techniques assure high reliability. MDI's hybrid power supply technology incorporates the latest advances in high frequency techniques, power hybrid and miniature magnetic components. MDI's product capacity includes:

- Standard, off-the-shelf DC to DC converters to 80 watts, operating frequencies to 400 kHz, power densities to 40 W/in^3
- Custom variations of standard DC to DC converters to 120 watts
- Custom DC–AC static inverters to 10 watts
- Design and construction to "K" level, "H" level and other requirements
- Wide temperature range

Hybrids combined with discrete components allow great volumetric efficiency as compared to all discrete designs. MDI's packaging technology incorporates the latest advances in NC milled and dip brazed enclosures, printed wiring and surface mount technology. This product capability provides:

- Higher packaging densities than all discrete designs
- Lower cost and quicker delivery than all hybrid designs
- Best suited for aerospace/high reliability, high density requirements at power levels from 50 watts to 1 KVA

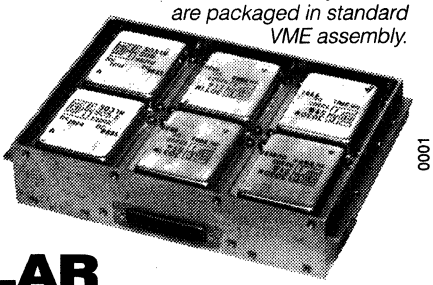
Assemblies of Hybrids:
MDI can combine multiple hybrid converters into a custom or semi-custom high density assembly using standard or modified hybrid converters and NC milled housings. Packaging formats can be VME, SEM E or custom. The hybrid modules can also be combined with other discrete circuitry to provide additional circuit functions. This allows rapid configuration of higher level functions from available modules with short lead times and minimal development costs.

By implementing the power converter function with assemblies of hybrid converters, it is possible to achieve the same functions at different input voltages (e.g., 28 VDC and 120 VDC, or 28 VDC and 270 VDC) by just changing out the hybrid modules. Sequencing, redundant outputs, programmable outputs and other functions are available.

Semi-Custom Hybrid Converters

The following pages show MDI's standard hybrid DC/DC converter lines. Many other converter types are available. In addition, MDI can readily alter input and output voltages for custom applications.

Six 80-watt converters with auxiliary circuits are packaged in standard VME assembly.



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TEL 516-345-3100 • FAX 516-345-3106

Selection Tree

HYBRID DC-DC CONVERTERS

MDI STANDARD DC/DC CONVERTER SELECTIONS

Maximum Power Output	28 VDC Input Series	28 VDC Input Full Featured Series (inhibit)	28 VDC Input Full Featured Series (inhibit not)	28 VDC Input Rad Hard Proton Series	8-40 VDC Low Input Voltage Range Series	Space Station 120 VDC Input Series	Space Station 120 VDC Input Full Featured Series	F-22 Comanche and 270 VDC Input Full Featured Series
5 Watts	3080 (p.4)				3061 (p.23)	3325 (p.28)		
6.5 Watts		2690 (p.8)	6690 (p.13)	5690 (p.18)	3062 (p.24)		3070 (p.29)	3020 (p.34)
20 Watts	3011 (p.5)							
20 Watts		3107 (p.9)	6107 (p.14)	5107 (p.19)	3113 (p.25)		3108 (p.30)	3109 (p.35)
30 Watts	3001, 3138 (pp.6,7)							
30 Watts		2680 (p.10)	6680 (p.15)	5680 (p.20)	3378 (p.26)		3060 (p.31)	3000 (p.36)
40 Watts		3193 (p.11)	6193 (p.16)	5193 (p.21)			3326 (p.32)	3327 (p.37)
80 Watts		3031 (p.12)	6031 (p.17)	5031 (p.22)	3114 (p.27)		3051 (p.33)	3041 (p.38)

PACKAGE OPTIONS

Maximum Power Output	Solder Sealed Flangeless PCB Mount	Solder Sealed With Flange PCB Mount	Seam Welded Flangeless PCB Mount	Seam Welded With Flange PCB Mount	Seam Welded With Flange Chassis Mount	Solder Sealed STUD/PCB Mount	Seam Welded STUD/PCB Mount	Package Pin Count
5 Watts	Blank	N/A	Special Order	N/A	N/A	N/A	N/A	18
6.5 Watts	Blank	F	G* and H	GF* and HF	UF* and VF	N/A	N/A	12
20 Watts	Blank	F*	Special Order	Special Order	Special Order	Special Order	Special Order	10
20 Watts	Blank	F	H	HF	VF	Special Order	Special Order	12
30 Watts	Blank	F	Special Order	Special Order	Special Order	PA	Special Order	10
30 Watts	Blank	F	I	IF	WF	PB	Special Order	12
40 Watts	Blank	F	J	JF	XF	PC	Special Order	12
80 Watts	N/A	Blank	N/A	LF	ZF	PD	PJ	12

0001

MDI'S ALPHANUMERIC PART NUMBERING SYSTEM

2 6 9 0	R E	—	T 0 3.3	G F
1 2 3 4	5 6		7 8 9 10	11 12

Positions 1-4 Indicate MDI Series and Output Power

Positions 5 & 6 Indicate Grade Level

Blank = Industrial

M = "H" Level Military/Aerospace hardware with full power output from -55° to +85°C case temp, linearly derates to zero at 115°C

E = "H" Level Military/Aerospace hardware with full output power from -55° to +125°C case temp, linearly derates to zero at 135°C

R = "H" Level Military/Aerospace hardware 100 KRAD with full power output from -55°C to +85°C case temp, linearly derates to zero at 115°C

RE = "H" Level Military/Aerospace hardware 100 KRAD with full output power from -55°C TO +125°c Case temp, linearly derates to zero at 135°C

S = "K" Level Aerospace hardware 100 KRAD with full output power from -55°C TO +85°C case temp, linearly derates to zero at 115°C

SE = "K" Level Aerospace hardware 100 KRAD with full power output power from -55°C TO +125°C case temp, linearly derates to zero at 135°C

V = For MIL-STD-1275 applications; "H" Level Military/Aerospace hardware with full power output from -55° to +85°C case temp, linearly derates to zero at 115°C (special order).

Position 7, 8, 9 AND 10 Indicates output configuration and voltages

S = Single Output, specified VDC

D = Dual Output, ± specified VDC

T = Triple Output, +5 VDC (main), ± specified VDC (dual)

Positions 11 and 12 Indicate Package

See Package Chart

Notes

* 28 VDC input units only

Unless otherwise noted, all data refers to +25°C case temperatures

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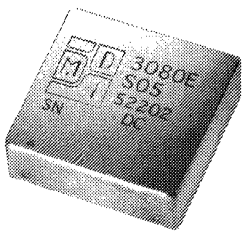
3.25-5 Watt HYBRID

DC-DC CONVERTERS

28 VOLTS DC INPUT



Features

- Completely self contained Thick Film Hybrid DC-DC Converter
- For MIL-STD-704 applications
- Built-in EMI input filter, which meets MIL-STD-461C requirements CE01, CE03, CE07, CS01 and CS02
- Inhibit not function
- Short circuit protection by current limit
- Fully isolated, input to output
- Single, dual or triple outputs
- 300 kHz operation for low ripple and fast response time
- No external filter caps required
- Full hermetic package

Specifications

INPUT: 28 VDC nominal
Range: 16 to 40 VDC continuous.
Survives 50 V transients/MIL-STD-704E
ISOLATION:
Input to case: 500 VDC
Input to output: 500 VDC
Output to case: 100 VDC
ENVIRONMENT:
Storage temperature: -55°C to +150°C
Shock: 50 G's
Acceleration: 500 G's
Vibration: 30 G's
Grade M:
Full Output Power at T_{case} = +85°C
Linearly derates to zero at T_{case} = +115°C
Grade E:
Full Power Output at T_{case} = +125°C
Linearly derates to zero at T_{case} = +135°C
MECHANICAL:
Dimensions: 1.08" x 1.08" x 0.380"
Terminals: PC board mount
Case: Kovar header, tin plate cover
Weight: 20 grams typical

Series 3080

SINGLE OUTPUT CONVERTERS		3080-S03.3 (3.3W)			3080-S05 (5W)			3080-S05.2 (5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1	-5.1	-5.2	-5.3
Output current	$V_{in\,min}$ — $V_{in\,max}$	—	—	1A	—	—	1A	—	—	961mA
Efficiency	P_{out} = max rated load	70%	73%	—	68%	77%	—	74%	77%	—
Line regulation	P_{out} = max rated load, $V_{in\,min}$ — $V_{in\,max}$	—	7mV	20mV	—	7mV	20mV	—	7mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	5mV	20mV	—	5mV	20mV	—	5mV	20mV
Output ripple	F.L. BW 2 MHz, mV_{pp}	—	30	50	—	50	85	—	30	50

SINGLE OUTPUT CONVERTERS		3080-S12 (3.3W)			3080-S15 (5W)			3080-S28 (5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1	+27.8	+28.0	+28.2
Output current	$V_{in\,min}$ — $V_{in\,max}$	—	—	416mA	—	—	333mA	—	—	178mA
Efficiency	P_{out} = max rated load	74%	77%	—	74%	77%	—	75%	78%	—
Line regulation	P_{out} = max rated load, $V_{in\,min}$ — $V_{in\,max}$	—	25mV	50mV	—	30mV	60mV	—	30mV	60mV
Load regulation	P_{out} = 10% to F.L.	—	5mV	20mV	—	5mV	20mV	—	5mV	20mV
Output ripple	F.L. BW 2 MHz, mV_{pp}	—	30	50	—	30	50	—	30	50

DUAL OUTPUT CONVERTERS		3080-D05 (5W)			3080-D12 (5W)			3080-D15 (5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out}$ = $-I_{out}$	+4.9 -4.9	+5.0 -5.0	+5.1 -5.1	+11.9 -11.9	+12.0 -12.0	+12.1 -12.1	+14.9 -14.9	+15.0 -15.0	+15.1 -15.1
Output current*	$V_{in\,min}$ — $V_{in\,max}$	±35mA	—	±500mA	±15mA	—	±208mA	±12mA	—	±166mA
Efficiency	P_{out} = max rated load	70%	77%	—	70%	77%	—	70%	77%	—
Line regulation	P_{out} = max rated load, $V_{in\,min}$ — $V_{in\,max}$	—	±5mV	±20mV	—	±5mV	±20mV	—	±5mV	±20mV
Load regulation†	P_{out} = 10% to F.L.	—	±5mV	±20mV	—	±5mV	±20mV	—	±5mV	±20mV
Output ripple	F.L. BW 2 MHz, mV_{pp}	—	50	85	—	50	85	—	50	85

Notes: *Up to 90% full power available from either output if rated output power is not exceeded; †balanced load conditions.

TRIPLE OUTPUT CONVERTERS		3080-T05 (3.7W)			3080-T12 (3.7W)			3080-T15 (3.7W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out}$ = $-I_{out}$	+4.9 +4.9 -4.9	+5.0 +5.0 -5.0	+5.1 +5.1 -5.1	+4.9 +11.5 -11.5	+5 +12.0 -12.0	+5.1 +12.5 -12.5	+4.9 +14.5 -14.5	+5 +15.0 -15.0	+5.1 +15.5 -15.5
Output current	$V_{in\,min}$ — $V_{in\,max}$	60mA ±20mA	— —	350mA ±150mA	100mA ±5mA	— —	500mA ±50mA	100mA ±5mA	— —	500mA ±40mA
Efficiency	P_{out} = max rated load	65%	70%	—	65%	70%	—	65%	70%	—
Line regulation	P_{out} = max rated load $V_{in\,min}$ — $V_{in\,max}$	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.4% 0.4%
Load regulation	P_{out} = 10% to F.L.	— —	0.20% 0.25%	0.4% 0.5%	— —	0.20% 0.25%	0.4% 0.4%	— —	0.20% 0.25%	0.4% 0.4%
Output ripple	F.L. BW 2 MHz, mV_{pp}	— —	— —	80 50	— —	— —	80 50	— —	— —	80 50

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GRADE LEVELS:
Please specify grade level for your application. Industrial grade units will be shipped if no option is specified.

M +85°C "H" level military/aerospace
E +125°C "H" level military/aerospace

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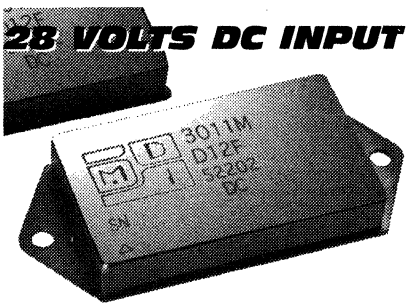
7.5-20 Watt HYBRID

DC-DC CONVERTERS



Features

- Completely self contained Thick Film Hybrid DC-DC Converter
- For MIL-STD-704/1275 applications
- Built-in EMI input filter, which meets MIL-STD-461C requirements CE01, CE03, CE07, CS01 and CS02
- Inhibit not function
- Short circuit protection by current limit
- Fully isolated, input to output
- Single, dual or triple outputs
- 300 kHz operation for low ripple and fast response time
- No external filter caps required
- Full hermetic package

Specifications

INPUT: 28 VDC nominal
Range: 16 to 50 VDC continuous.
Survives 80 V transients/MIL-STD-704A
ISOLATION:
Input to case: 500 VDC
Input to output: 500 VDC
Output to case: 100 VDC
ENVIRONMENT:
Storage temperature: -55°C to +150°C
Shock: 50 G's
Acceleration: 500 G's
Vibration: 30 G's
Grade M:
Full Output Power at T_{case} = +85°C
Linearly derates to zero at T_{case} = +115°C
Grade E:
Full Power Output at T_{case} = +125°C
Linearly derates to zero at T_{case} = +135°C
WEIGHT: 55 grams typical
PACKAGE and DIMENSIONS: see chart

Series 3011

SINGLE OUTPUT DEVICES		3011-S03.3 (13.2W)			3011-S05 (20W)			3011-S05.2 (20W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1	-5.1	-5.2	-5.3
Output current	$V_{in\ min}$—$V_{in\ max}$	—	—	4A	—	—	4A	—	—	3.85A
Efficiency	P_{out} = max rated load	65%	69%	—	72%	75%	—	72%	75%	—
Line regulation	P_{out} = max rated load, $V_{in\ min}$—$V_{in\ max}$	—	7mV	20mV	—	7mV	20mV	—	10mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	5mV	20mV	—	5mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	50	—	30	50	—	30	65

SINGLE OUTPUT DEVICES		3011-S12 (20W)			3011-S15 (20W)			3011-S28 (20W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1	+27.8	+28.0	+28.2
Output current	$V_{in\ min}$—$V_{in\ max}$	—	—	1.67A	—	—	1.33mA	—	—	714mA
Efficiency	P_{out} = max rated load	72%	75%	—	72%	75%	—	75%	84%	—
Line regulation	P_{out} = max rated load, $V_{in\ min}$—$V_{in\ max}$	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	65	—	30	65	—	30	65

DUAL OUTPUT DEVICES		3011-D05 (20W)			3011-D12 (20W)			3011-D15 (20W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out} = -I_{out}$	+4.9 -4.9	+5.0 -5.0	+5.1 -5.1	+11.9 -11.9	+12.0 -12.0	+12.1 -12.1	+14.9 -14.9	+15.0 -15.0	+15.1 -15.1
Output current*	$V_{in\ min}$—$V_{in\ max}$	±150mA	—	±2A	±125mA	—	±833mA	±100mA	—	±667mA
Efficiency	P_{out} = max rated load	70%	75%	—	75%	84%	—	75%	85%	—
Line regulation	P_{out} = max rated load, $V_{in\ min}$—$V_{in\ max}$	—	±10mV	±25mV	—	±10mV	±25mV	—	±10mV	±25mV
Load regulation†	P_{out} = 10% to F.L.	—	±20mV	±50mV	—	±20mV	±50mV	—	±20mV	±50mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	50	85	—	50	85	—	50	85

Notes: *Up to 90% full power available from either output if rated output power is not exceeded; †balanced load conditions.

TRIPLE OUTPUT DEVICES		3011-T05 (7.5W)			3011-T12 (10W)			3011-T15 (10W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out} = -I_{out}$	+4.9 +4.9 -4.9	+5.0 +5.0 -5.0	+5.1 +5.1 -5.1	+4.9 +11.9 -11.9	+5.0 +12.0 -12.0	+5.1 +12.1 -12.1	+4.9 +14.9 -14.9	+5.0 +15.0 -15.0	+5.1 +15.1 -15.1
Output current	$V_{in\ min}$— $V_{in\ max}$	60mA ±15mA	— —	1A ±250mA	30mA ±15mA	— —	1A ±208mA	30mA ±15mA	— —	1A ±167mA
Efficiency	P_{out} = max rated load	67%	75%	—	65%	75%	—	65%	79%	—
Line regulation	P_{out} = max rated load $V_{in\ min}$— $V_{in\ max}$	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.2% 0.4%
Load regulation	P_{out} = 10% to F.L.	— —	0.20% 0.25%	0.4% 0.5%	— —	0.20% 0.25%	0.4% 0.4%	— —	0.20% 0.25%	0.4% 0.4%
Output ripple	F.L. BW 2 MHz mV_{pp}	— —	— —	80 50	— —	— —	80 30	— —	— —	80 30

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GRADE LEVELS:
Please specify grade level for your application. Industrial grade units will be shipped if no option is specified.

M +85°C "H" level military/aerospace
E +125°C "H" level military/aerospace

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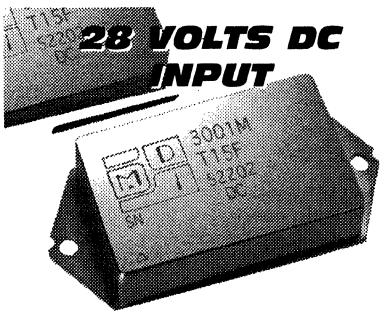
15-30 Watt HYBRID

DC-DC CONVERTERS



Features

- Completely self contained Thick Film Hybrid DC-DC Converter
- For MIL-STD-704/1275 applications
- Built-in EMI input filter, which meets MIL-STD-461C requirements CE01, CE03, CE07, CS01 and CS02
- Inhibit not function
- Short circuit protection by current limit
- Fully isolated, input to output
- Single, dual or triple outputs
- 300 kHz operation for low ripple and fast response time
- No external filter caps required
- Full hermetic package

Specifications

INPUT: 28 VDC nominal
Range: 16 to 50 VDC continuous.
Survives 80 V transients/MIL-STD-704A
ISOLATION:
Input to case: 500 VDC
Input to output: 500 VDC
Output to case: 100 VDC
ENVIRONMENT:
Storage temperature: -55°C to +150°C
Shock: 50 G's
Acceleration: 500 G's
Vibration: 30 G's
Grade M:
Full Output Power at T_{case} = +85°C
Linearly derates to zero at T_{case} = +115°C
Grade E:
Full Power Output at T_{case} = +125°C
Linearly derates to zero at T_{case} = +135°C
WEIGHT: 65 grams typical
PACKAGE and DIMENSIONS: see chart

Series 3001

SINGLE OUTPUT DEVICES		3001-S03.3 (20W)			3001-S05 (30W)			3001-S05.2 (30W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1	-5.1	-5.2	-5.3
Output current	$V_{in\,min}$ — $V_{in\,max}$	—	—	6.06A	—	—	6A	—	—	5.76A
Efficiency	P_{out} = max rated load	65%	69%	—	72%	75%	—	72%	75%	—
Line regulation	P_{out} = max rated load, $V_{in\,min}$ — $V_{in\,max}$	—	7mV	20mV	—	7mV	20mV	—	10mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	5mV	20mV	—	5mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	50	—	30	50	—	30	65

SINGLE OUTPUT DEVICES		3001-S12 (30W)			3001-S15 (30W)			3001-S28 (30W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1	+27.8	+28.0	+28.2
Output current	$V_{in\,min}$ — $V_{in\,max}$	—	—	2.5A	—	—	2A	—	—	1.07A
Efficiency	P_{out} = max rated load	72%	75%	—	72%	75%	—	75%	84%	—
Line regulation	P_{out} = max rated load, $V_{in\,min}$ — $V_{in\,max}$	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	65	—	30	65	—	30	65

DUAL OUTPUT DEVICES		3001-D05 (20W)			3001-D12 (30W)			3001-D15 (30W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out} = -I_{out}$	+4.9 -4.9	+5.0 -5.0	+5.1 -5.1	+11.9 -11.9	+12.0 -12.0	+12.1 -12.1	+14.9 -14.9	+15.0 -15.0	+15.1 -15.1
Output current*	$V_{in\,min}$ — $V_{in\,max}$	±150mA	—	±2A	±95mA	—	±1.25A	±76mA	—	±1A
Efficiency	P_{out} = max rated load	70%	75%	—	75%	84%	—	75%	85%	—
Line regulation	P_{out} = max rated load, $V_{in\,min}$ — $V_{in\,max}$	—	±10mV	±25mV	—	±10mV	±25mV	—	±10mV	±25mV
Load regulation†	P_{out} = 10% to F.L.	—	±20mV	±50mV	—	±20mV	±50mV	—	±20mV	±50mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	50	85	—	50	85	—	50	85

Notes: *Up to 90% full power available from either output if rated output power is not exceeded; †balanced load conditions.

TRIPLE OUTPUT DEVICES		3001-T05 (17.5W)			3001-T12 (17.5W)			3001-T15 (16W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out} = -I_{out}$	+4.9 +4.9 -4.9	+5.0 +5.0 -5.0	+5.1 +5.1 -5.1	+4.9 +11.9 -11.9	+5.0 +12.0 -12.0	+5.1 +12.1 -12.1	+4.9 +14.9 -14.9	+5.0 +15.0 -15.0	+5.1 +15.1 -15.1
Output current	$V_{in\,min}$ — $V_{in\,max}$	90mA ±40mA	— —	3A ±250mA	90mA ±40mA	— —	2A ±312mA	90mA ±32mA	— —	2A ±250mA
Efficiency	P_{out} = max rated load	67%	72%	—	72%	76%	—	72%	76%	—
Line regulation	P_{out} = max rated load $V_{in\,min}$ — $V_{in\,max}$	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.2% 0.4%
Load regulation	P_{out} = 10% to F.L.	— —	0.20% 0.25%	0.4% 0.5%	— —	0.20% 0.25%	0.4% 0.4%	— —	0.20% 0.25%	0.4% 0.4%
Output ripple	F.L. BW 2 MHz mV_{pp}	— —	— —	80 50	— —	— —	80 30	— —	— —	80 30

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GRADE LEVELS:
Please specify grade level for your application. Industrial grade units will be shipped if no option is specified.

M +85°C "H" level military/aerospace
E +125°C "H" level military/aerospace

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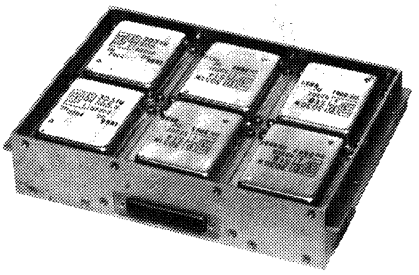
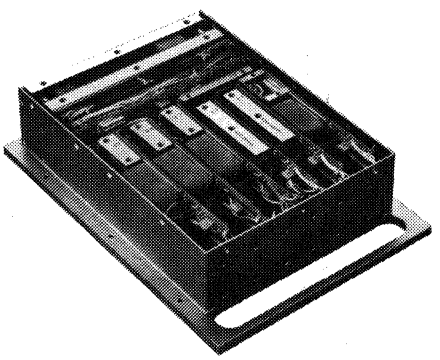
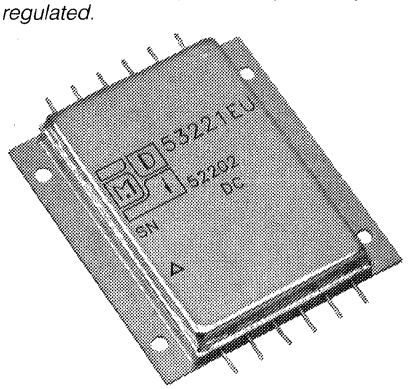
"K" level and "H+" level units derived from space heritage designs offering realistic development costs and lead times...



Six 80-watt converters with auxiliary circuits are packaged in standard VME assembly.



Six output DC-DC converter delivering 300 watts from a 120 VDC bus voltage. This unit also contains extensive built-in test and telemetry functions. Each output is independently regulated.



80-watt chassis mounted hybrid converter resistant to SEU and Proton radiation.

Modular Devices Inc (MDI) designs and manufactures many types of power supplies and DC-DC converters for space application. Our products have been used in applications such as the Space Station, Space Shuttle, and numerous satellites. MDI is organized to handle space level quality assurance requirements, materials control, documentation, and testing. MDI Space power supplies offer these advantages:

- Designs drawn from space heritage units
- Wide selection of input voltage ranges to match spacecraft busses
- Complete choice of packaging technology (full hybrid, part hybrid/part discrete, assemblies of hybrids) allows best choice for the application
- Designs are well characterized for radiation effects
- MDI's organization accommodates space level work statements
- Extensive on-site pre-qual testing is time and cost effective

Full Hybrid Power Supplies using thick film, chip and wire/surface mount components within hermetic hybrid enclosures allows ultimate power density. Careful computer aided thermal analysis and proven thermal management techniques assure high reliability. MDI's hybrid power supply technology incorporates the latest advances in high frequency techniques, power hybrid and miniature magnetic components. MDI's product capacity includes:

- Standard, off the shelf DC to DC converters to 80 watts, operating frequencies to 400 kHz, power densities to 40 W/in^3
- Custom variations of standard DC to DC converters to 120 watts
- Custom DC–AC static inverters to 10 watts
- Design and construction to "K" level, "H" level and other requirements
- Wide temperature range

Hybrids combined with discrete components allow great volumetric efficiency as compared to all discrete designs. This product capability provides:

- Higher packaging densities than all discrete designs
- Lower cost and quicker delivery than all hybrid designs
- Best suited for aerospace/high reliability, high density requirements at power levels from 50 watts to 1 KVA

Hybrid Assemblies are multiple full hybrid converters packaged in combination with discrete peripheral components. Advantages of this construction include:

- Low non recurring costs
- Short lead time
- Ability to sequence outputs
- Output flexibility
- VME and other enclosures

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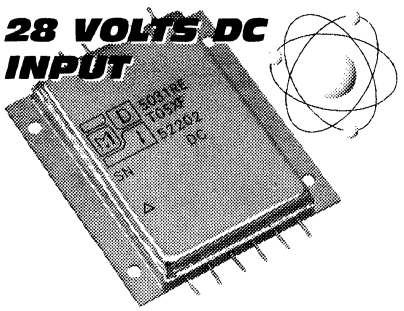
MODULAR DEVICES INC

BROOKHAVEN R&D PLAZA • ONE RONED ROAD • SHIRLEY, NEW YORK 11967

TEL 516-345-3100 • FAX 516-345-3106

32.5-80 Watt HYBRID

PROTON RAD HARD DC-DC CONVERTERS



Features

- Proton Rad Hard
- SEU resistant
- Specifically designed for redundant or individual space applications
- Completely self contained Thick Film Hybrid DC-DC Converter
- No external filter caps required
- Fully isolated design
- For MIL-STD-704 applications
- Inhibit not function
- Power on soft start
- 300 kHz operation for low ripple and fast response time
- Built-in EMI input filter meets MIL-STD-461C requirements CE01, CE03, CE07, CS01 and CS02
- Short circuit and overvoltage protection
- Capability of external synch for switching frequencies
- Built-in test capability

Specifications

INPUT: 28 VDC nominal
Range: 16 VDC to 50 VDC continuous
Survives 80 V transients/MIL-STD-704A
ISOLATION:
Input to case: 500 VDC
Input to output: 500 VDC
Output to case: 100 VDC
ENVIRONMENT:
Storage temperature: -55°C to +150°C
Shock: 50 G's
Acceleration: 500 G's
Vibration: 30 G's
Grades EU, RE & SE
Full Power Output at T_{case} = +125°C
Linearly derates to zero at T_{case} = +135°C
WEIGHT: 160 grams typical
PACKAGE and DIMENSIONS: see chart

Magnetically Isolated Series 5031

SINGLE OUTPUT DEVICES		5031-S03.3 (49.5W)			5031-S05 (75W)			5031-S05.2 (78W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1	-5.1	-5.2	-5.3
Output current	$V_{in\,min}$ — $V_{in\,max}$	—	—	15A	—	—	15A	—	—	15A
Efficiency	P_{out} = max rated load	65%	69%	—	72%	75%	—	72%	75%	—
Line regulation	P_{out} = max rated load, $V_{in\,min}$ — $V_{in\,max}$	—	7mV	20mV	—	7mV	20mV	—	10mV	20mV
Load regulation	P_{out} =10% to F.L.	—	5mV	20mV	—	5mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz	—	30	50	—	30	50	—	30	65
	mV_{pp}									

SINGLE OUTPUT DEVICES		5031-S12 (75W)			5031-S15 (75W)			5031-S28 (70W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1	+27.8	+28.0	+28.2
Output current	$V_{in\,min}$ — $V_{in\,max}$	—	—	6.25A	—	—	5A	—	—	2.5A
Efficiency	P_{out} = max rated load	72%	75%	—	72%	75%	—	75%	84%	—
Line regulation	P_{out} = max rated load, $V_{in\,min}$ — $V_{in\,max}$	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz	—	30	65	—	30	65	—	30	65
	mV_{pp}									

DUAL OUTPUT DEVICES		5031-D05 (75W)			5031-D12 (74.4W)			5031-D15 (75W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out}$ = $-I_{out}$	+4.9 -4.9	+5.0 -5.0	+5.1 -5.1	+11.9 -11.9	+12.0 -12.0	+12.1 -12.1	+14.9 -14.9	+15.0 -15.0	+15.1 -15.1
Output current*	$V_{in\,min}$ — $V_{in\,max}$	±266mA	—	±7.5A	±158mA	—	±3.1A	±127mA	—	±2.5A
Efficiency	P_{out} = max rated load	67%	75%	—	72%	84%	—	72%	85%	—
Line regulation	P_{out} = max rated load, $V_{in\,min}$ — $V_{in\,max}$	—	±10mV	±25mV	—	±10mV	±25mV	—	±10mV	±25mV
Load regulation	P_{out} = 10% to F.L.	—	±20mV	±50mV	—	±20mV	±50mV	—	±20mV	±50mV
Output ripple	F.L. BW 2 MHz	—	50	85	—	50	85	—	50	85
	mV_{pp}									

Notes: *Up to 90% full power available from either output if rated output power is not exceeded; †balanced load conditions.

TRIPLE OUTPUT DEVICES		5031-T05 (32.5W)			5031-T12 (43W)			5031-T15 (47.5W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out}$ = $-I_{out}$	+4.9 +4.9 -4.9	+5.0 +5.0 -5.0	+5.1 +5.1 -5.1	+4.9 +11.9 -11.9	+5.0 +12.0 -12.0	+5.1 +12.1 -12.1	+4.9 +14.9 -14.9	+5.0 +15.0 -15.0	+5.1 +15.1 -15.1
Output current	$V_{in\,min}$ — $V_{in\,max}$	90mA ±40mA	— —	5A ±750mA	90mA ±40mA	— —	5A ±750mA	90mA ±32mA	— —	5A ±750mA
Efficiency	P_{out} = max rated load	65%	72%	—	70%	76%	—	70%	76%	—
Line regulation	P_{out} = max rated load	—	0.10%	0.2%	—	0.10%	0.2%	—	0.10%	0.2%
	$V_{in\,min}$ — $V_{in\,max}$	—	0.25%	0.4%	—	0.25%	0.4%	—	0.25%	0.4%
Load regulation	P_{out} = 10% to F.L.	— —	0.20% 0.25%	0.4% 0.4%	— —	0.20% 0.25%	0.4% 0.4%	— —	0.20% 0.25%	0.4% 0.4%
Output ripple	F.L. BW 2 MHz	—	—	80	—	—	80	—	—	80
	mV_{pp}	—	—	50	—	—	30	—	—	30

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GRADE LEVELS:

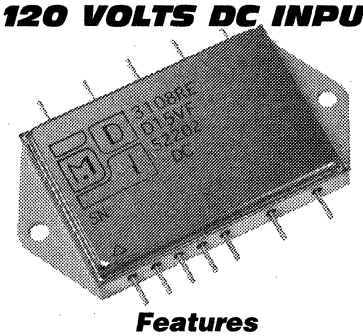
EU Engineering Units
RE100 KRAD, +125°C "H" level military/aerospace
SE100 KRAD, +125°C "K" level aerospace

Modular Devices, Inc. • *One Roned Road* • *Shirley, New York 11967* • FAX 516.345.3106 • **TEL 516.345.3100**

7.5-20 Watt HYBRID

RAD HARD DC-DC CONVERTERS

120 VOLTS DC INPUT



Features

- Specifically designed for redundant or individual space applications
- Completely self contained Thick Film Hybrid DC-DC Converter
- No external filter caps required
- Fully isolated design
- Inhibit not function
- Power on soft start
- 200 kHz operation for low ripple and fast response time
- Built-in EMI input filter meets MIL-STD-461C requirements CE01, CE03, CE07, CS01 and CS02
- Short circuit and overvoltage protection
- Capability of external synch for switching frequencies
- Built-in test capability

Specifications

INPUT: 120 VDC nominal
Range: 86 VDC to 158 VDC continuous
OUTPUT: Voltage & Current (see chart)
REGULATION: (see chart)
RIPPLE: 50 mV peak-to-peak, typical
ISOLATION:
Input to case: 500 VDC
Input to output: 500 VDC
Output to case: 100 VDC
ENVIRONMENT:
Storage temperature: -55°C to +150°C
Shock: 50 G's
Acceleration: 500 G's
Vibration: 30 G's
Grades M, R & S
Full Output Power at T_{case}= +85°C
Linearly derates to zero at T_{case}=+115°C
Grades E, RE & SE
Full Power Output at T_{case}=+125°C
Linearly derates to zero at T_{case}=+135°C
WEIGHT: 60 grams typical
PACKAGE and DIMENSIONS: see chart

Full Feature Series 3108

SINGLE OUTPUT DEVICES		3108-S03.3 (13.2W)			3108-S05 (20W)			3108-S05.2 (20W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1	-5.1	-5.2	-5.3
Output current	$V_{in\ min}$ — $V_{in\ max}$	—	—	4A	—	—	4A	—	—	3.85A
Efficiency	P_{out} = max rated load	65%	69%	—	72%	75%	—	72%	75%	—
Line regulation	P_{out} = max rated load, $V_{in\ min}$ — $V_{in\ max}$	—	7mV	20mV	—	7mV	20mV	—	10mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	5mV	20mV	—	5mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	50	—	30	50	—	30	65

SINGLE OUTPUT DEVICES		3108-S12 (20W)			3108-S15 (20W)			3108-S28 (20W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1	+27.8	+28.0	+28.2
Output current	$V_{in\ min}$ — $V_{in\ max}$	—	—	1.67A	—	—	1.33mA	—	—	714mA
Efficiency	P_{out} = max rated load	72%	75%	—	72%	75%	—	75%	84%	—
Line regulation	P_{out} = max rated load, $V_{in\ min}$ — $V_{in\ max}$	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	65	—	30	65	—	30	65

DUAL OUTPUT DEVICES		3108-D05 (20W)			3108-D12 (20W)			3108-D15 (20W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out}$ = $-I_{out}$	+4.9 -4.9	+5.0 -5.0	+5.1 -5.1	+11.9 -11.9	+12.0 -12.0	+12.1 -12.1	+14.9 -14.9	+15.0 -15.0	+15.1 -15.1
Output current*	$V_{in\ min}$ — $V_{in\ max}$	±150mA	—	±2A	±125mA	—	±833mA	±100mA	—	±667mA
Efficiency	P_{out} = max rated load	70%	75%	—	75%	84%	—	75%	85%	—
Line regulation	P_{out} = max rated load, $V_{in\ min}$ — $V_{in\ max}$	—	±10mV	±25mV	—	±10mV	±25mV	—	±10mV	±25mV
Load regulation†	P_{out} = 10% to F.L.	—	±20mV	±50mV	—	±20mV	±50mV	—	±20mV	±50mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	50	85	—	50	85	—	50	85

Notes: *Up to 90% full power available from either output if rated output power is not exceeded; †balanced load conditions.

TRIPLE OUTPUT DEVICES		3108-T05 (7.5W)			3108-T12 (10W)			3108-T15 (10W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out}$ = $-I_{out}$	+4.9 +4.9 -4.9	+5.0 +5.0 -5.0	+5.1 +5.1 -5.1	+4.9 +11.9 -11.9	+5.0 +12.0 -12.0	+5.1 +12.1 -12.1	+4.9 +14.9 -14.9	+5.0 +15.0 -15.0	+5.1 +15.1 -15.1
Output current	$V_{in\ min}$ — $V_{in\ max}$	60mA ±15mA	— —	1A ±250mA	30mA ±15mA	— —	1A ±208mA	30mA ±15mA	— —	1A ±167mA
Efficiency	P_{out} = max rated load	67%	75%	—	65%	75%	—	65%	75%	—
Line regulation	P_{out} = max rated load $V_{in\ min}$ — $V_{in\ max}$	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.2% 0.4%
Load regulation	P_{out} = 10% to F.L.	— —	0.20% 0.25%	0.4% 0.5%	— —	0.20% 0.25%	0.4% 0.4%	— —	0.20% 0.25%	0.4% 0.4%
Output ripple	F.L. BW 2 MHz mV_{pp}	— —	— —	80 50	— —	— —	80 30	— —	— —	80 30

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GRADE LEVELS:
Please specify grade level for your application. Industrial grade units will be shipped if no option is specified.

M	+85°C "H" level military/aerospace	RE	100 KRAD, +125°C "H" level military/aerospace
E	+125°C "H" level military/aerospace	S	100 KRAD, +85°C "K" level aerospace
R	100 KRAD, +85°C "H" level military/aerospace	SE	100 KRAD, +125°C "K" level aerospace

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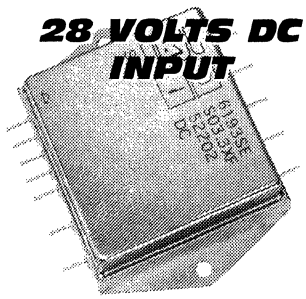
19.5-40 Watt HYBRID

RAD HARD DC-DC CONVERTERS



Features

- Specifically designed for redundant or individual space applications
- Completely self contained Thick Film Hybrid DC-DC Converter
- No external filter caps required
- Fully isolated design
- For MIL-STD-704/1275 applications
- Inhibit not function
- Power on soft start
- 300 kHz operation for low ripple and fast response time
- Built-in EMI input filter meets MIL-STD-461C requirements CE01, CE03, CE07, CS01 and CS02
- Short circuit and overvoltage protection
- Capability of external synch for switching frequencies
- Built-in test capability

Specifications

INPUT: 28 VDC nominal
Range: 16 VDC to 50 VDC continuous
Survives 80 V transients/MIL-STD-704A
ISOLATION:
Input to case: 500 VDC
Input to output: 500 VDC
Output to case: 100 VDC
ENVIRONMENT:
Storage temperature: -55°C to +150°C
Shock: 50 G's
Acceleration: 500 G's
Vibration: 30 G's
Grades M, R & S:
Full Output Power at T_{case} = +85°C
Linearly derates to zero at T_{case} =+115°C
Grades E, RE & SE:
Full Power Output at T_{case} = +125°C
Linearly derates to zero at T_{case} = +135°C
WEIGHT: 90 grams typical
PACKAGE and DIMENSIONS: see chart

Note

Series 6193 is recommended over 3193 for new designs (inhibit not function yields at higher level of noise immunity).

Full Feature Series 6193

SINGLE OUTPUT DEVICES		6193-S03.3 (26.4W)			6193-S05 (40W)			6193-S05.2 (40W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+3.2	+3.3	+3.4	+4.9	+5.0	+5.1	-5.1	-5.2	-5.3
Output current	$V_{in\,min}$ — $V_{in\,max}$	—	—	8A	—	—	8A	—	—	7.69A
Efficiency	P_{out} = max rated load	65%	69%	—	72%	75%	—	72%	75%	—
Line regulation	P_{out} = max rated load; $V_{in\,min}$ — $V_{in\,max}$	—	7mV	20mV	—	7mV	20mV	—	10mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	5mV	20mV	—	5mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	50	—	30	50	—	30	65

SINGLE OUTPUT DEVICES		6193-S12 (40W)			6193-S15 (40W)			6193-S28 (40W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	—	+11.9	+12.0	+12.1	+14.9	+15.0	+15.1	+27.8	+28.0	+28.2
Output current	$V_{in\,min}$ — $V_{in\,max}$	—	—	3.33A	—	—	2.67A	—	—	1.43A
Efficiency	P_{out} = max rated load	72%	75%	—	72%	75%	—	75%	84%	—
Line regulation	P_{out} = max rated load; $V_{in\,min}$ — $V_{in\,max}$	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Load regulation	P_{out} = 10% to F.L.	—	10mV	20mV	—	10mV	20mV	—	10mV	20mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	30	65	—	30	65	—	30	65

DUAL OUTPUT DEVICES		6193-D05 (40W)			6193-D12 (40W)			6193-D15 (40W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out}$ = $-I_{out}$	+4.9 -4.9	+5.0 -5.0	+5.1 -5.1	+11.9 -11.9	+12.0 -12.0	+12.1 -12.1	+14.9 -14.9	+15.0 -15.0	+15.1 -15.1
Output current*	$V_{in\,min}$ — $V_{in\,max}$	±150mA	—	±4A	±95mA	—	±1.67A	±76mA	—	±1.33A
Efficiency	P_{out} = max rated load	67%	75%	—	75%	84%	—	75%	85%	—
Line regulation	P_{out} = max rated load; $V_{in\,min}$ — $V_{in\,max}$	—	±10mV	±25mV	—	±10mV	±25mV	—	±10mV	±25mV
Load regulation†	P_{out} = 10% to F.L.	—	±20mV	±50mV	—	±20mV	±50mV	—	±20mV	±50mV
Output ripple	F.L. BW 2 MHz mV_{pp}	—	50	85	—	50	85	—	50	85

Notes: *Up to 90% full power available from either output if rated output power is not exceeded; †balanced load conditions.

TRIPLE OUTPUT DEVICES		6193-T05 (19.5W)			6193-T12 (25.8W)			6193-T15 (27W)		
PARAMETER	CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
Output voltage	$+I_{out}$ = $-I_{out}$	+4.9 +4.9 -4.9	+5.0 +5.0 -5.0	+5.1 +5.1 -5.1	+4.9 +11.9 -11.9	+5.0 +12.0 -12.0	+5.1 +12.1 -12.1	+4.9 +14.9 -14.9	+5.0 +15.0 -15.0	+5.1 +15.1 -15.1
Output current	$V_{in\,min}$ — $V_{in\,max}$	90mA ±40mA	— —	3A ±450mA	90mA ±40mA	— —	3A ±450mA	90mA ±32mA	— —	3A ±400mA
Efficiency	P_{out} = max rated load	67%	75%	—	70%	79%	—	70%	79%	—
Line regulation	P_{out} = max rated load; $V_{in\,min}$ — $V_{in\,max}$	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.2% 0.4%	— —	0.10% 0.25%	0.2% 0.4%
Load regulation	P_{out} = 10% to F.L.	— —	0.20% 0.25%	0.4% 0.5%	— —	0.20% 0.25%	0.4% 0.4%	— —	0.20% 0.25%	0.4% 0.4%
Output ripple	F.L. BW 2 MHz mV_{pp}	— —	— —	80 50	— —	— —	80 30	— —	— —	80 30

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GRADE LEVELS:
Please specify grade level for your application. Industrial grade units will be shipped if no option is specified.

M	+85°C "H" level military/aerospace	RE	100 KRAD, +125°C "H" level military/aerospace
E	+125°C "H" level military/aerospace	S	100 KRAD, +85°C "K" level aerospace
R	100 KRAD, +85°C "H" level military/aerospace	SE	100 KRAD, +125°C "K" level aerospace

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Newport Components, Inc.
8917 Glenwood Ave. • Raleigh, NC 27612
(919) 571-9405 • (919) 571-9262 FAX

ISOLATED DC-DC CONVERTERS

Power to Meet Your Needs

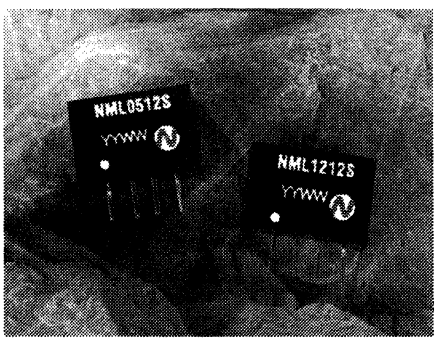
Newport Components is proud of its position as a leading manufacturer of micro-ferrite based electronic components. Incorporating the latest techniques in miniature, hybrid component manufacturing, Newport Components' advanced series of DC-DC converters provide innovative solutions to the practical problems faced by engineers and designers today.

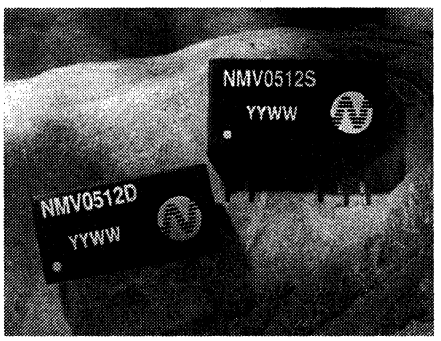
The demands for ever smaller components and higher power density have led Newport Components to pioneer advanced techniques using chip and wire bonding, low profile packaging and surface mount technology. Our aim is to reduce the engineer's design time, board area and costs by providing the greatest power output from the smallest possible package.

World Class Quality

Quality is the foundation of Newport Components' philosophy and underpins every aspect of our work. All our design, production and distribution processes are certified to the internationally recognized quality standards ISO 9001 and ISO 9002.

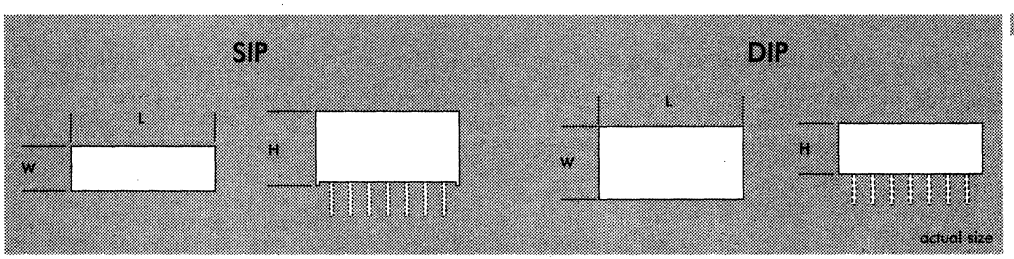
Miniature Component Type DC-DC Converters





Key Features

- 250mW to 5W power range
- Isolation up to 6kV
- Small footprint design
- Standard Inputs up to 48V
- Outputs up to 30V
- Single, dual or twin outputs
- High power density



Newport Syntax - Standard M Class

Converter Topology | Input voltage | Output voltage

NMA 0505S

Series eg NMA/NME | Package Type

Package Type: S - Single Inline Package
D - Dual Inline Package
[Note: no suffix indicates DIP]

Series	Power	Isolation	Output			Input Voltage					Output Voltage					SIP (lxwxh)†	DIP (lxwxh)†	SIP Footprint†	DIP Footprint†
Units	Watts	kV DC				V DC					V DC					mm	mm	cm^2	cm^2
			S	D	T	3	5	12	24	48	3	5	9	12	15				
LME	0.25	1.0	•			•	•	•			•	•	•	•	•	11.5x6.0x10.0	11.5x9.8x6.8	0.69	1.13
NMA	1.0	1.0		•		•	•	•	•	•		•	•	•	•	19.5x6.0x10.0	19.8x9.8x6.8	1.17	1.94
NMD	1.0	1.0			•		•	•			•	•	•	•	•	19.5x6.0x10.0	19.8x9.8x6.8	1.17	1.94
NME	1.0	1.0	•			•	•	•	•	•	•	•	•	•	•	11.5x6.0x10.0	11.5x9.8x6.8	0.69	1.13
NMF	1.0	1.0	•				•	•	•	•		•	•	•	•	19.5x6.0x10.0	19.5x9.8x6.8	1.17	1.91
NMR	1.0	1.0	•				•	•	•			•		•	•	19.5x6.0x10.0	SIP only	1.17	SIP only
NMV	1.0	3.0	•	•			•	•	•	•		•	•	•	•	19.5x6.0x10.0	19.5x9.8x6.8	1.17	1.91
NMJ	1.0	5.2*		•			•	•				•	•	•	•	19.5x9.8x12.5	SIP only	1.91	SIP only
NMH	2.0	1.0		•			•	•	•	•		•	•	•	•	19.5x7.5x10.0	19.5x9.8x7.7	1.46	1.91
NML	2.0	1.0	•				•	•				•	•	•	•	14.0x7.5x10.0	SIP only	1.05	SIP only
NMS	2.0	6.0*		•			•	•				•	•	•	•	DIP only	32.6x14.7x9.4	DIP only	4.80

*BS EN 60950 certified †48V input parts slightly larger

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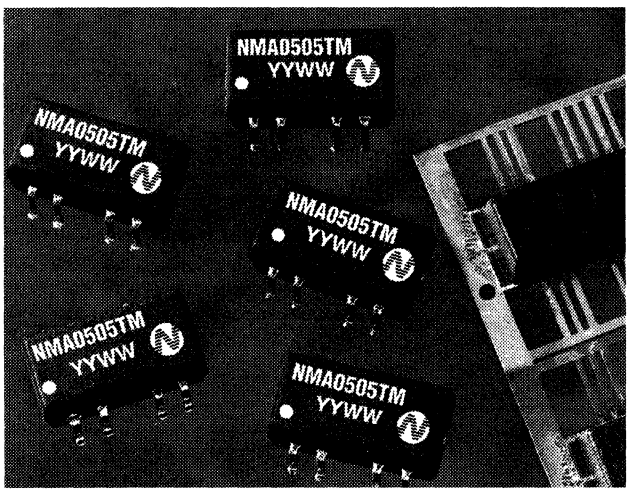
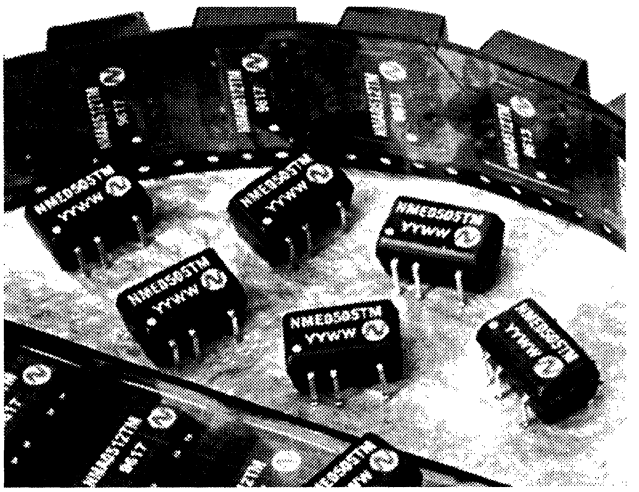
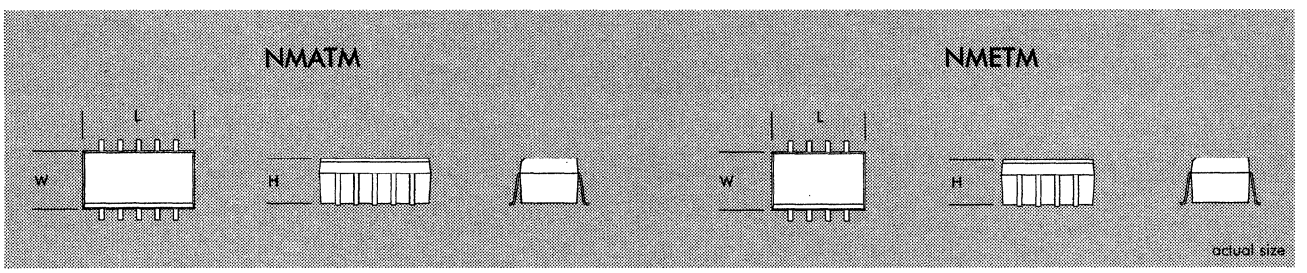
ISOLATED DC-DC CONVERTERS





IC-Style Surface Mount DC-DC Converters

In order to address the enormous demand for surface mount products, Newport Components has developed a revolutionary manufacturing process to automate the production of surface mount hybrid DC-DC converters. The NMATM and NMETM Series of miniature surface mount DC-DC converters employ leadframe technology and transfer molding techniques to bring all of the benefits of IC-style packaging to hybrid circuitry.



Series	Power	Isolation	Output			Input Voltage					Output Voltage					SOIC (lxwxh)	Footprint
Units	Watts	kV DC				V DC					V DC					mm	cm^2
			S	D	T	3	5	12	24	48	3	5	9	12	15		
NMATM	1.0	1.0		•			•	•				•	•	•	•	15.3x7.7x6.3	1.17
NMETM	1.0	1.0	•				•	•				•	•	•	•	12.7x7.7x6.3	0.98

Newport Syntax - Standard T Class

Converter Topology / Input voltage / Output voltage

NMA 0505TM

Series eg NMA/NME / Package Type

Package Type - TM: SOIC Moulded Package

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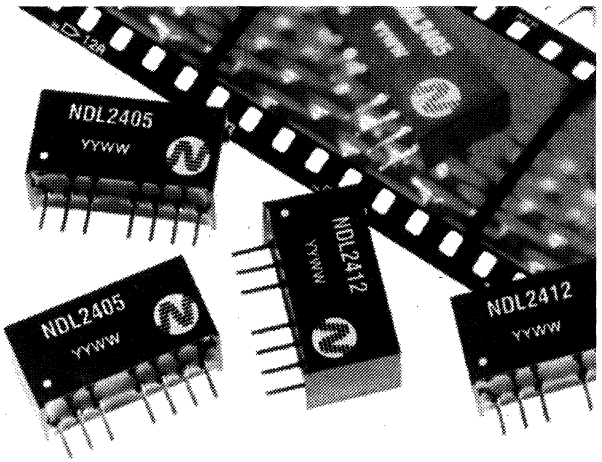
ISOLATED DC-DC CONVERTERS

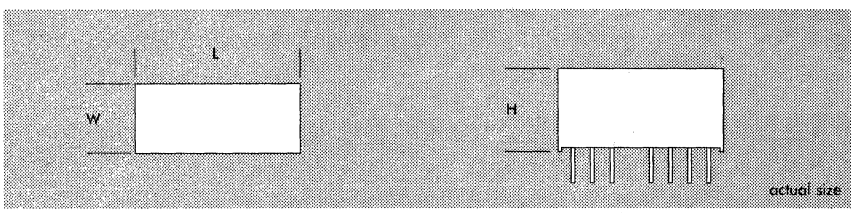


High Performance Wide Input DC-DC Converters

These new DC-DC converters from Newport Components include such features as wide input, regulated output, short-circuit protection, and industrial operating temperature range.

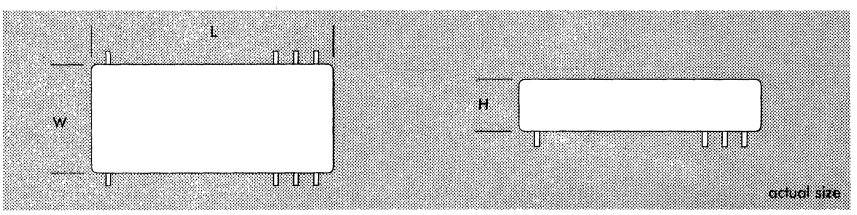
NDL SERIES

- MOSFET Power Die
- 2:1 Wide Range Input
- Continuous Short Circuit Protection
- -40 to 85°C Operating Temperature
- 0.5% Output Regulation



NDY SERIES

- Industry Standard Footprint
- 2:1 Wide Range Input
- Short Circuit Protection
- Low Profile 24 Pin Case
- Efficiency to 83%



Series	Power	Isolation	Output			Input Voltage					Output Voltage					Size (lxwxh)	Footprint
Units	Watts	kV DC				V DC					V DC					mm	cm^2
			S	D	T	3	5	12	24	48	3	5	9	12	15		
NDL	2.0	1.0	•						2:1	2:1		•	•	•	•	21.8x9.2x11.1 (SIP)	2.00 (SIP)
NDY	3.0	1.0	•				2:1	2:1	2:1	2:1		•	•	•	•	32.3x14.7x7.0 (DIP)	4.73 (DIP)

Newport Syntax - Standard D Class

Converter Topology — Input voltage — Output voltage

NDL 2405S

Series eg NDL/NDY — Package Type

Package Type: S - Single Inline Package
D - Dual Inline Package
[Note: no suffix indicates DIP]

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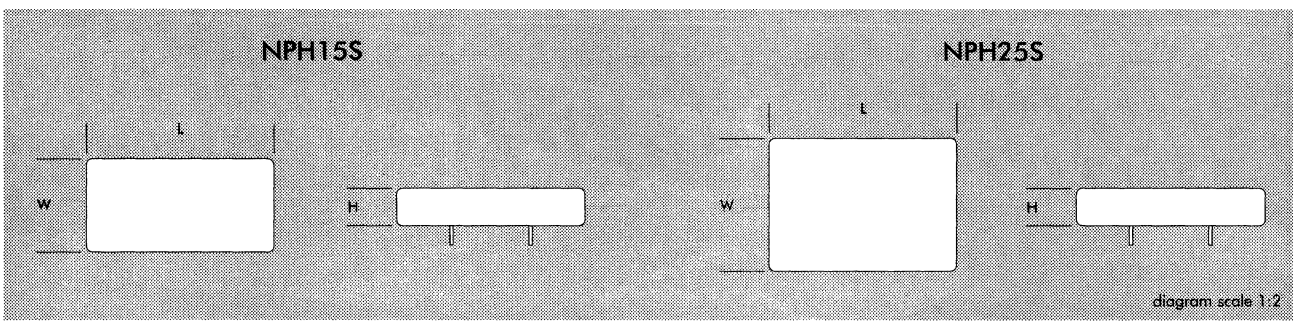
ISOLATED DC-DC CONVERTERS

- 2:1 Wide Input Range
- 24V and 48V Nominal Input
- 3.3V, 5V, 12V, and 15V Single Output
- High Efficiency to 89%
- Versatile Control Options
- Protected Against all Load Faults
- Operation to Zero Load
- Industry Standard Pinout

Miniature Power Modules

The NPH Series of DC-DC converters combines ease of application with versatility. The pin pattern is based on the popular industry standard, but two additional pins may optionally be fitted to provide a variety of features not commonly found on units of this type. High efficiency enables full rating to be achieved in a small package without heatsinking, and a high surge capability will provide for start up and transient loads, while being thermally protected against sustained overload. Overload protection of the "constant current" type ensures start up into complex load conditions.



Series	Power	Isolation	Output			Input Voltage					Output Voltage					Size (lxwxh)	Footprint
Units	Watts	kV DC				V DC					V DC					mm	cm^2
			S	D	T	3	5	12	24	48	3	5	9	12	15		
NPH15S	15.0	1.5	•						2:1	2:1	•	•		•	•	50.0x25.0x10.0	12.50
NPH25S	25.0	1.5	•						2:1	2:1	•	•		•	•	50.0x35.0x10.0	17.50

Newport Syntax - Standard P Class

Converter Topology — Output - S: Single D:Dual T: Twin Format

NPH 15S2405EI

Power Rating — Input voltage — Output voltage — Indust. temp. range

*Include for optional remote/sync and trim

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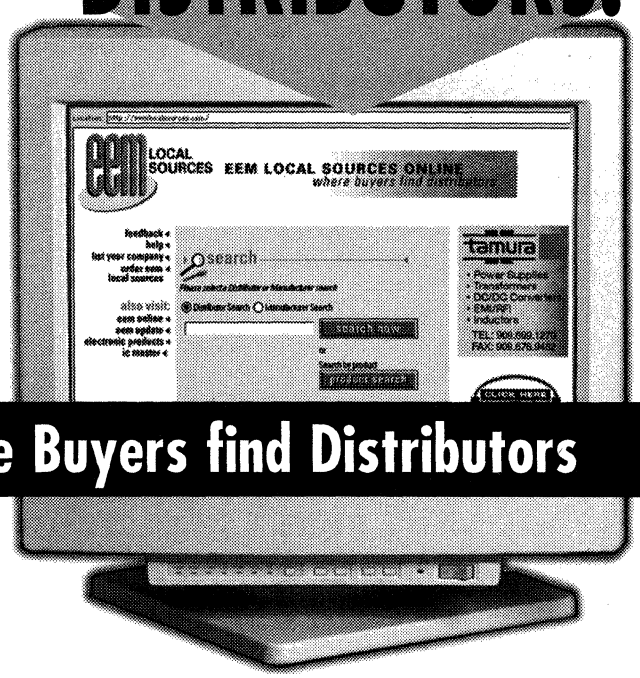

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PICO Hi-Reliability Ultra-Miniature DC-DC Converters

New Surface Mount Models from 5V DC to 1000V DC outputs. See pages D•2034-D•2035; D•2036-D•2037

New Series AV/SMV up to 1000 VDC Output See pages D•2036-D•2037

New Series VV up to 5000 VDC Output See pages D•2038-D•2039

AT/DT/SAT/SDT .200 height– up to .75 Watts. See pages D•2040-D•2041

2.0 to 5000 VDC Outputs

OPTIONS AVAILABLE
- Expanded operating temp. (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

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New

New

Delivery– stock to one week

DC-DC CONVERTERS . . . Series A ***Single and Dual .5" × .5" × .3" ht., up to 1.25 Watts*** **SURFACE MOUNT** DC-DC CONVERTERS . . .Series SM ***Single and Dual .5" × .5" × .340 ht., up to 1.25 Watts***	**D•2034-35**
DC-DC CONVERTERS . . . Series AV ***Up to 1000 Volts DC Output 1.25 Watts*** **SURFACE MOUNT** DC-DC CONVERTERS . . .Series SMV ***.440" ht., up to 500V DC output/.540" ht., up to 1000V DC output***	**D•2036-37**
DC-DC CONVERTERS . . . Series VV ***0.500" ht., 100 up to 5000 VDC output***	**D•2038-39**
DC-DC CONVERTERS . . . Series AT/DT **Surface Mount SAT/SDT** ***Single and Dual, .300" ht., up to .75 Watts***	**D•2040-41**
DC-DC CONVERTERS . . . Series B **Surface Mount Series SB** ***Single and Dual, .7" × 1.12" × .3" ht., up to 2.5 Watts***	**D•2042-43**
DC-DC CONVERTERS . . . Series C **Surface Mount Series SC** ***Single and Dual, 1.12" × 1.24" × .3" ht., up to 4 Watts***	**D•2044-45**
DC-DC CONVERTERS . . . Series E **Surface Mount Series SE** ***Single 1.24" × 1.43" × .4" ht., Dual 1.12" × 2" × .4" ht., up to 7 Watts***	**D•2046-47**
DC-DC CONVERTERS . . . Series FR, **Surface Mount Series SFR** ***Single and Dual, .5" × 1" × .3" ht., up to 1 Watt***	**D•2048**
DC-DC CONVERTERS . . . Series XGR, **Surface Mount Series XSGR** ***Single and Dual, 1.125" x 2.25" x .350" ht., up to 3.5 Watts***	**D•2049**
MILITARY DC-DC CONVERTERS . . . Series M/MV ***Single and Dual, up to 1.25 Watts***	**D•2050-51**
MILITARY DC-DC CONVERTERS . . . Series MR ***Wide Input Voltages, Single and Dual Outputs, up to 2.5" Watts***	**D•2052-53**
DC-DC CONVERTERS... Series OR ***Single and Dual Outputs, Wide Input Range up to 25 Watts***	**D•2054-55**
DC-DC CONVERTERS . . . Series LR, Regulated, Isolated ***Single and Dual Outputs, Wide Input Range 5 to 60 Volts, up to 5 Watts***	**D•2056-57**
DC-DC CONVERTERS . . . Series PLR Regulated ***Single and Dual Outputs, Wide Input Range up to 8 Watts, .300" max. ht.***	**D•2058-59**
SURFACE MOUNT Series SIR, Regulated, Isolated ***Single and Dual Outputs, Wide Input Range up to 3.33:1, up to 8 Watts***	**D•2060-61**
DC-DC CONVERTERS . . . Series IR, Regulated, Isolated ***Single and Dual Outputs, Wide Input Range 5 to 60 Volts, up to 10 Watts***	**D•2062-63**
DC-DC CONVERTERS . . . Series JR, Regulated, Isolated ***Single and Dual Outputs, Wide Input Range 18 to 60 Volts, up to 15 Watts***	**D•2064-65**
DC-DC CONVERTERS . . . Series KR, Regulated, Isolated ***Single and Dual Outputs, Wide Input Range 18 to 60 Volts, up to 20 Watts***	**D•2066-67**
DC-DC CONVERTERS . . . Series NR, Regulated ***Single, Dual and New Triple Outputs, Wide Input 10 to 72 Volts, up to 30 Watts***	**D•2068-69**
DC-DC CONVERTERS . . . Series LV, Regulated, Isolated ***Wide Input 36-80 V*** DC,***up to 10 Watts***	**D•2070-71**
DC-DC CONVERTERS . . . Series HV, Regulated, Isolated ***Wide Input*** 200-380V DC, ***up to 15 Watts***	**D•2072-73**
AC-DC POWER SUPPLIES SECTION	**D•1725-43**
OPTIONAL SCREENING PER MIL-STD-883	**D•2074**
Fixed Frequency Regulated 75, 100, 200 Watts	**D•2075-2106**

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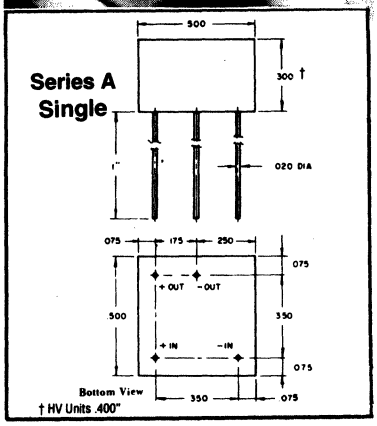
SERIES A/SM
Hi Reliability Ultra-Miniature DC-DC Converters

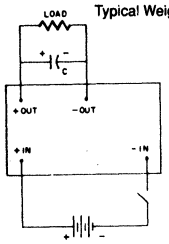
SURFACE MOUNT and PLUG-IN

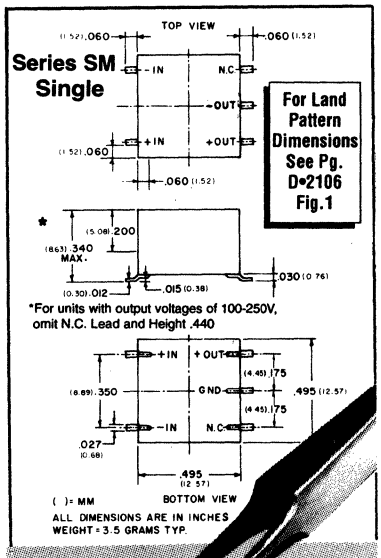
3.3 Volts Output Now Standard
for PICO Part Numbers: 5A3.3S, 12A3.3S, 24A3.3S, 28A3.3S, 48A3.3S

OPTIONS AVAILABLE
- *Expanded operating temp (−55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (−55°C to +125°C)*
- *Hi Temp, full power burn in (100% power, 125°C case temp)*

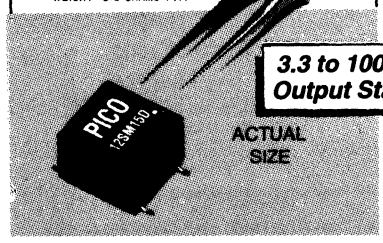


Typical Weight: 3.5 Grams





For Land Pattern Dimensions See Pg. D•2106 Fig.1



3.3 to 1000 VDC Output Standard

ACTUAL SIZE

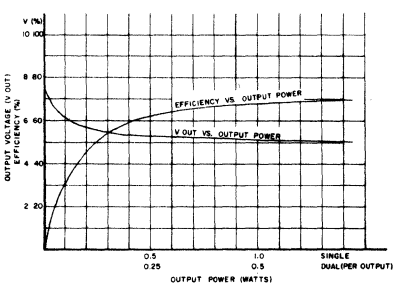
SINGLE OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
5A5S	5SM5S	5	5	200	1	66	303	0.20	65	±0.25	56.55
5A9S	5SM9S	5	9	139	1.25	73	342	0.15	80	±0.3	56.55
5A12S	5SM12S	5	12	104	1.25	73	342	0.15	80	±0.4	56.55
5A15S	5SM15S	5	15	83	1.25	75	333	0.12	90	±0.4	56.55
5A24S	5SM24S	5	24	52	1.25	75	333	0.10	90	±0.5	56.55
5A28S	5SM28S	5	28	45	1.25	74	338	0.10	90	±0.5	56.55
5A48S	5SM48S	5	48	26	1.25	77	325	0.10	90	±0.7	56.55
5A100S	5SM100S	5	100	12.5	1.25	78	321	0.90	90	±3.0	80.12 †
5A150S	5SM150S	5	150	8.3	1.25	76	329	0.90	100	±3.0	80.12 †
5A200S	5SM200S	5	200	6.25	1.25	75	333	0.90	100	±3.0	80.12 †
5A250S	5SM250S	5	250	5	1.25	75	333	0.90	100	±3.0	80.12 †
12A5S	12SM5S	12	5	200	1	66	126	0.20	24	±0.25	56.55
12A9S	12SM9S	12	9	139	1.25	74	141	0.15	26	±0.3	56.55
12A12S	12SM12S	12	12	104	1.25	76	137	0.15	26	±0.4	56.55
12A15S	12SM15S	12	15	83	1.25	78	134	0.15	26	±0.4	56.55
12A24S	12SM24S	12	24	52	1.25	78	134	0.15	26	±0.5	56.55
12A28S	12SM28S	12	28	45	1.25	77	135	0.15	26	±0.5	56.55
12A48S	12SM48S	12	48	26	1.25	80	130	0.20	26	±0.7	56.55
12A100S	12SM100S	12	100	12.5	1.25	80	130	0.90	30	±3.0	80.12 †
12A150S	12SM150S	12	150	8.3	1.25	79	132	0.90	35	±3.0	80.12 †
12A200S	12SM200S	12	200	6.25	1.25	78	134	0.90	35	±3.0	80.12 †
12A250S	12SM250S	12	250	5	1.25	75	139	0.90	40	±3.0	80.12 †
24A5S	24SM5S	24	5	200	1	66	63	0.20	13	±0.25	56.55
24A9S	24SM9S	24	9	139	1.25	72	72	0.20	15	±0.3	56.55
24A12S	24SM12S	24	12	104	1.25	75	69	0.20	15	±0.4	56.55
24A15S	24SM15S	24	15	83	1.25	75	69	0.20	15	±0.4	56.55
24A24S	24SM24S	24	24	52	1.25	78	67	0.20	15	±0.5	56.55
24A28S	24SM28S	24	28	45	1.25	77	68	0.20	15	±0.5	56.55
24A48S	24SM48S	24	48	26	1.25	78	67	0.25	16	±0.7	56.55
24A100S	24SM100S	24	100	12.5	1.25	76	69	0.90	20	±3.0	80.12 †
24A150S	24SM150S	24	150	8.3	1.25	73	71	0.90	25	±3.0	80.12 †
24A200S	24SM200S	24	200	6.25	1.25	73	71	0.90	25	±3.0	80.12 †
24A250S	24SM250S	24	250	5	1.25	70	74	0.90	25	±3.0	80.12 †
28A5S	28SM5S	28	5	200	1	66	54	0.20	12	±0.25	56.55
28A9S	28SM9S	28	9	139	1.25	72	62	0.20	14	±0.3	56.55
28A12S	28SM12S	28	12	104	1.25	72	62	0.20	14	±0.4	56.55
28A15S	28SM15S	28	15	83	1.25	73	61	0.20	14	±0.4	56.55
28A24S	28SM24S	28	24	52	1.25	76	59	0.20	14	±0.5	56.55
28A28S	28SM28S	28	28	45	1.25	76	59	0.20	14	±0.5	56.55
28A48S	28SM48S	28	48	26	1.25	77	58	0.25	15	±0.7	56.55
28A100S	28SM100S	28	100	12.5	1.25	75	60	0.90	20	±3.0	80.12 †
28A150S	28SM150S	28	150	8.3	1.25	76	59	0.90	25	±3.0	80.12 †
28A200S	28SM200S	28	200	6.25	1.25	75	60	0.90	25	±3.0	80.12 †
28A250S	28SM250S	28	250	5	1.25	70	64	0.90	25	±3.0	80.12 †
48A5S	48SM5S	48	5	200	1	66	32	0.25	6	±0.25	60.70
48A9S	48SM9S	48	9	139	1.25	72	36	0.25	8	±0.3	60.70
48A12S	48SM12S	48	12	104	1.25	73	36	0.25	8	±0.4	60.70
48A15S	48SM15S	48	15	83	1.25	72	36	0.25	8	±0.4	60.70
48A24S	48SM24S	48	24	52	1.25	76	34	0.25	9	±0.5	60.70
48A28S	48SM28S	48	28	45	1.25	76	34	0.25	9	±0.5	60.70

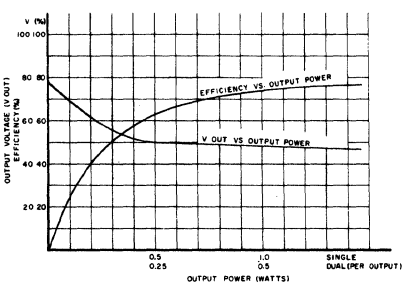
*For units with output voltages up to 48 volts, ripple is measured with 10μF, 75 volt high quality tantalum capacitor which is required across the output.
For units with output voltage of 100-250 volts use A 0.1μF, 300 volt capacitor which is required across output, and maintain at least 10% of rated load to prevent a voltage surge.

† HV Units .400"

SINGLE & DUAL 12V-5V



SINGLE & DUAL 5V-48V



SURFACE MOUNT and PLUG-IN SERIES A/SM

FEATURES

- Up to 1.25 watt output at 70°C ambient
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Ultra-miniature size (0.3" Height)
- 5 input voltage ranges 5, 12, 24, 28 and 48V DC
- 100 megohm @ 500V DC isolation
- Input/output isolation
- Single and dual output
- No heat sink required
- Up to 250V Output

New Series AT/DT .200 height– up to .75 Watts. See pages D•2040-2041

This series of unregulated DC-DC converters are produced in an ultra-miniature encapsulated package. 84 different models are available. The units feature single and dual outputs. They will operate over the temperature range of −25°C to +70°C. No heat sink is required.

SERIES A
Low Profile .5"x.5"x.3" Height!
...up to 1.25 Watts

SERIES SM
Low Profile .5" x .5" x .340" Height
...up to 1.25 Watts

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient and input voltage at nominal value unless otherwise specified.

LINE REGULATION: *OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT*

Input voltage range: 5V models 4 to 6.5V DC
12V models 9 to 15V DC
24V models 17 to 28V DC
28V models 21 to 32V DC
48V models 25 to 50V DC

Output voltage tolerance at full load: 5V models ± 0.25V
9V models ± 0.3V
12V & 15V models ± 0.4V
24V & 28V models ± 0.5V
48V models ± 0.7V
100V, 150V, 200V & 250V models ± 3.0V

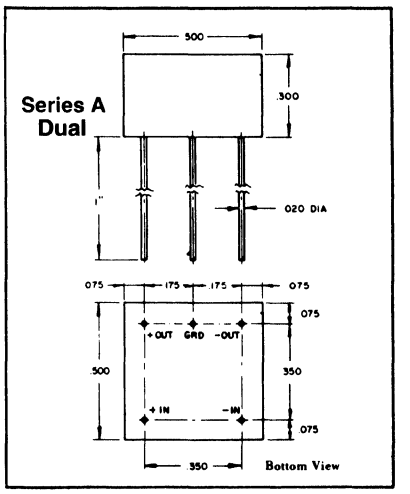
Converter frequency: 20 40 KHz

Output temperature coefficient: 0.05%/°C for 5V output
0.04%/°C for 12 & 15V output
0.02%/°C for 24, 28, 48, 100, 150, 200 and 250 volt outputs

Operating temperature: 25°C to +70°C ambient
No heat sink is required

Storage temperature: 55°C to +125°C

Isolation: 100 megohms min @ 500V DC



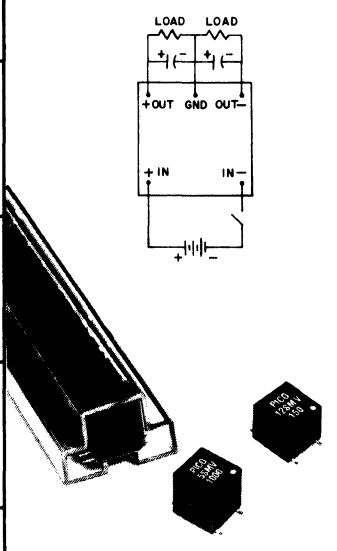
Typical Weight: 3.5 Grams

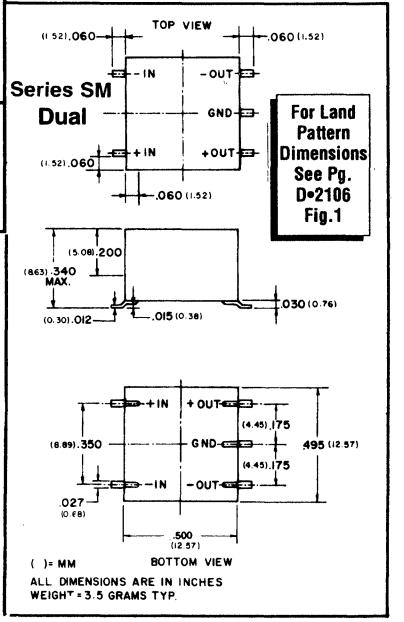
DUAL OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1–24
5A5D	5SM5D	5	±5	100	0.5	66	303	0.20	65	±0.25	63.93
5A9D	5SM9D	5	±9	69	0.625	73	342	0.15	80	±0.3	63.93
5A12D	5SM12D	5	±12	52	0.625	73	342	0.15	80	±0.4	63.93
5A15D	5SM15D	5	±15	42	0.625	75	333	0.12	90	±0.4	63.93
5A24D	5SM24D	5	±24	26	0.625	75	333	0.10	90	±0.5	63.93
5A28D	5SM28D	5	±28	22	0.625	74	338	0.10	90	±0.5	63.93
5A48D	5SM48D	5	±48	13	0.625	77	325	0.10	90	±0.7	63.93
12A5D	12SM5D	12	±5	100	0.5	66	126	0.20	24	±0.25	63.93
12A9D	12SM9D	12	±9	69	0.625	74	141	0.15	26	±0.3	63.93
12A12D	12SM12D	12	±12	52	0.625	76	137	0.15	26	±0.4	63.93
12A15D	12SM15D	12	±15	42	0.625	78	134	0.15	26	±0.4	63.93
12A24D	12SM24D	12	±24	26	0.625	78	134	0.15	26	±0.5	63.93
12A28D	12SM28D	12	±28	22	0.625	77	135	0.15	26	±0.5	63.93
12A48D	12SM48D	12	±48	13	0.625	80	130	0.20	26	±0.7	63.93
24A5D	24SM5D	24	±5	100	0.5	66	63	0.20	13	±0.25	63.93
24A9D	24SM9D	24	±9	69	0.625	72	72	0.20	15	±0.3	63.93
24A12D	24SM12D	24	±12	52	0.625	75	69	0.20	15	±0.4	63.93
24A15D	24SM15D	24	±15	42	0.625	75	69	0.20	15	±0.4	63.93
24A24D	24SM24D	24	±24	26	0.625	78	67	0.20	15	±0.5	63.93
24A28D	24SM28D	24	±28	22	0.625	77	68	0.20	15	±0.5	63.93
24A48D	24SM48D	24	±48	13	0.625	78	67	0.25	16	±0.7	63.93
28A5D	28SM5D	28	±5	100	0.5	66	54	0.20	12	±0.25	63.93
28A9D	28SM9D	28	±9	69	0.625	72	62	0.20	14	±0.3	63.93
28A12D	28SM12D	28	±12	52	0.625	72	62	0.20	14	±0.4	63.93
28A15D	28SM15D	28	±15	42	0.625	73	61	0.20	14	±0.4	63.93
28A24D	28SM24D	28	±24	26	0.625	76	59	0.20	14	±0.5	63.93
28A28D	28SM28D	28	±28	22	0.625	76	59	0.20	14	±0.5	63.93
28A48D	28SM48D	28	±48	13	0.625	77	58	0.25	15	±0.7	63.93
48A5D	48SM5D	48	±5	100	0.5	66	32	0.25	6	±0.25	68.63
48A9D	48SM9D	48	±9	69	0.625	72	36	0.25	8	±0.3	68.63
48A12D	48SM12D	48	±12	52	0.625	73	36	0.25	8	±0.4	68.63
48A15D	48SM15D	48	±15	42	0.625	72	36	0.25	8	±0.4	68.63
48A24D	48SM24D	48	±24	26	0.625	76	34	0.25	9	±0.5	68.63
48A28D	48SM28D	48	±28	22	0.625	76	34	0.25	9	±0.5	68.63

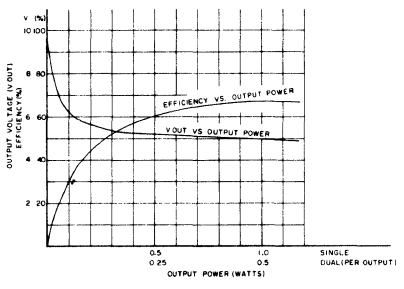
*For units with output voltages up to 48 volts, ripple is measured with 10μF, 75 volt high quality tantalum capacitor which is required across each output.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

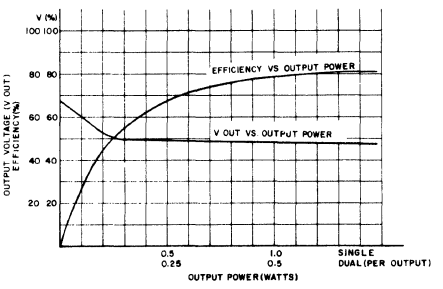




SINGLE & DUAL 5V-5V

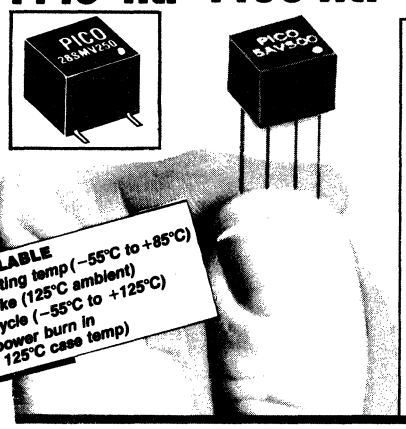


SINGLE & DUAL 12V-48V



SERIES AV/SMV SURFACE MOUNT and PLUG-IN .440" ht. .400 ht. up to 500 VDC output

Hi Voltage Hi Reliability Ultra-Miniature Isolated DC-DC Converters



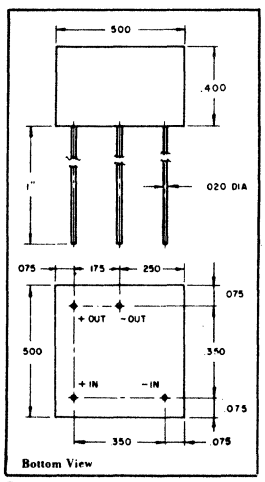
- 1.25 watt output at 70° ambient
- Ultra-miniature size 0.400" height, 4.0 grams weight, 0.1 cubic inches volume
- 4 input voltage ranges 5, 12, 24 and 28 VDC
- 100 megohm @ 1000 VDC input/output isolation
- MIL-STD 883 options available
- No heat sink or electrical derating required

This series of unregulated high voltage DC-DC converters are produced in an ultra-miniature encapsulated package. 36 different models are available. These single output isolated units will operate over the temperature range of −25° to +70°C with no heat sink or electrical derating. For military applications an operating temperature range −55°C to +85°C is available. An optional environmental screening package per MIL-STD-883 is also available.

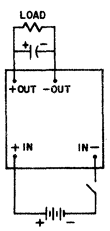
OPTIONS AVAILABLE
- Expanded operating temp (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

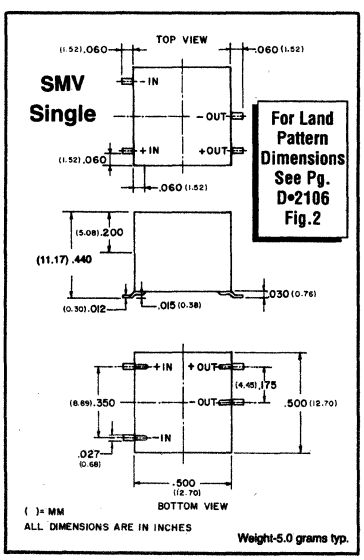
Ordering Instructions:
No minimum.
Net 30 days F.O.B.

AV Single



Typical Weight: 4 Grams





TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient and input voltage at nominal value unless otherwise specified.

LINE REGULATION: *OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT*

Input voltage range: ±10% all models

Output voltage tolerance at full load–nom. input: ±3% Please keep loaded to minimum of 10% at all times.
Note: For tighter output voltage tolerances, please consult factory.

Converter frequency: 20 – 40 KHz

Output temperature coefficient: 0.02%/°C for all models

Operating temperature: −25°C to + 70°C ambient. No heat sink.

Storage temperature: −55°C to +125°C

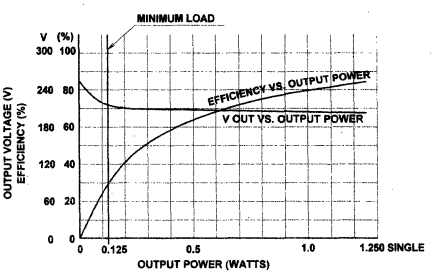
Isolation: 100 megohms min. @ 1000V DC

SINGLE OUTPUT

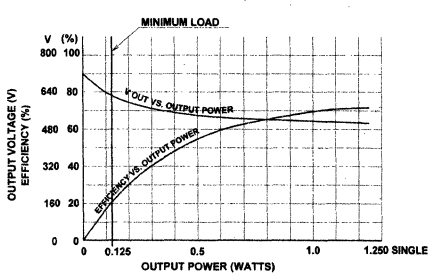
PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (Vp-p max)	FULL** LOAD OUTPUT VOLTAGE TOLERANCE (%)	PRICE 1-24
5AV100	5SMV100	5	100	12.50	1.25	78	321	0.90	±3	80.12
5AV150	5SMV150	5	150	8.30	1.25	76	329	0.90	±3	80.12
5AV200	5SMV200	5	200	6.25	1.25	75	333	0.90	±3	80.12
5AV250	5SMV250	5	250	5.00	1.25	75	333	0.90	±3	80.12
5AV300	5SMV300	5	300	4.16	1.25	70	357	1.20	±3	99.00
5AV350	5SMV350	5	350	3.57	1.25	70	357	1.20	±3	99.00
5AV400	5SMV400	5	400	3.12	1.25	70	357	1.20	±3	99.00
5AV450	5SMV450	5	450	2.77	1.25	70	357	1.50	±3	99.00
5AV500	5SMV500	5	500	2.50	1.25	70	357	1.50	±3	99.00
12AV100	12SMV100	12	100	12.50	1.25	80	130	0.90	±3	80.12
12AV150	12SMV150	12	150	8.30	1.25	79	132	0.90	±3	80.12
12AV200	12SMV200	12	200	6.25	1.25	78	134	0.90	±3	80.12
12AV250	12SMV250	12	250	5.00	1.25	75	139	0.90	±3	80.12
12AV300	12SMV300	12	300	4.16	1.25	75	139	1.20	±3	99.00
12AV350	12SMV350	12	350	3.57	1.25	75	139	1.20	±3	99.00
12AV400	12SMV400	12	400	3.12	1.25	75	139	1.20	±3	99.00
12AV450	12SMV450	12	450	2.77	1.25	75	139	1.50	±3	99.00
12AV500	12SMV500	12	500	2.50	1.25	75	139	1.50	±3	99.00
24AV100	24SMV100	24	100	12.50	1.25	76	69	0.90	±3	80.12
24AV150	24SMV150	24	150	8.30	1.25	73	71	0.90	±3	80.12
24AV200	24SMV200	24	200	6.25	1.25	73	71	0.90	±3	80.12
24AV250	24SMV250	24	250	5.00	1.25	70	74	0.90	±3	80.12
24AV300	24SMV300	24	300	4.16	1.25	73	71	1.20	±3	99.00
24AV350	24SMV350	24	350	3.57	1.25	73	71	1.20	±3	99.00
24AV400	24SMV400	24	400	3.12	1.25	73	71	1.20	±3	99.00
24AV450	24SMV450	24	450	2.77	1.25	73	71	1.50	±3	99.00
24AV500	24SMV500	24	500	2.50	1.25	73	71	1.50	±3	99.00
28AV100	28SMV100	28	100	12.50	1.25	75	60	0.90	±3	80.12
28AV150	28SMV150	28	150	8.30	1.25	76	59	0.90	±3	80.12
28AV200	28SMV200	28	200	6.25	1.25	75	60	0.90	±3	80.12
28AV250	28SMV250	28	250	5.00	1.25	70	64	0.90	±3	80.12
28AV300	28SMV300	28	300	4.16	1.25	73	61	1.20	±3	99.00
28AV350	28SMV350	28	350	3.57	1.25	73	61	1.20	±3	99.00
28AV400	28SMV400	28	400	3.12	1.25	73	61	1.20	±3	99.00
28AV450	28SMV450	28	450	2.77	1.25	73	61	1.50	±3	99.00
28AV500	28SMV500	28	500	2.50	1.25	73	61	1.50	±3	99.00

*Measured using 0.1μf, 1000 volt DC capacitor which is required across the output and maintain at least 10% of load at all times to prevent voltage surge. **For tighter tolerances consult factory.

24 AV/SMV 200



5 AV/SMV 500



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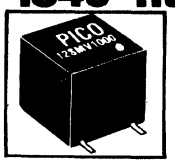
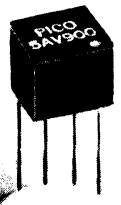
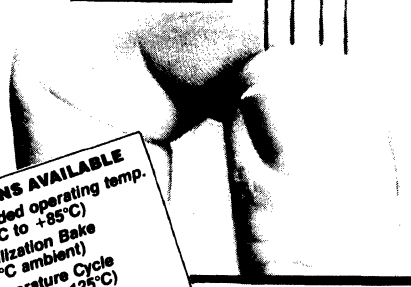
SERIES AV/SMV .540" ht. .500 ht. up to 1000 VDC output

SURFACE MOUNT and PLUG-IN

Hi Voltage Hi Reliability Ultra-Miniature Isolated DC-DC Converters





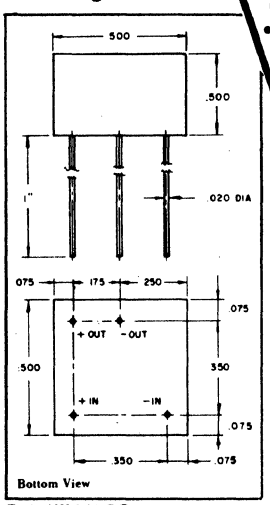


- 1.25 watt output at 70° ambient
- Ultra-miniature size 0.500" height, 5.0 grams weight, .125 cubic inches volume
- 4 input voltage ranges 5, 12, 24 and 28 VDC
- 100 megohm @ 1500 VDC input/output isolation
- MIL-STD 883 options available
- No heat sink or electrical derating required

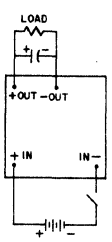
This series of unregulated high voltage DC-DC converters are produced in an ultra-miniature encapsulated package. 20 different models are available. These single output isolated units will operate over the temperature range of −25° to +70°C with no heat sink or electrical derating. For military applications an operating temperature range −55°C to +85°C is available. An optional environmental screening package per MIL-STD-883 is also available.

OPTIONS AVAILABLE
- Expanded operating temp. (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, burn in

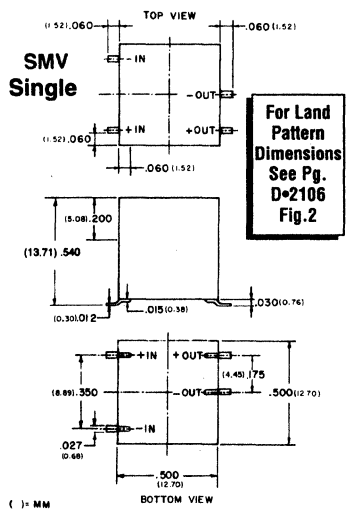
AV Single



Typical Weight: 5 Grams



SMV Single



For Land Pattern Dimensions See Pg. D•2106 Fig.2

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient and input voltage at nominal value unless otherwise specified.

LINE REGULATION: *OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT*

Input voltage range: ±10% all models

Output voltage tolerance at full load–nom. input: ±3% Please keep loaded to minimum of 10% at all times.

Note: For tighter output voltage tolerances, please consult factor

Converter frequency: 20 – 40 KHz

Output temperature coefficient: 0.02%/°C for all models

Operating temperature: −25°C to + 70°C ambient. No heat sink.

Storage temperature: −55°C to +125°C

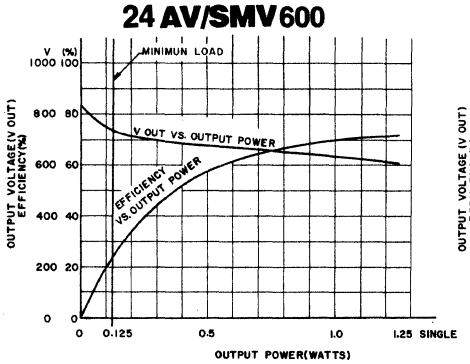
Isolation: 100 megohms min. @ 1500V DC

SINGLE OUTPUT

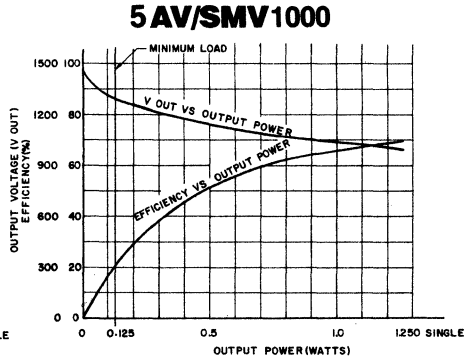
PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF.@ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (Vp-p max)	FULL** LOAD OUTPUT VOLTAGE TOLERANCE (%)	PRICE 1-24
5AV600	5SMV600	5	600	2.08	1.25	70	357	3.0	±3	120.00
5AV700	5SMV700	5	700	1.79	1.25	70	357	3.0	±3	120.00
5AV800	5SMV800	5	800	1.56	1.25	70	357	3.0	±3	120.00
5AV900	5SMV900	5	900	1.39	1.25	70	357	3.0	±3	120.00
5AV1000	5SMV1000	5	1000	1.25	1.25	70	357	3.0	±3	120.00
12AV600	12SMV600	12	600	2.08	1.25	70	149	3.0	±3	120.00
12AV700	12SMV700	12	700	1.79	1.25	70	149	3.0	±3	120.00
12AV800	12SMV800	12	800	1.56	1.25	70	149	3.0	±3	120.00
12AV900	12SMV900	12	900	1.39	1.25	70	149	3.0	±3	120.00
12AV1000	12SMV1000	12	1000	1.25	1.25	70	149	3.0	±3	120.00
24AV600	24SMV600	24	600	2.08	1.25	70	74	3.0	±3	120.00
24AV700	24SMV700	24	700	1.79	1.25	70	74	3.0	±3	120.00
24AV800	24SMV800	24	800	1.56	1.25	70	74	3.0	±3	120.00
24AV900	24SMV900	24	900	1.39	1.25	70	74	3.0	±3	120.00
24AV1000	24SMV1000	24	1000	1.25	1.25	70	74	3.0	±3	120.00
28AV600	28SMV600	28	600	2.08	1.25	70	64	3.0	±3	120.00
28AV700	28SMV700	28	700	1.79	1.25	70	64	3.0	±3	120.00
28AV800	28SMV800	28	800	1.56	1.25	70	64	3.0	±3	120.00
28AV900	28SMV900	28	900	1.39	1.25	70	64	3.0	±3	120.00
28AV1000	28SMV1000	28	1000	1.25	1.25	70	64	3.0	±3	120.00

*Measured using 0.01μf, 3000 Volt DC capacitor which is required across the output and maintain at least 10% of load at all times to prevent voltage surge. **For tighter tolerances consult factory.

24 AV/SMV600



5 AV/SMV1000



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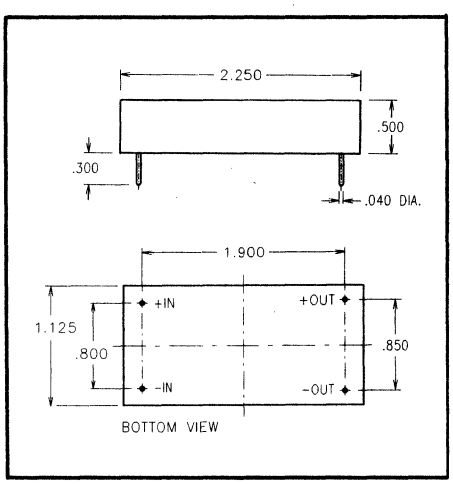
SERIES VV Ultra-miniature to 5000 VDC output

100 to 5000 Volts DC Output
Output VDC Proportional to Input VDC
Up to 10 Watts
High Efficiency

Low Profile 0.500" Height

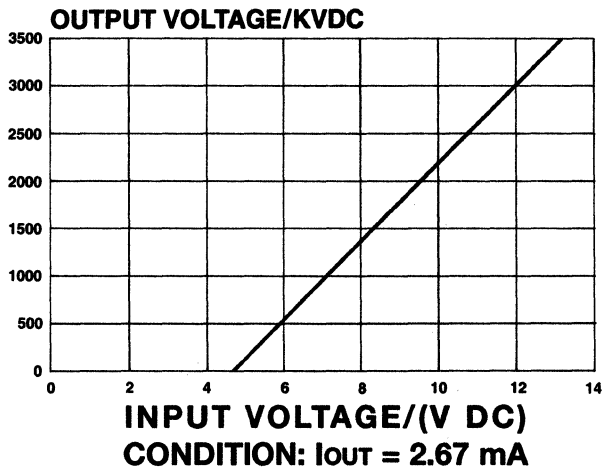
FEATURES:
- Up to 10 watts @ 70°C ambient
- Encapsulated semiconductors conservatively rated for maximum reliability.
- Ultra-miniature size, only 0.500" height
- 7 input voltages standard
- 35 models standard
- High Efficiency: Up to 85%
- Isolation: 7000 VDC

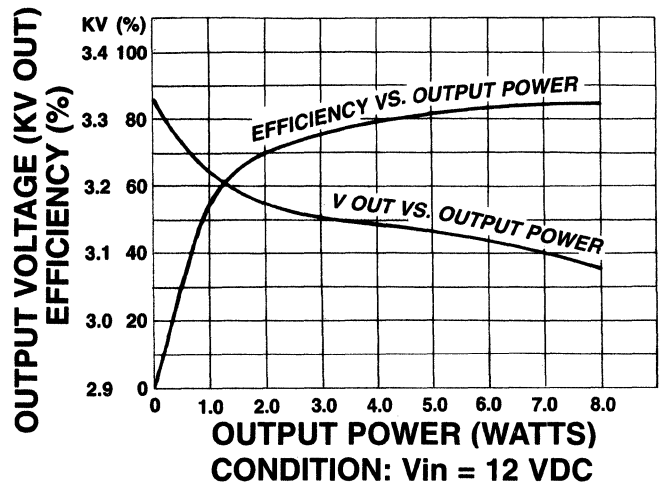


PICO PART NUMBER	INPUT VOLTAGE RANGE (VDC) MIN	MAX	* MAXIMUM LOAD CURRENT (mA) MINIMUM LOAD CURRENT 5%	OUTPUT VOLTAGE RANGE (VDC) MIN VIN	MAX VIN	MAX. OUTPUT POWER (WATTS)	TYPICAL EFFICIENCY @ FULL LOAD AT MAX VIN (%)	TYPICAL OUTPUT VOLTAGE RIPPLE @ FULL LOAD AT MAX VIN (%)	PRICE
5VV1	2.0	5	6.0	100	1000	6	76	2	99.00
5VV2	2.0	5	3.0	250	2000	6	76	2	109.00
5VV3	2.0	5	2.0	300	3000	6	76	2	119.00
5VV4	2.0	5	1.375	550	4000	5.5	75	2	129.00
5VV5	2.0	5	1.10	850	5000	5.5	75	2	139.00
9VV1	3.5	9	7.0	75	1000	7	82	2	99.00
9VV2	3.5	9	3.5	200	2000	7	82	2	109.00
9VV3	3.5	9	2.33	400	3000	7	78	2	119.00
9VV4	3.5	9	1.75	625	4000	7	78	2	129.00
9VV5	3.5	9	1.20	1075	5000	6	78	2	139.00
12VV1	4.0	12	8.00	100	1000	8	82	2	99.00
12VV2	4.0	12	4.00	175	2000	8	82	2	109.00
12VV3	4.0	12	2.67	350	3000	8	82	2	119.00
12VV4	4.0	12	1.75	525	4000	7	78	2	129.00
12VV5	4.0	12	1.20	1050	5000	6	78	2	139.00
15VV1	5.0	15	8.5	75	1000	8.5	83	2	99.00
15VV2	5.0	15	4.25	200	2000	8.5	83	2	109.00
15VV3	5.0	15	2.67	400	3000	8	83	2	119.00
15VV4	5.0	15	1.75	600	4000	7	82	2	129.00
15VV5	5.0	15	1.20	1050	5000	6	79	2	139.00

*Maximum load current remains constant throughout input voltage range

PICO PART 12VV3





Delivery— stock to one week

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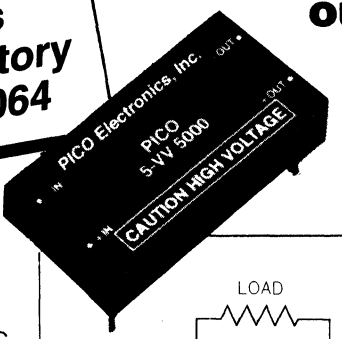
This series of "High Voltage" DC-DC Converters allow you to vary the input voltage in order to vary the output voltage. The seven standard input voltage ranges will allow you to provide DC outputs from 100 to 5000 VDC from almost any DC source. These single output, isolated units will operate over the temperature range of –25°C to +70°C with no heat sink of electrical derating required.

For Special Voltages or Military Upgrades Consult Factory 800-431-1064

SERIES VV

Ultra-miniature to 5000 VDC output

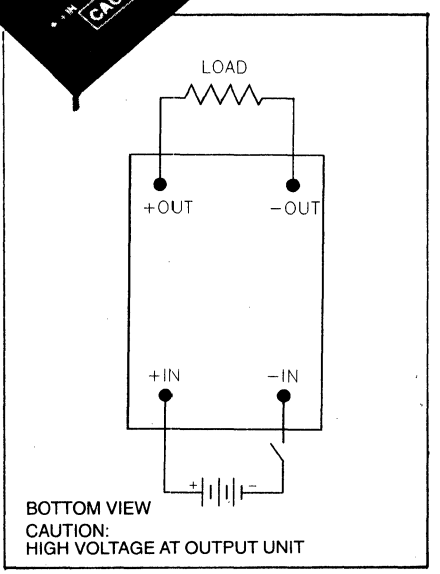
Low Profile 0.500" Height



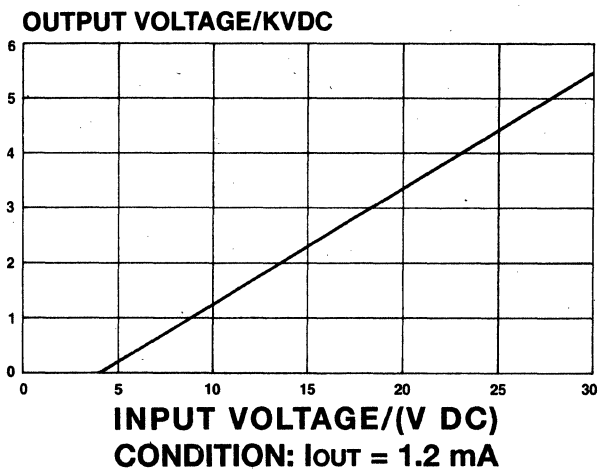
TYPICAL CHARACTERISTICS:
Test Conditions: 25°C
Operating Temperature Range: –25°C to +70°C
Storage Temperature: –55°C to +125°C
Operating Frequency: 15–25 KHz
Output Temperature Coefficient: 0.02%/°C
Isolation: Greater <100 megohms at 7000 VDC

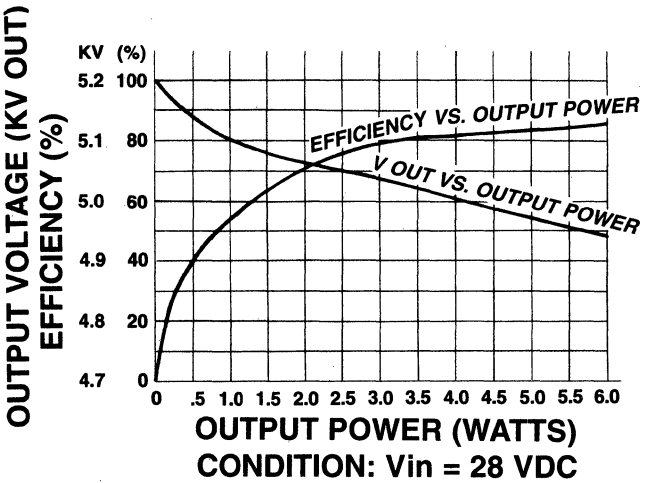
PICO PART NUMBER	INPUT VOLTAGE RANGE (VDC) MIN	MAX	MAXIMUM LOAD CURRENT (mA) MINIMUM LOAD CURRENT 5%	OUTPUT VOLTAGE RANGE (VDC) MIN VIN	MAX VIN	MAX. OUTPUT POWER (WATTS)	TYPICAL EFFICIENCY @ FULL LOAD AT MAX VIN (%)	TYPICAL OUTPUT VOLTAGE RIPPLE @ FULL LOAD AT MAX VIN (%)	PRICE
24VV1	7.0	24	9.0	75	1000	9	84	2	99.00
24VV2	7.0	24	4.50	175	2000	9	84	2	109.00
24VV3	7.0	24	3.00	200	3000	9	82	2	119.00
24VV4	7.0	24	2.00	400	4000	8	82	2	129.00
24VV5	7.0	24	1.20	1075	5000	6	80	2	139.00
28VV1	8.0	28	10	75	1000	10	83	2	99.00
28VV2	8.0	28	5.0	175	2000	10	83	2	109.00
28VV3	8.0	28	3.33	250	3000	10	83	2	119.00
28VV4	8.0	28	2.00	375	4000	8	82	2	129.00
28VV5	8.0	28	1.20	1100	5000	6	80	2	139.00
48VV1	15.0	48	8.00	75	1000	8	80	2	99.00
48VV2	15.0	48	4.00	200	2000	8	80	2	109.00
48VV3	15.0	48	2.67	450	3000	8	80	2	119.00
48VV4	15.0	48	2.00	400	4000	8	80	2	129.00
48VV5	15.0	48	1.20	1075	5000	6	80	2	139.00

*Maximum load current remains constant throughout input voltage range



PICO PART 28VV5





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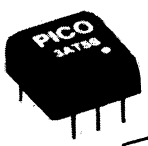
SERIES AT/DT/SAT/SDT SURFACE MOUNT and PLUG-IN

High Reliability Ultra-Miniature, 0.2" ht. Isolated DC-DC Converters

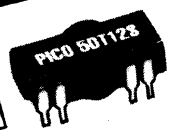


0.2" Height Low Profile

Low No Load Current for Battery Applications

No External Components Required

New DIP Package

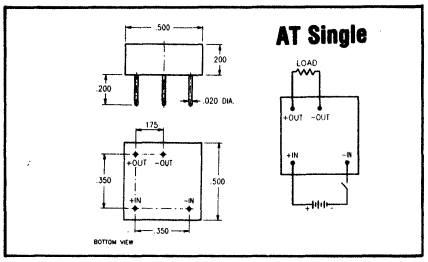


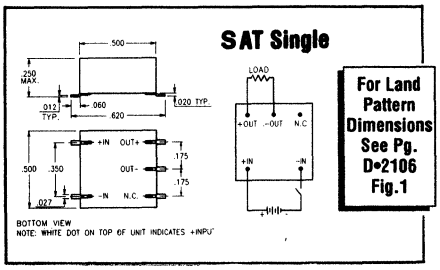
3.3 Volts Output Now Standard
for PICO Part Numbers: 3AT3.3S, 5AT3.3S, 9AT3.3S, 12AT3.3S 3DT3.3S, 5DT3.3S, 9DT3.3S, 12DT3.3S

FEATURES

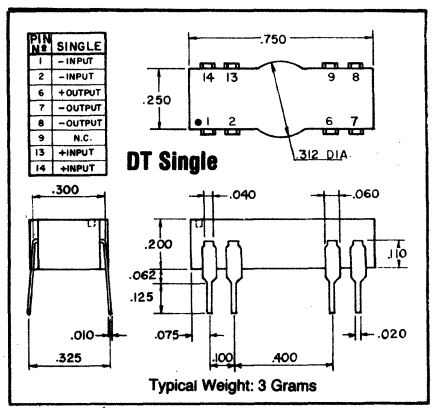
- Ultra-miniature, 0.200" height
- New DIP package available
- Low current consumption
- No external components required
- 4 convenient input voltages, 3-5-9-12V DC
- Up to 0.75 watt output
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Single and dual outputs
- Isolated: 100 megohms at 500V DC
- No heat sink required

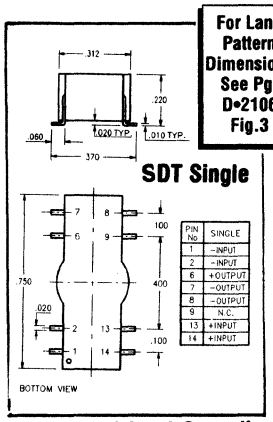
This series of unregulated DC-DC converters offer you a 0.200" tall, package. 64 different models are available and all offer very low current consumption to operate in battery driven circuits. Isolated, single and dual outputs will operate from −25°C to +70°C with no heat sink or derating required. Built-in output capacitors and 4 convenient input voltages also help in simplifying your design, and with the addition of our new DIP package, board layout and assembly is simplified.





For Land Pattern Dimensions See Pg. D•2106 Fig.1





For Land Pattern Dimensions See Pg. D•2106 Fig.3

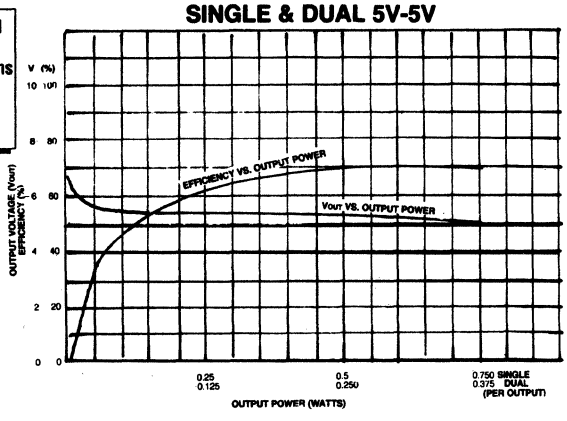
SERIES SAT - AT SINGLE OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	MAX. OUTPUT VOLT RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
3AT5S	3SAT5S	3	5	130	0.65	66	328	0.20	35	±0.25	79.00
3AT9S	3SAT9S	3	9	83	0.75	70	357	0.20	35	±0.30	79.00
3AT12S	3SAT12S	3	12	63	0.75	72	347	0.20	35	±0.40	79.00
3AT15S	3SAT15S	3	15	50	0.75	73	342	0.20	35	±0.40	79.00
5AT5S	5SAT5S	5	5	150	0.75	69	217	0.20	25	±0.25	79.00
5AT9S	5SAT9S	5	9	83	0.75	72	208	0.20	25	±0.30	79.00
5AT12S	5SAT12S	5	12	63	0.75	75	200	0.20	25	±0.40	79.00
5AT15S	5SAT15S	5	15	50	0.75	76	197	0.20	25	±0.40	79.00
9AT5S	9SAT5S	9	5	150	0.75	70	119	0.20	15	±0.25	79.00
9AT9S	9SAT9S	9	9	83	0.75	72	116	0.20	15	±0.30	79.00
9AT12S	9SAT12S	9	12	63	0.75	78	107	0.20	15	±0.40	79.00
9AT15S	9SAT15S	9	15	50	0.75	80	104	0.20	15	±0.40	79.00
12AT5S	12SAT5S	12	5	150	0.75	71	88	0.20	8	±0.25	79.00
12AT9S	12SAT9S	12	9	83	0.75	73	86	0.20	8	±0.30	79.00
12AT12S	12SAT12S	12	12	63	0.75	78	80	0.20	8	±0.40	79.00
12AT15S	12SAT15S	12	15	50	0.75	80	78	0.20	8	±0.40	79.00

SERIES SDT - DT SINGLE OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	TYPICAL OUTPUT VOLT RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
3DT5S	3SDT5S	3	5	130	0.65	66	328	0.20	35	±0.25	95.00
3DT9S	3SDT9S	3	9	83	0.75	70	357	0.20	35	±0.30	95.00
3DT12S	3SDT12S	3	12	63	0.75	72	347	0.20	35	±0.40	95.00
3DT15S	3SDT15S	3	15	50	0.75	73	342	0.20	35	±0.40	95.00
5DT5S	5SDT5S	5	5	150	0.75	69	217	0.20	25	±0.25	95.00
5DT9S	5SDT9S	5	9	83	0.75	72	208	0.20	25	±0.30	95.00
5DT12S	5SDT12S	5	12	63	0.75	75	200	0.20	25	±0.40	95.00
5DT15S	5SDT15S	5	15	50	0.75	76	197	0.20	25	±0.40	95.00
9DT5S	9SDT5S	9	5	150	0.75	70	119	0.20	15	±0.25	95.00
9DT9S	9SDT9S	9	9	83	0.75	72	116	0.20	15	±0.30	95.00
9DT12S	9SDT12S	9	12	63	0.75	78	107	0.20	15	±0.40	95.00
9DT15S	9SDT15S	9	15	50	0.75	80	104	0.20	15	±0.40	95.00
12DT5S	12SDT5S	12	5	150	0.75	71	88	0.20	8	±0.25	95.00
12DT9S	12SDT9S	12	9	83	0.75	73	86	0.20	8	±0.30	95.00
12DT12S	12SDT12S	12	12	63	0.75	78	80	0.20	8	±0.40	95.00
12DT15S	12SDT15S	12	15	50	0.75	80	78	0.20	8	±0.40	95.00

SINGLE & DUAL 5V-5V



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SURFACE MOUNT and PLUG-IN

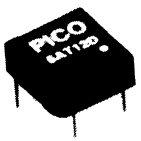
SERIES AT/DT/SAT/SDT

AT Low Profile .5"x.5"x.2" ht. . . . up to 0.75 Watts

No Heat Sink or Electrical Derating Required

New DIP Package

No External Components Required



OPTIONS AVAILABLE
- *Expanded operating temp. (−55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (−55°C to +125°C)*
- *Hi Temp, full power burn in (100% power, 125°C case temp)*

SERIES SAT - AT DUAL OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	MAX. OUTPUT VOLT RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
3AT5D	3SAT5D	3	5	65	0.325	66	328	0.20	35	±0.25	89.00
3AT9D	3SAT9D	3	9	41	0.375	70	357	0.20	35	±0.30	89.00
3AT12D	3SAT12D	3	12	31	0.375	72	347	0.20	35	±0.40	89.00
3AT15D	3SAT15D	3	15	25	0.375	73	342	0.20	35	±0.40	89.00
5AT5D	5SAT5D	5	5	75	0.375	69	217	0.20	35	±0.40	89.00
5AT9D	5SAT9D	5	9	41	0.375	72	208	0.20	25	±0.30	89.00
5AT12D	5SAT12D	5	12	31	0.375	75	200	0.20	25	±0.40	89.00
5AT15D	5SAT15D	5	15	25	0.375	76	197	0.20	25	±0.40	89.00
9AT5D	9SAT5D	9	5	75	0.375	70	119	0.20	15	±0.25	89.00
9AT9D	9SAT9D	9	9	41	0.375	72	116	0.20	15	±0.30	89.00
9AT12D	9SAT12D	9	12	31	0.375	78	107	0.20	15	±0.40	89.00
9AT15D	9SAT15D	9	15	25	0.375	80	104	0.20	15	±0.40	89.00
12AT5D	12SAT5D	12	5	75	0.375	71	88	0.20	8	±0.25	89.00
12AT9D	12SAT9D	12	9	41	0.375	78	86	0.20	8	±0.30	89.00
12AT12D	12SAT12D	12	12	31	0.375	78	80	0.20	8	±0.40	89.00
12AT15D	12SAT15D	12	15	25	0.375	80	78	0.20	8	±0.40	89.00

SERIES SDT- DT DUAL OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	TYPICAL OUTPUT VOLT RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
3DT5D	3SDT5D	3	5	65	0.325	66	328	0.20	35	±0.25	105.00
3DT9D	3SDT9D	3	9	41	0.375	70	357	0.20	35	±0.30	105.00
3DT12D	3SDT12D	3	12	31	0.375	72	347	0.20	35	±0.40	105.00
3DT15D	3SDT15D	3	15	25	0.375	73	342	0.20	35	±0.40	105.00
5DT5D	5SDT5D	5	5	75	0.375	69	217	0.20	25	±0.25	105.00
5DT9D	5SDT9D	5	9	41	0.375	72	208	0.20	25	±0.30	105.00
5DT12D	5SDT12D	5	12	31	0.375	75	200	0.20	25	±0.40	105.00
5DT15D	5SDT15D	5	15	25	0.375	76	197	0.20	25	±0.40	105.00
9DT5D	9SDT5D	9	5	75	0.375	70	119	0.20	15	±0.25	105.00
9DT9D	9SDT9D	9	9	41	0.375	72	116	0.20	15	±0.30	105.00
9DT12D	9SDT12D	9	12	31	0.375	78	107	0.20	15	±0.40	105.00
9DT15D	9SDT15D	9	15	25	0.375	80	104	0.20	15	±0.40	105.00
12DT5D	12SDT5D	12	5	75	0.375	71	88	0.20	8	±0.25	105.00
12DT9D	12SDT9D	12	9	41	0.375	73	86	0.20	8	±0.30	105.00
12DT12D	12SDT12D	12	12	31	0.375	78	80	0.20	8	±0.40	105.00
12DT15D	12SDT15D	12	15	25	0.375	80	78	0.20	8	±0.40	105.00

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient and input voltage at nominal value unless otherwise specified.

LINE REGULATION: OUTPUT VOLTAGE IS DIRECTLY PROPORTIONAL TO THE INPUT VOLTAGE.

Input voltage range: 3V models 2.5 to 3.5V DC
5V models 4 to 6V DC
9V models 7 to 11V DC
12V models 9 to 14V DC

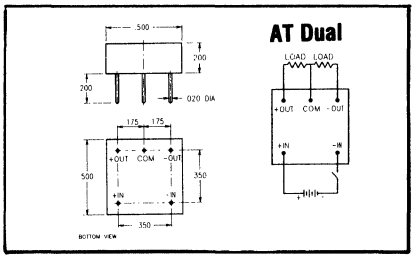
Converter frequency: 40 to 60 KHz

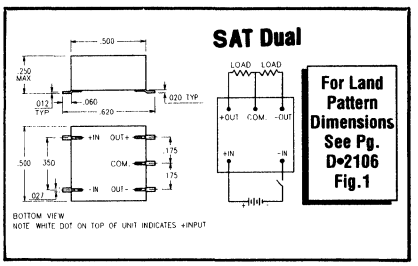
Output temperature coefficient: 0.05% per °C all models

Operating temperature: −25°C to +70°C ambient. No heat sink or derating required.

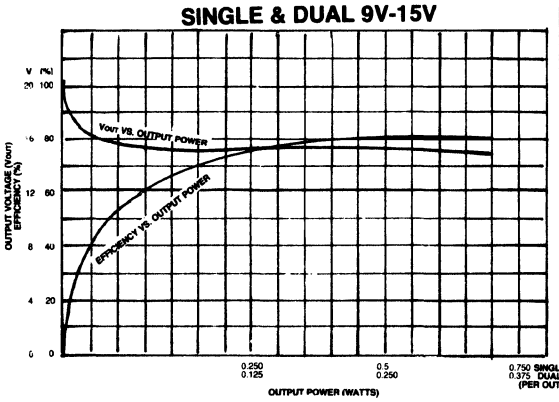
Storage temperature: −55°C to +125°C

Isolation: 100 megohms min. @ 500V DC

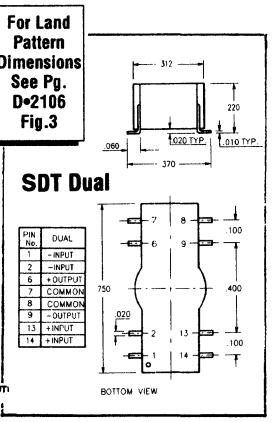


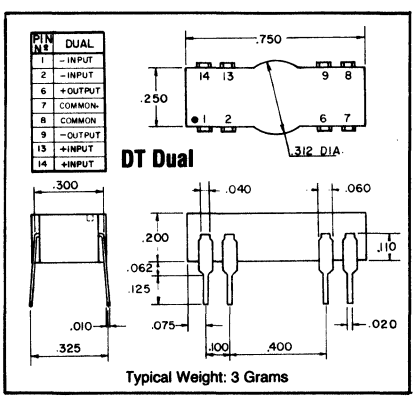


For Land Pattern Dimensions See Pg. D•2106 Fig.1



For Land Pattern Dimensions See Pg. D•2106 Fig.3





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SERIES B/SB SURFACE MOUNT and PLUG-IN

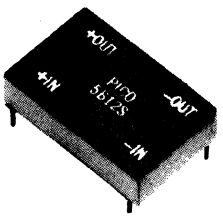
Hi Reliability Ultra-Miniature Isolated DC-DC Converters Up to 2.5 Watts

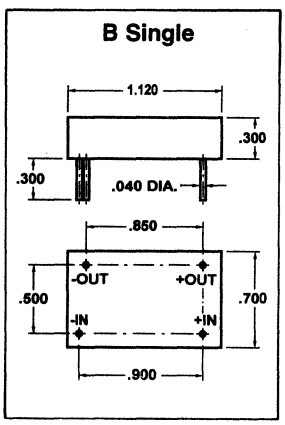
This series of unregulated DC-DC converters comes in a miniaturized encapsulated package. 68 different models are available. The units feature single and isolated dual outputs. They will operate over the temperature range of −25°C to +70°C. No heat sink is required.

3.3 Volts Output Now Standard for PICO Part Numbers: 5B3.3S, 12B3.3S, 24B3.3S, 28B3.3S, 48B3.3S

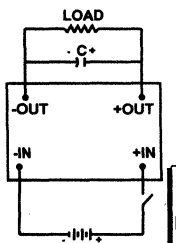
FEATURES

- Up to 2.5 watt output at 70°C ambient
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Ultra-miniature size (0.3" Height)
- 5 input voltage ranges 5, 12, 24, 28 and 48V DC
- 100 megohm @ 500V DC isolation
- Single and dual isolated output
- No heat sink required

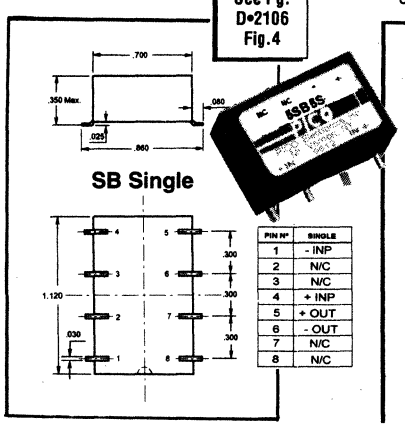




BOTTOM VIEW
Typical Weight: 8.0 Grams
NOTE: ALL DIMENSIONS ARE IN INCHES



For Land Pattern Dimensions See Pg. D•2106 Fig.4

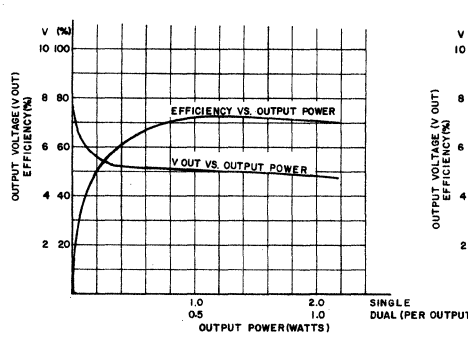


SERIES B/SB - SINGLE OUTPUT

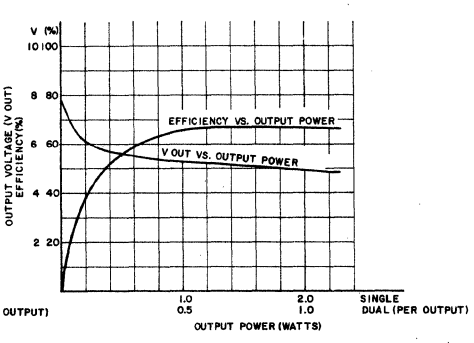
PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
5B5S	5SB5S	5	5	300	1.5	67	447	0.15	90	±0.25	48.19
5B9S	5SB9S	5	9	167	1.5	73	411	0.15	90	±0.3	48.19
5B12S	5SB12S	5	12	125	1.5	75	400	0.15	90	±0.4	48.19
5B15S	5SB15S	5	15	100	1.5	75	400	0.15	90	±0.4	48.19
5B24S	5SB24S	5	24	63	1.5	78	385	0.15	90	±0.5	48.19
5B28S	5SB28S	5	28	54	1.5	78	385	0.15	90	±0.5	48.19
5B48S	5SB48S	5	48	31	1.5	79	380	0.15	90	±0.7	48.19
12B5S	12SB5S	12	5	300	1.5	69	182	0.15	40	±0.25	48.19
12B9S	12SB9S	12	9	222	2.0	76	219	0.15	40	±0.3	48.19
12B12S	12SB12S	12	12	167	2.0	78	214	0.15	40	±0.4	48.19
12B15S	12SB15S	12	15	133	2.0	78	214	0.15	40	±0.4	48.19
12B24S	12SB24S	12	24	83	2.0	80	208	0.15	40	±0.5	48.19
12B28S	12SB28S	12	28	71	2.0	80	208	0.15	40	±0.5	48.19
12B48S	12SB48S	12	48	42	2.0	80	208	0.15	40	±0.7	48.19
24B5S	24SB5S	24	5	300	1.5	69	91	0.15	10	±0.25	48.19
24B9S	24SB9S	24	9	222	2.0	76	110	0.15	15	±0.3	48.19
24B12S	24SB12S	24	12	167	2.0	78	107	0.15	15	±0.4	48.19
24B15S	24SB15S	24	15	133	2.0	78	107	0.15	15	±0.4	48.19
24B24S	24SB24S	24	24	104	2.5	82	127	0.15	15	±0.5	48.19
24B28S	24SB28S	24	28	89	2.5	81	129	0.15	15	±0.5	48.19
24B48S	24SB48S	24	48	52	2.5	82	127	0.15	15	±0.7	48.19
28B5S	28SB5S	28	5	300	1.5	67	80	0.15	15	±0.25	48.19
28B9S	28SB9S	28	9	222	2.0	75	95	0.15	15	±0.3	48.19
28B12S	28SB12S	28	12	167	2.0	77	93	0.15	15	±0.4	48.19
28B15S	28SB15S	28	15	133	2.0	77	93	0.15	15	±0.4	48.19
28B24S	28SB24S	28	24	104	2.5	81	110	0.15	15	±0.5	48.19
28B28S	28SB28S	28	28	89	2.5	81	110	0.15	15	±0.5	48.19
28B48S	28SB48S	28	48	52	2.5	82	109	0.15	15	±0.7	48.19
48B5S	48SB5S	48	5	300	1.5	71	44	0.20	3	±0.25	51.70
48B9S	48SB9S	48	9	222	2.0	76	55	0.20	3	±0.3	51.70
48B12S	48SB12S	48	12	167	2.0	82	51	0.20	3	±0.4	51.70
48B15S	48SB15S	48	15	133	2.0	82	51	0.20	3	±0.4	51.70
48B24S	48SB24S	48	24	104	2.5	84	62	0.20	3	±0.5	51.70
48B28S	48SB28S	48	28	89	2.5	83	63	0.20	3	±0.5	51.70

*The ripple is measured with a 22μF, 75 volt high quality tantalum capacitor which is required across the output.
Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

SINGLE & DUAL 48V-5V



SINGLE & DUAL 5V-5V



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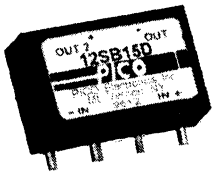
SURFACE MOUNT and PLUG-IN SERIES B/SB

TYPICAL CHARACTERISTICS: **Test conditions:** 25°C ambient and input voltage at nominal value unless otherwise specified.



LINE REGULATION: *OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT.*

Input voltage range: 5V models 4 to 6.5V DC
12V models 9 to 15V DC
24V models 17 to 28V DC
28V models 21 to 32V DC
48V models 25 to 50V DC

Output voltage tolerance at full load:
5V models ± 0.25V
9V models ± 0.3V
12V & 15V models ± 0.4V
24V & 28V models ± 0.5V
48V models ± 0.7V

Converter frequency: 20 to 40 KHz

Output temperature coefficient: 0.02%/°C

Operating temperature: −25°C to +70°C ambient. No heat sink is required.

Storage temperature: −55°C to +125°C

Isolation: 100 megohms min. @ 500V DC

Short circuit protection: Temporary

SERIES B/SB - DUAL OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF.@ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1–24
5B5D	5SB5D	5	5	150	0.75	68	441	0.15	90	±0.25	54.46
5B9D	5SB9D	5	9	83	0.75	73	411	0.15	90	±0.3	54.46
5B12D	5SB12D	5	12	62	0.75	76	394	0.15	90	±0.4	54.46
5B15D	5SB15D	5	15	50	0.75	78	384	0.15	90	±0.4	54.46
5B24D	5SB24D	5	24	31	0.75	80	375	0.15	90	±0.5	54.46
5B28D	5SB28D	5	28	27	0.75	78	385	0.15	90	±0.5	54.46
5B48D	5SB48D	5	48	15	0.75	79	380	0.15	90	±0.7	54.46
12B5D	12SB5D	12	5	150	0.75	71	176	0.15	40	±0.25	54.46
12B9D	12SB9D	12	9	111	1.0	76	219	0.15	40	±0.3	54.46
12B12D	12SB12D	12	12	83	1.0	81	205	0.15	40	±0.4	54.46
12B15D	12SB15D	12	15	66	1.0	81	205	0.15	40	±0.4	54.46
12B24D	12SB24D	12	24	41	1.0	83	200	0.15	40	±0.5	54.46
12B28D	12SB28D	12	28	35	1.0	80	208	0.15	40	±0.5	54.46
12B48D	12SB48D	12	48	21	1.0	80	208	0.15	40	±0.7	54.46
24B5D	24SB5D	24	5	150	0.75	71	88	0.15	10	±0.25	54.46
24B9D	24SB9D	24	9	111	1.0	76	110	0.15	15	±0.3	54.46
24B12D	24SB12D	24	12	83	1.0	80	104	0.15	15	±0.4	54.46
24B15D	24SB15D	24	15	66	1.0	81	102	0.15	15	±0.4	54.46
24B24D	24SB24D	24	24	52	1.25	82	127	0.15	15	±0.5	54.46
24B28D	24SB28D	24	28	45	1.25	81	129	0.15	15	±0.5	54.46
24B48D	24SB48D	24	48	26	1.25	82	127	0.15	15	±0.7	54.46
28B5D	28SB5D	28	5	150	0.75	67	80	0.15	15	±0.25	54.46
28B9D	28SB9D	28	9	111	1.0	75	95	0.15	15	±0.3	54.46
28B12D	28SB12D	28	12	83	1.0	77	93	0.15	15	±0.4	54.46
28B15D	28SB15D	28	15	66	1.0	77	93	0.15	15	±0.4	54.46
28B24D	28SB24D	28	24	52	1.25	81	110	0.15	15	±0.5	54.46
28B28D	28SB28D	28	28	45	1.25	81	110	0.15	15	±0.5	54.46
28B48D	28SB48D	28	48	26	1.25	82	109	0.15	15	±0.7	54.46
48B5D	48SB5D	48	5	150	0.75	71	44	0.20	3	±0.25	58.45
48B9D	48SB9D	48	9	111	1.0	76	55	0.20	3	±0.3	58.45
48B12D	48SB12D	48	12	83	1.0	82	51	0.20	3	±0.4	58.45
48B15D	48SB15D	48	15	67	1.0	82	51	0.20	3	±0.4	58.45
48B24D	48SB24D	48	24	52	1.25	84	62	0.20	3	±0.5	58.45
48B28D	48SB28D	48	28	45	1.25	83	63	0.20	3	±0.7	58.45

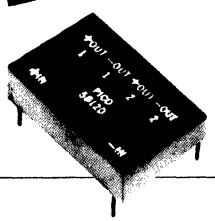
*The ripple is measured with a 22μF, 75 volt high quality tantalum capacitor which is required across each output.

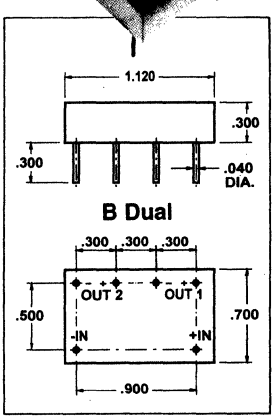
Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

Low Profile 0.3" Height! Up to 2.5 Watts

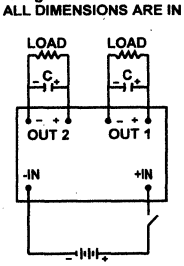
No Heat Sink or Electrical Derating Required

OPTIONS AVAILABLE
- Expanded operating temp. (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

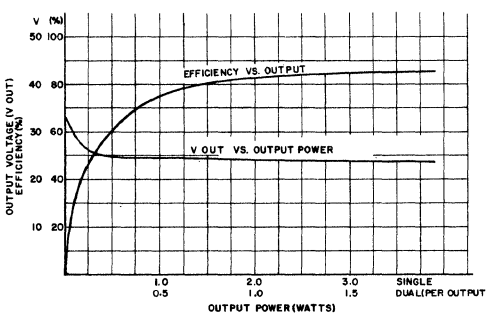




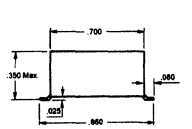
BOTTOM VIEW
Typical Weight: 8.5 Grams
NOTE: ALL DIMENSIONS ARE IN INCHES



SINGLE & DUAL 24V-24V

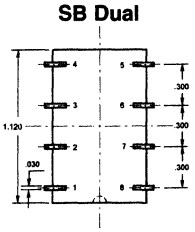


For Land Pattern Dimensions See Pg. D•2106 Fig.4



SB Dual

PIN N°	DUAL
1	- INP
2	N/C
3	N/C
4	+ INP
5	+ OUT 1
6	- OUT 1
7	+ OUT 2
8	- OUT 2



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Delivery— stock to one week

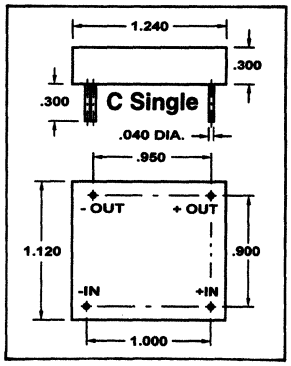
SERIES C/SC SURFACE MOUNT and PLUG-IN

Hi Reliability Miniature Isolated DC-DC Converters Up to 4 Watts

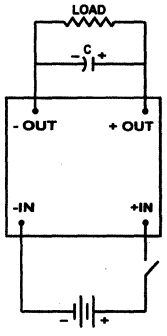
FEATURES

- Up to 4 watts output at 70°C ambient
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Miniature-size (0.3" Height)
- 5 input voltage ranges 5, 12, 24, 28 and 48V DC
- 100 megohm @ 500V DC
- Single and dual isolated outputs
- No heat sink required

This series of unregulated DC-DC converters are produced in an miniaturized encapsulated package. 68 different models are available. The units feature single and isolated dual outputs. They will operate over the temperature range of −25°C to +70°C. No heat sink is required.



BOTTOM VIEW
Typical Weight: 14.5 Grams
NOTE: ALL DIMENSIONS ARE IN INCHES

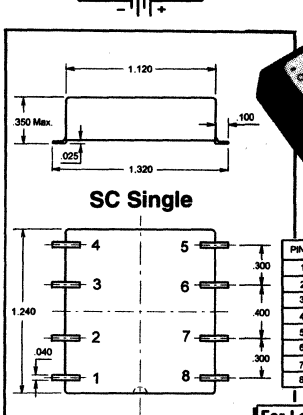


SERIES C/SC - SINGLE OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
5C5S	5SC5S	5	5	500	2.5	68	735	0.20	90	±0.25	54.46
5C9S	5SC9S	5	9	333	3.0	72	833	0.20	100	±0.3	54.46
5C12S	5SC12S	5	12	250	3.0	75	800	0.20	100	±0.4	54.46
5C15S	5SC15S	5	15	200	3.0	77	779	0.15	100	±0.4	54.46
5C24S	5SC24S	5	24	125	3.0	76	789	0.15	120	±0.5	54.46
5C28S	5SC28S	5	28	107	3.0	76	789	0.15	120	±0.5	54.46
5C48S	5SC48S	5	48	63	3.0	76	789	0.15	120	±0.7	54.46
12C5S	12SC5S	12	5	500	2.5	67	311	0.20	45	±0.25	54.46
12C9S	12SC9S	12	9	333	3.0	75	333	0.20	45	±0.3	54.46
12C12S	12SC12S	12	12	290	3.5	77	379	0.20	40	±0.4	54.46
12C15S	12SC15S	12	15	266	4.0	84	396	0.15	40	±0.4	54.46
12C24S	12SC24S	12	24	166	4.0	81	411	0.15	45	±0.5	54.46
12C28S	12SC28S	12	28	143	4.0	82	407	0.15	45	±0.5	54.46
12C48S	12SC48S	12	48	83	4.0	81	412	0.15	45	±0.7	54.46
24C5S	24SC5S	24	5	500	2.5	67	155	0.20	25	±0.25	54.46
24C9S	24SC9S	24	9	333	3.0	73	171	0.20	25	±0.3	54.46
24C12S	24SC12S	24	12	290	3.5	75	194	0.20	25	±0.4	54.46
24C15S	24SC15S	24	15	235	3.5	79	184	0.20	25	±0.4	54.46
24C24S	24SC24S	24	24	166	4.0	83	200	0.20	25	±0.5	54.46
24C28S	24SC28S	24	28	143	4.0	83	201	0.20	25	±0.5	54.46
24C48S	24SC48S	24	48	83	4.0	83	201	0.20	25	±0.7	54.46
28C5S	28SC5S	28	5	500	2.5	67	133	0.20	25	±0.25	54.46
28C9S	28SC9S	28	9	333	3.0	73	147	0.20	25	±0.3	54.46
28C12S	28SC12S	28	12	290	3.5	75	167	0.20	25	±0.4	54.46
28C15S	28SC15S	28	15	235	3.5	78	160	0.20	25	±0.4	54.46
28C24S	28SC24S	28	24	166	4.0	82	174	0.20	25	±0.5	54.46
28C28S	28SC28S	28	28	143	4.0	83	172	0.20	25	±0.5	54.46
28C48S	28SC48S	28	48	83	4.0	83	172	0.20	25	±0.7	54.46
48C5S	48SC5S	48	5	500	2.5	75	69	0.25	3	±0.25	58.45
48C9S	48SC9S	48	9	333	3.0	76	82	0.25	3	±0.3	58.45
48C12S	48SC12S	48	12	290	3.5	81	90	0.25	3	±0.4	58.45
48C15S	48SC15S	48	15	235	3.5	81	90	0.25	3	±0.4	58.45
48C24S	48SC24S	48	24	166	4.0	85	98	0.25	3	±0.5	58.45
48C28S	48SC28S	48	28	143	4.0	83	100	0.25	3	±0.5	58.45

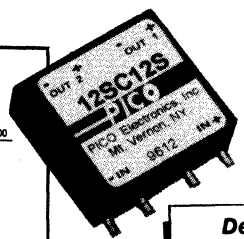
*The ripple is measured with a 22μF, 75 volt high quality tantalum capacitor which is required across the output.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York



PIN Nº	SINGLE
1	- INP
2	N/C
3	N/C
4	+ INP
5	+ OUT
6	- OUT
7	N/C
8	N/C

For Land Pattern Dimensions See Pg. D•2106 Fig.5

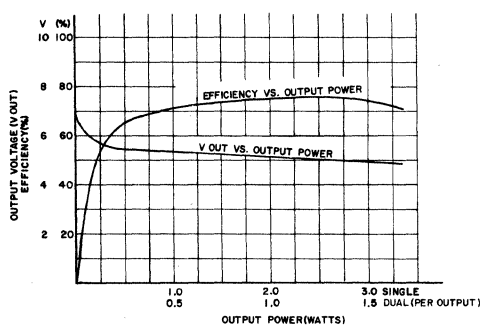


No Heat Sink or Electrical Derating Required

Delivery— stock to one week

Low Profile 0.3" Height! Up to 4 Watts

SINGLE & DUAL 48V-5V



SURFACE MOUNT and PLUG-IN SERIES C/SC

TYPICAL CHARACTERISTICS: **Test conditions:** 25°C ambient and input voltage at nominal value unless otherwise specified.

LINE REGULATION: OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT.

Input voltage range: 5V models 4 to 6.5V DC
12V models 9 to 15V DC
24V models 17 to 28V DC
28V models 21 to 31V DC
48V models 25 to 50V DC

Output voltage tolerance at full load:
5V models ± 0.25V
9V models ± 0.3V
12V & 15V models ± 0.4V
24V & 28V models ± 0.5V
48V models ± 0.7V

Converter frequency: 20 to 40 KHz

Output temperature coefficient: 0.02%/°C

Operating temperature: −25°C to +70°C ambient. No heat sink is required.

Storage temperature: −55°C to +125°C

Isolation: 100 megohms min. @ 500V DC

Short circuit protection: Temporary

Delivery— stock to one week

3.3 Volts Output Now Standard for PICO Part Numbers: 5C3.3S, 12C3.3S, 24C3.3S, 28C3.3S, 48C3.3S

OPTIONS AVAILABLE
- *Expanded operating temp. (−55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (−55°C to +125°C)*
- *HI Temp, full power burn in (100% power, 125°C case temp)*

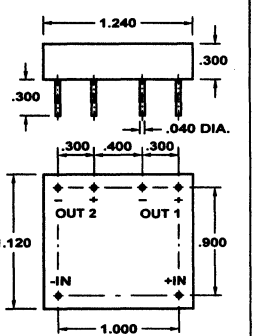
SERIES C/SC - DUAL OUTPUT

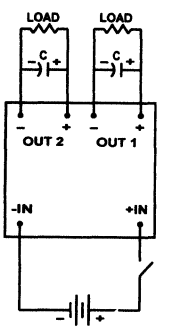
PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
5C5D	5SC5D	5	5	250	1.25	71	704	0.20	90	±0.25	62.04
5C9D	5SC9D	5	9	166	1.5	72	833	0.20	100	±0.3	62.04
5C12D	5SC12D	5	12	125	1.5	75	800	0.20	100	±0.4	62.04
5C15D	5SC15D	5	15	100	1.5	77	779	0.15	110	±0.4	62.04
5C24D	5SC24D	5	24	62	1.5	78	769	0.15	120	±0.5	62.04
5C28D	5SC28D	5	28	53	1.5	76	789	0.15	120	±0.5	62.04
5C48D	5SC48D	5	48	31	1.5	76	789	0.15	120	±0.7	62.04
12C5D	12SC5D	12	5	250	1.25	69	302	0.20	45	±0.25	62.04
12C9D	12SC9D	12	9	166	1.5	75	333	0.20	45	±0.3	62.04
12C12D	12SC12D	12	12	145	1.75	80	364	0.20	40	±0.4	62.04
12C15D	12SC15D	12	15	133	2.0	82	406	0.15	40	±0.4	62.04
12C24D	12SC24D	12	24	83	2.0	83	401	0.15	45	±0.5	62.04
12C28D	12SC28D	12	28	71	2.0	82	407	0.15	45	±0.5	62.04
12C48D	12SC48D	12	48	41	2.0	81	412	0.15	45	±0.7	62.04
24C5D	24SC5D	24	5	250	1.25	67	155	0.20	30	±0.25	62.04
24C9D	24SC9D	24	9	166	1.5	73	171	0.20	30	±0.3	62.04
24C12D	24SC12D	24	12	145	1.75	78	186	0.20	30	±0.4	62.04
24C15D	24SC15D	24	15	117	1.75	79	184	0.20	25	±0.4	62.04
24C24D	24SC24D	24	24	83	2.0	82	203	0.20	25	±0.5	62.04
24C28D	24SC28D	24	28	71	2.0	83	201	0.20	25	±0.5	62.04
24C48D	24SC48D	24	48	41	2.0	83	201	0.20	25	±0.7	62.04
28C5D	28SC5D	28	5	250	1.25	67	133	0.20	30	±0.25	62.04
28C9D	28SC9D	28	9	166	1.5	73	147	0.20	30	±0.3	62.04
28C12D	28SC12D	28	12	145	1.75	75	167	0.20	30	±0.4	62.04
28C15D	28SC15D	28	15	117	1.75	78	160	0.20	25	±0.4	62.04
28C24D	28SC24D	28	24	83	2.0	82	174	0.20	25	±0.5	62.04
28C28D	28SC28D	28	28	71	2.0	83	172	0.20	25	±0.5	62.04
28C48D	28SC48D	28	48	41	2.0	83	172	0.20	25	±0.7	62.04
48C5D	48SC5D	48	5	250	1.25	74	70	0.25	3	±0.25	66.52
48C9D	48SC9D	48	9	166	1.5	76	82	0.25	3	±0.3	66.52
48C12D	48SC12D	48	12	145	1.75	82	89	0.25	3	±0.4	66.52
48C15D	48SC15D	48	15	117	1.75	82	89	0.25	3	±0.4	66.52
48C24D	48SC24D	48	24	83	2.0	85	98	0.25	3	±0.5	66.52
48C28D	48SC28D	48	28	71	2.0	83	100	0.25	3	±0.7	66.52

*The ripple is measured with a 22μF, 75 volt high quality tantalum capacitor which is required across each output.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

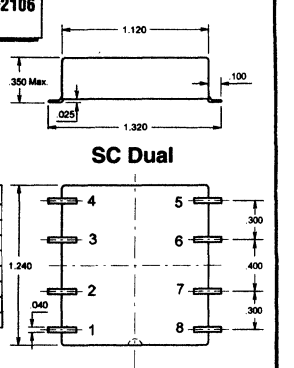
C Dual



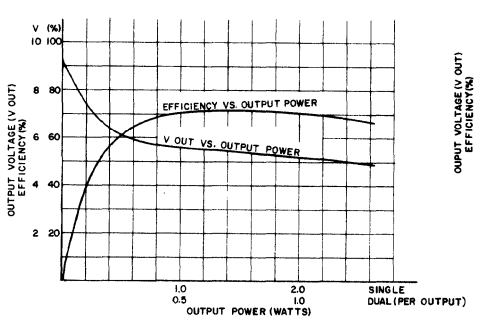


For Land Pattern Dimensions See Pg. D•2106 Fig.5

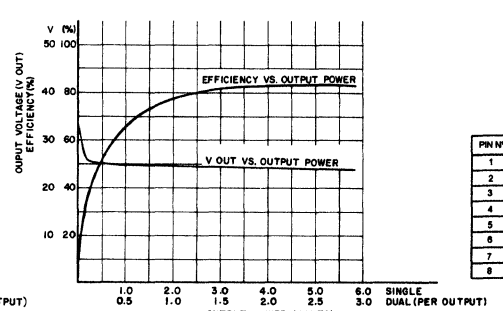
SC Dual



SINGLE & DUAL 5V-5V



SINGLE & DUAL 24V-24V



PICO Electronics, Inc.
143 Sparks Ave., Pelham, NY 10803-1837 • FAX: 914-738-8225
Internet:http://www.picoelectronics.com • E-Mail:HLSC73A@prodigy.com
For immediate engineering assistance or to place an order–Call Toll Free 800-228-9747

SERIES E/SE SURFACE MOUNT and PLUG-IN

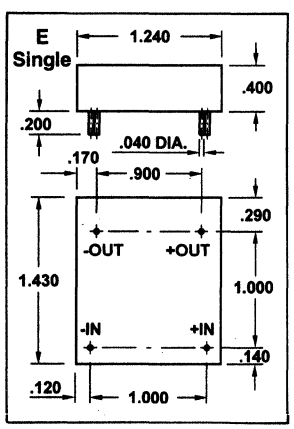
Hi Reliability Miniature Isolated DC-DC Converters Up to 7 Watts

FEATURES

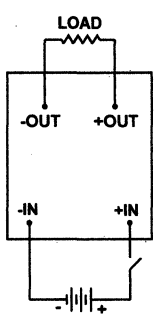
- Up to 7 watt output at 70°C ambient
- Encapsulated semiconductors, conservatively rated for maximum reliability
- 5 input voltage ranges 5, 12, 24, 28 and 48V DC
  - 100 megohm @ 500V DC isolation
  - Single and dual isolated outputs
  - No heat sink required
  - Output filter included (No external capacitors required)

This series of unregulated DC-DC converters are produced in an ultra-miniature encapsulated package. 68 different models are available. The units feature single and isolated dual outputs. They will operate over the temperature range of −25°C to +70°C. No heat sink is required.

3.3 Volts Output Now Standard for PICO Part Numbers: 5E3.3S, 12E3.3S, 24E3.3S, 28E3.3S, 48E3.3S



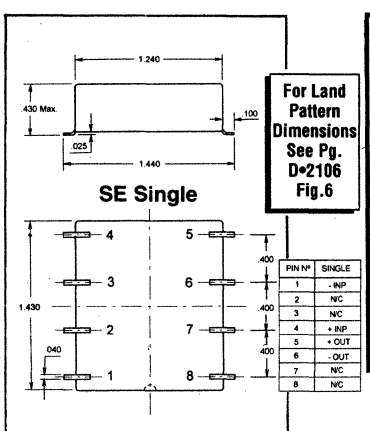
BOTTOM VIEW
Typical Weight: 25 Grams
NOTE: ALL DIMENSIONS ARE IN INCHES



SERIES E/SE - SINGLE OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
5E5S	5SE5S	5	5	800	4	68	1176	0.3	140	±0.25	89.62
5E9S	5SE9S	5	9	500	4.5	73	1233	0.3	200	±0.3	89.62
5E12S	5SE9S	5	12	375	4.5	75	1200	0.25	200	±0.4	89.62
5E15S	5SE15S	5	15	300	4.5	78	1154	0.25	190	±0.4	89.62
5E24S	5SE24S	5	24	187	4.5	80	1125	0.25	190	±0.5	89.62
5E28S	5SE28S	5	28	161	4.5	79	1139	0.25	190	±0.5	89.62
5E48S	5SE48S	5	48	93	4.5	80	1125	0.25	190	±0.7	89.62
12E5S	12SE5S	12	5	800	4.0	73	456	0.3	40	±0.25	89.62
12E9S	12SE9S	12	9	666	6.0	80	625	0.3	45	±0.3	89.62
12E12S	12SE12S	12	12	541	6.5	82	660	0.25	45	±0.4	89.62
12E15S	12SE15S	12	15	433	6.5	83	652	0.25	40	±0.4	89.62
12E24S	12SE24S	12	24	281	6.75	86	654	0.25	40	±0.5	89.62
12E28S	12SE28S	12	28	241	6.75	86	654	0.25	40	±0.5	89.62
12E48S	12SE48S	12	48	141	6.75	86	654	0.25	40	±0.7	89.62
24E5S	24SE5S	24	5	800	4.0	69	241	0.3	22	±0.25	89.62
24E9S	24SE9S	24	9	666	6.0	79	316	0.3	22	±0.3	89.62
24E12S	24SE12S	24	12	541	6.5	81	334	0.25	22	±0.4	89.62
24E15S	24SE15S	24	15	433	6.5	82	330	0.25	22	±0.4	89.62
24E24S	24SE24S	24	24	291	7.0	88	331	0.25	17	±0.5	89.62
24E28S	24SE28S	24	28	250	7.0	88	331	0.25	17	±0.5	89.62
24E48S	24SE48S	24	48	146	7.0	88	331	0.25	17	±0.7	89.62
28E5S	28SE5S	28	5	800	4.0	69	207	0.3	22	±0.25	89.62
28E9S	28SE9S	28	9	666	6.0	80	268	0.3	22	±0.3	89.62
28E12S	28SE12S	28	12	540	6.5	80	290	0.25	22	±0.4	89.62
28E15S	28SE15S	28	15	433	6.5	82	283	0.25	22	±0.4	89.62
28E24S	28SE24S	28	24	291	7.0	88	284	0.25	22	±0.5	89.62
28E28S	28SE28S	28	28	250	7.0	88	284	0.25	20	±0.5	89.62
28E48S	28SE48S	28	48	146	7.0	88	284	0.25	20	±0.7	89.62
48E5S	48SE5S	48	5	800	4.0	75	111	0.3	6	±0.25	96.45
48E9S	48SE9S	48	9	666	6.0	80	156	0.3	6	±0.3	96.45
48E12S	48SE12S	48	12	541	6.5	84	161	0.3	6	±0.4	96.45
48E15S	48SE15S	48	15	433	6.5	84	161	0.3	6	±0.4	96.45
48E24S	48SE24S	48	24	291	7.0	89	164	0.3	6	±0.5	96.45
48E28S	48SE28S	48	28	250	7.0	89	164	0.3	6	±0.5	96.45

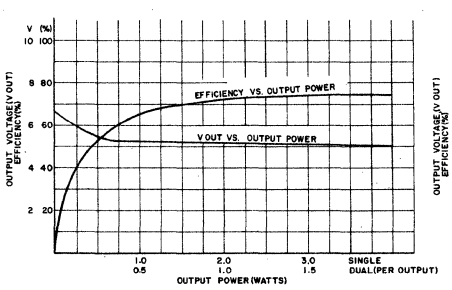
Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York



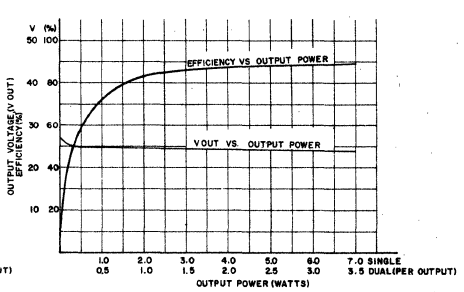
PIN N°	SINGLE
1	- INP
2	N/C
3	N/C
4	+ INP
5	+ OUT
6	- OUT
7	N/C
8	N/C

For Land Pattern Dimensions See Pg. D•2106 Fig.6

SINGLE & DUAL 48V-5V



SINGLE & DUAL 48V-24V



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SURFACE MOUNT and PLUG-IN SERIES E/SE

TYPICAL CHARACTERISTICS: **Test conditions:** 25°C ambient and input voltage at nominal value unless otherwise specified.

LINE REGULATION: OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT.

Input voltage range: 5V models 4 to 6.5V DC
12V models 9 to 15V DC
24V models 17 to 28V DC
28V models 21 to 32V DC
48V models 25 to 50V DC

Output voltage tolerance at full load:
5V models ± 0.25V
9V models ± 0.3V
12V & 15V models ± 0.4V
24V & 28V models ± 0.5V
48V models ± 0.7V

Converter frequency: 20 to 40 KHz

Output temperature coefficient: 0.02%/°C

Operating temperature: -25°C to +70°C ambient. No heat sink is required.

Storage temperature: -55°C to +125°C

Isolation: 100 megohms min. @ 500V DC

Short circuit protection: Temporary

OPTIONS AVAILABLE
- *Expanded operating temp. (-55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (-55°C to +125°C)*
- *Hi Temp, burn in*

Delivery— stock to one week

Low Profile 0.4" Height! Up to 7 Watts

NO EXTERNAL CAPACITORS REQUIRED

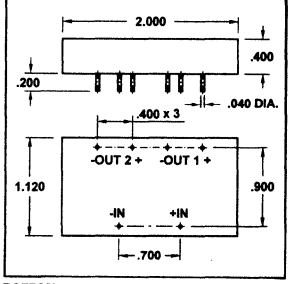
No Heat Sink or Electrical Derating Required

SERIES E/SE - DUAL OUTPUT

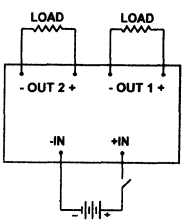
PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
5E5D	5SE5D	5	5	400	2.0	68	1176	0.3	200	±0.25	97.91
5E9D	5SE9D	5	9	250	2.25	74	1216	0.3	200	±0.3	97.91
5E12D	5SE12D	5	12	187	2.25	77	1168	0.25	220	±0.4	97.91
5E15D	5SE15D	5	15	150	2.25	79	1139	0.25	200	±0.4	97.91
5E24D	5SE24D	5	24	93	2.25	80	1125	0.25	200	±0.5	97.91
5E28D	5SE28D	5	28	80	2.25	80	1139	0.25	200	±0.5	97.91
5E48D	5SE48D	5	48	46	2.25	80	1125	0.25	200	±0.7	97.91
12E5D	12SE5D	12	5	400	2.0	75	444	0.3	40	±0.25	97.91
12E9D	12SE9D	12	9	333	3.0	80	625	0.3	40	±0.3	97.91
12E12D	12SE12D	12	12	270	3.25	83	652	0.25	40	±0.4	97.91
12E15D	12SE15D	12	15	217	3.25	85	637	0.25	40	±0.4	97.91
12E24D	12SE24D	12	24	140	3.375	86	654	0.25	40	±0.5	97.91
12E28D	12SE28D	12	28	121	3.375	86	654	0.25	40	±0.5	97.91
12E48D	12SE48D	12	48	70	3.5	88	654	0.25	40	±0.7	97.91
24E5D	24SE5D	24	5	400	2.0	72	231	0.3	22	±0.25	97.91
24E9D	24SE9D	24	9	333	3.0	79	316	0.3	22	±0.3	97.91
24E12D	24SE12D	24	12	270	3.25	82	330	0.25	22	±0.4	97.91
24E15D	24SE15D	24	15	217	3.25	85	318	0.25	22	±0.4	97.91
24E24D	24SE24D	24	24	145	3.5	88	331	0.25	18	±0.5	97.91
24E28D	24SE28D	24	28	125	3.5	88	331	0.25	18	±0.5	97.91
24E48D	24SE48D	24	48	73	3.5	88	331	0.25	18	±0.7	97.91
28E5D	28SE5D	28	5	400	2.0	69	207	0.3	25	±0.25	97.91
28E9D	28SE9D	28	9	333	3.0	80	268	0.3	25	±0.3	97.91
28E12D	28SE12D	28	12	270	3.25	80	290	0.25	22	±0.4	97.91
28E15D	28SE15D	28	15	217	3.25	82	283	0.25	22	±0.4	97.91
28E24D	28SE24D	28	24	145	3.5	88	284	0.25	20	±0.5	97.91
28E28D	28SE28D	28	28	125	3.5	88	284	0.25	20	±0.5	97.91
28E48D	28SE48D	28	48	73	3.5	88	284	0.25	20	±0.7	97.91
48E5D	48SE5D	48	5	400	2.0	74	113	0.3	6	±0.25	104.72
48E9D	48SE9D	48	9	333	3.0	80	156	0.3	6	±0.3	104.72
48E12D	48SE12D	48	12	270	3.25	85	160	0.3	6	±0.4	104.72
48E15D	48SE15D	48	15	217	3.25	85	160	0.3	6	±0.4	104.72
48E24D	48SE24D	48	24	145	3.5	88	166	0.3	6	±0.5	104.72
48E28D	48SE28D	48	28	125	3.5	89	164	0.3	6	±0.5	104.72

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

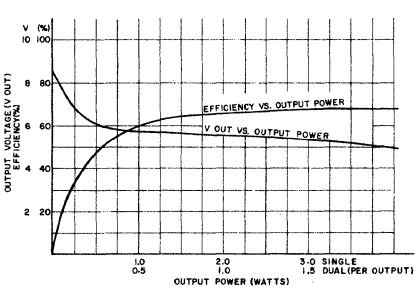
E Dual



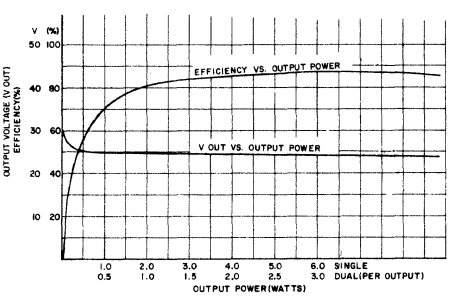
BOTTOM VIEW
Typical Weight: 33 Grams
NOTE: ALL DIMENSIONS ARE IN INCHES



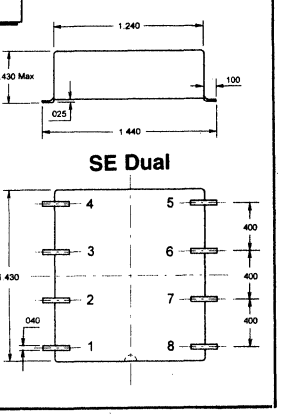
SINGLE & DUAL 5V-5V



SINGLE & DUAL 24V-24V



For Land Pattern Dimensions See Pg. D•2106 Fig.6



PIN N°	DUAL
1	- INP
2	N/C
3	N/C
4	+ INP
5	+ OUT 1
6	- OUT 1
7	+ OUT 2
8	- OUT 2

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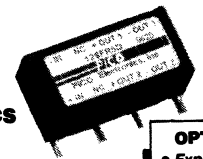
SERIES FR/SFR SURFACE MOUNT and PLUG-IN

SERIES FR Hi Reliability Isolated Regulated DC-DC Converters

No Heat Sink or Electrical Derating Required



FEATURES:

- Excellent voltage regulations ±0.1% single/±0.2% dual
- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Excellent load regulations 0.2% single/0.4% dual
- Up to 1.0 watts output power at 70°C ambient
- Low output ripple
- 100 megohm 500V DC isolation
- Single and dual isolated outputs
- Low profile, ultra-miniature size
- No output capacitor required • No heat sink required

Low Profile .5"×1"×.3" ht. up to 1 Watt

TYPICAL CHARACTERISTICS FOR ALL MODELS:

Test conditions: 25°C ambient
Output voltage tolerance: ±1% on all single/±2% dual
Line regulations: ±0.1% single/±0.2% dual (for the input voltage range of ±10%)
Load regulation: 0.2% single/0.4% dual
Converter frequency: 20-40K Hz.
Operating temperature: −25°C to +70°C ambient
Output voltage temperature coefficient: 0.01%/°C
Storage temperature: −55°C to +125°C
Isolation: 100 megohms minimum at 500 volts DC
Short circuit protection: Temporary

OPTIONS AVAILABLE

- *Expanded operating temp. (−55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (−55°C to +125°C)*
- *Hi Temp, full power burn in (100% power, 125°C case temp)*

This series of encapsulated converters come in 24 different models. The highly regulated output is isolated from the input. The units will operate over the temperature range of −25°C to +70°C. No heat sink is required. These units are excellent for applications where the input voltage varies ±10% and the output must be held to ±0.1% single/and ±0.2% dual. The output voltage is maintained to within 0.2% from no load to full load for single and 0.4% for dual.

SERIES FR/SFR - SINGLE OUTPUT

PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	*INPUT VOLTAGE (V dc)	OUTPUT VOLTAGE (V dc)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD AT NOMINAL INPUT VOLTAGE TYPICAL (%)	INPUT CURRENT @ FULL LOAD TYPICAL (mA) AT NOMINAL INPUT VOLTAGE	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (mVp-p) max.	INPUT CURRENT @ NO LOAD TYPICAL AT NOMINAL INPUT VOLTAGE (mA)	EFF. @ FULL LOAD TYPICAL (%) HIGH LINE	EFF. @ FULL LOAD TYPICAL (%) LOW LINE	PRICE 1-24
5FR5S	5SFR5S	5	5	150	0.75	37	405	75	88	34	42	72.09
5FR12S	5SFR12S	5	12	83	1.00	50	400	50	88	45	56	72.09
5FR15S	5SFR15S	5	15	67	1.00	51	392	50	86	45	57	72.09
12FR5S	12SFR5S	12	5	150	0.75	42	149	75	27	38	48	72.09
12FR12S	12SFR12S	12	12	83	1.00	53	157	50	32	47	60	72.09
12FR15S	12SFR15S	12	15	67	1.00	55	152	50	34	49	62	72.09
24FR5S	24SFR5S	24	5	150	0.75	41	76	75	16	37	47	72.09
24FR12S	24SFR12S	24	12	83	1.00	51	82	50	19	45	58	72.09
24FR15S	24SFR15S	24	15	67	1.00	54	77	50	19	47	61	72.09
28FR5S	28SFR5S	28	5	150	0.75	41	65	75	16	32	40	72.09
28FR12S	28SFR12S	28	12	83	1.00	51	70	50	19	40	50	72.09
28FR15S	28SFR15S	28	15	67	1.00	54	66	50	19	41	52	72.09

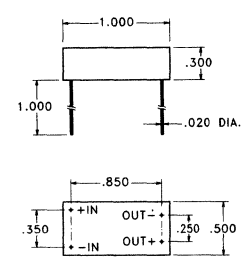
SERIES FR/SFR - DUAL OUTPUT

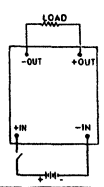
PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	*INPUT VOLTAGE (V dc)	DUAL OUTPUT VOLTAGE ISOLATED (V dc)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD AT NOMINAL INPUT VOLTAGE TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL AT NOMINAL INPUT VOLTAGE (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD PER OUTPUT (mVp-p max.)	INPUT CURRENT @ NO LOAD TYPICAL AT NOMINAL INPUT VOLTAGE (mA)	EFF. @ FULL LOAD TYPICAL (%) HIGH LINE	EFF. @ FULL LOAD TYPICAL (%) LOW LINE	PRICE 1-24
5FR5D	5SFR5D	5	5	50	0.25	37	270	50	100	34	42	96.30
5FR12D	5SFR12D	5	12	29	0.35	42	333	50	100	38	48	96.30
5FR15D	5SFR15D	5	15	23	0.35	45	311	50	120	41	52	96.30
12FR5D	12SFR5D	12	5	50	0.25	40	104	50	32	36	45	96.30
12FR12D	12SFR12D	12	12	29	0.35	49	119	50	39	44	55	96.30
12FR15D	12SFR15D	12	15	23	0.35	49	119	50	35	44	55	96.30
24FR5D	24SFR5D	24	5	50	0.25	39	53	50	18	35	44	96.30
24FR12D	24SFR12D	24	12	29	0.35	46	63	50	22	41	52	96.30
24FR15D	24SFR15D	24	15	23	0.35	47	62	50	22	42	53	96.30
28FR5D	28SFR5D	28	5	50	0.25	40	45	50	18	31	39	96.30
28FR12D	28SFR12D	28	12	29	0.35	46	54	50	22	36	45	96.30
28FR15D	28SFR15D	28	15	23	0.35	47	53	50	22	36	45	96.30

*Input voltage +/−10%

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

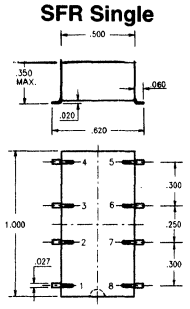
FR Single





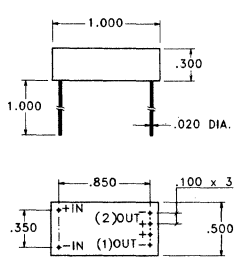
PIN N	DUAL
1	+ INP
2	N/C
3	N/C
4	− OUT
5	+OUT
6	N/C
7	N/C
8	− INP

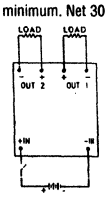
SFR Single



For Land Pattern Dimensions See Pg. D•2106 Fig.7

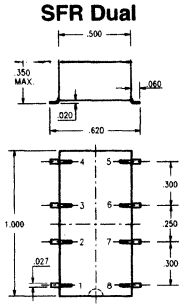
FR Dual





PIN N	DUAL
1	+ INP
2	N/C
3	+ OUT 2
4	− OUT 2
5	− OUT 1
6	+ OUT 1
7	N/C
8	− INP

SFR Dual



For Land Pattern Dimensions See Pg. D•2106 Fig.7

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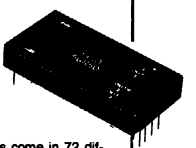
SERIES XGR/XSGR SURFACE MOUNT and PLUG-IN

Hi Reliability Isolated Regulated DC-DC Converters

OPTIONS AVAILABLE
- Expanded operating temp. (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

No Heat Sink or Electrical Derating Required

FEATURES:
- Excellent load regulation ±0.5%
- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Excellent load regulation 0.2%
- Up to 4.5 watts output power at 70°C ambient
- Low output ripple
- 100 megohm 500V DC isolation
- Single and dual isolated outputs
- No heat sink required
- Miniature size
- No output capacitor required



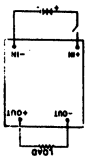
This series of encapsulated converters come in 72 different models. The units feature single and isolated dual outputs. They will operate over a temperature range of −25°C to +70°C. No heat sink is required. These units are excellent for applications where the input voltage varies ±10% and the output must be held to ±0.2%. The output voltage is maintained to within 0.5% from no load to full load.

TYPICAL CHARACTERISTICS FOR ALL MODELS:

Test conditions: 25°C ambient
Output voltage tolerance: Single units 2 or 3 V outputs 3%, single units all others 1%, dual units ±2%
Line regulation: ±0.2% (for the input voltage range of ±10%)
Load regulation: 0.5% (from full load to no load)
Converter frequency: 20-40K Hz.
Operating temperature: −25°C to +70°C ambient
Output voltage temperature coefficient: 0.005%/°C
Storage temperature: −55°C to +125°C
Isolation: 100 megohms minimum at 500 volts DC
Short circuit protection: Continuous

Low Profile 0.35" Height Up to 4.5 Watts

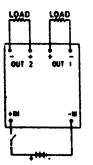
SERIES XGR/XSGR - SINGLE OUTPUT



PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	*INPUT VOLTAGE (V dc)	OUTPUT VOLTAGE (V dc)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD AT NOMINAL INPUT VOLTAGE TYPICAL (%)	INPUT CURRENT @ FULL LOAD TYPICAL (mA) AT NOMINAL INPUT VOLTAGE	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (mV p-p) max.	INPUT CURRENT @ NO LOAD TYPICAL AT NOMINAL INPUT VOLTAGE (mA)	EFF. @ FULL LOAD TYPICAL % HIGH LINE	EFF. @ FULL LOAD TYPICAL % LOW LINE	PRICE 1-24
*5XGR2S	*5XSGR2S	5	2	625	1.25	45	556	30	85	40	50	75.14
*5XGR3.3S	*5XSGR3.3S	5	3.3	530	1.75	50	700	30	85	45	55	75.14
5XGR5S	5XSGR5S	5	5	400	2	55	727	50	85	50	60	75.14
5XGR12S	5XSGR12S	5	12	250	3	60	1000	50	90	53	67	75.14
5XGR15S	5XSGR15S	5	15	200	3	61	984	50	100	55	68	75.14
*12XGR2S	*12XSGR2S	12	2	750	1.5	45	278	30	17	40	50	75.14
*12XGR3.3S	*12XSGR3.3S	12	3.3	606	2	50	333	30	14	45	55	75.14
12XGR5S	12XSGR5S	12	5	400	2	54	309	50	12	50	60	75.14
12XGR12S	12XSGR12S	12	12	333	4	64	521	50	29	58	70	75.14
12XGR15S	12XSGR15S	12	15	266	4	66	505	50	32	61	73	75.14
*24XGR2S	*24XSGR2S	24	2	750	1.5	50	125	30	17	45	56	75.14
*24XGR3.3S	*24XSGR3.3S	24	3.3	606	2	50	154	30	14	45	55	75.14
24XGR5S	24XSGR5S	24	5	500	2.5	54	193	50	8	47	61	75.14
24XGR12S	24XSGR12S	24	12	333	4	63	265	50	20	56	71	75.14
24XGR15S	24XSGR15S	24	15	266	4	66	253	50	25	58	73	75.14
*28XGR2S	*28XSGR2S	28	2	750	1.5	50	107	30	12	45	56	75.14
*28XGR3.3S	*28XSGR3.3S	28	3.3	606	2	54	132	30	15	49	59	75.14
28XGR5S	28XSGR5S	28	5	600	3	56	191	50	15	52	65	75.14
28XGR12S	28XSGR12S	28	12	375	4.5	65	247	50	17	58	74	75.14
28XGR15S	28XSGR15S	28	15	300	4.5	67	240	50	30	60	75	75.14

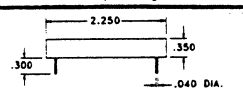
*Output Voltage Tolerance = + or − 3% max Output Voltage Tolerance = + or − 1% max Load Regulation = 0.5% Full Load to No Load Line Regulation = 0.2% for Input Voltage Range of + or −10%

SERIES XGR/XSGR - DUAL OUTPUT

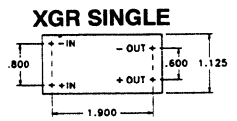


PICO PLUG-IN PART NUMBER	PICO SURFACE MOUNT PART NUMBER	*INPUT VOLTAGE (V dc)	DUAL OUTPUT VOLTAGE ISOLATED (V dc)	MAX. LOAD CURRENT. PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD AT NOMINAL INPUT VOLTAGE TYPICAL (%)	INPUT CURRENT @ FULL LOAD TYPICAL (mA) AT NOMINAL INPUT VOLTAGE	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (mV p-p) max.	INPUT CURRENT @ NO LOAD TYPICAL AT NOMINAL INPUT VOLTAGE (mA)	EFF. @ FULL LOAD TYPICAL % HIGH LINE	EFF. @ FULL LOAD TYPICAL % LOW LINE	PRICE 1-24
5XGR5D	5XSGR5D	5	5	200	1	55	727	50	85	50	60	89.62
5XGR9D	5XSGR9D	5	9	139	1.25	54	926	50	85	51	58	89.62
5XGR12D	5XSGR12D	5	12	125	1.5	60	1000	50	90	53	67	89.62
5XGR15D	5XSGR15D	5	15	100	1.5	61	984	50	100	55	68	89.62
12XGR5D	12XSGR5D	12	5	200	1	54	309	50	12	50	60	89.62
12XGR9D	12XSGR9D	12	9	167	1.5	52	481	50	30	47	57	89.62
12XGR12D	12XSGR12D	12	12	166	2	64	521	50	29	58	70	89.62
12XGR15D	12XSGR15D	12	15	133	2	66	505	50	32	61	73	89.62
24XGR5D	24XSGR5D	24	5	250	1.25	54	193	50	18	47	61	89.62
24XGR9D	24XSGR9D	24	9	167	1.5	56	223	50	18	51	62	89.62
24XGR12D	24XSGR12D	24	12	166	2	63	265	50	20	56	71	89.62
24XGR15D	24XSGR15D	24	15	133	2	66	253	50	25	58	73	89.62
28XGR5D	28XSGR5D	28	5	300	1.5	56	191	50	15	52	65	89.62
28XGR9D	28XSGR9D	28	9	194	1.75	55	227	50	15	51	62	89.62
28XGR12D	28XSGR12D	28	12	188	2.25	65	247	50	17	58	74	89.62
28XGR15D	28XSGR15D	28	15	150	2.25	67	240	50	30	60	75	89.62

*Output Voltage Tolerance = + or −2% max Load Regulation = 0.5% Full Load to No Load Line Regulation = 0.2% for Input Voltage Range of + or −10%



XGR SINGLE

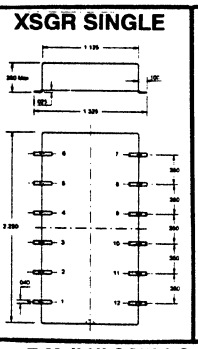


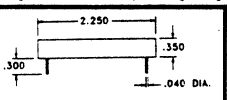
BOTTOM VIEW

For Land Pattern Dimensions See Pg. D•2106 Fig.8

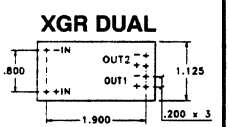
XSGR SINGLE

PIN N°	SINGLE
1	- INP
2	- INP
3	N/C
4	N/C
5	+ INP
6	+ INP
7	+ OUT
8	- OUT
9	N/C
10	N/C
11	N/C
12	N/C





XGR DUAL

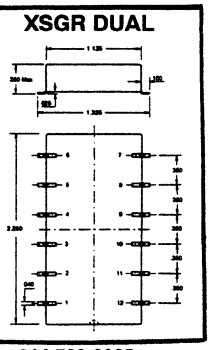


BOTTOM VIEW

For Land Pattern Dimensions See Pg. D•2106 Fig.8

XSGR DUAL

PIN N°	DUAL
1	- INP
2	- INP
3	N/C
4	N/C
5	+ INP
6	+ INP
7	+ OUT 1
8	- OUT 1
9	N/C
10	N/C
11	+ OUT 2
12	- OUT 2



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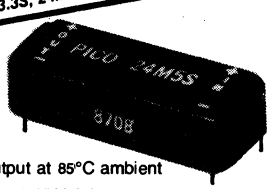
SERIES M and MV MILITARY

Hi Reliability Ultra-Miniature Isolated DC-DC Converters -55°C + 85°C

- *Diodes JAN TX*
- *Transformers manufactured to MIL-T-27 (TF5S40ZZ)*
- *Capacitors MIL-C-39003, S Level MIL-C-55681, S Level*
- *Resistors MIL-R-39008, S Level*
- *Transistors Hermetically Sealed, Screened per MIL-S-19500, Table II, JAN TXV*

Up to 500V DC Output Now Available
- All MIL components
- −55°C to +85°C ambient operating temp.
- Selected MIL-STD-883 environmental screening available

3.3 Volts Output Now Standard for PICO Part Numbers: 5M3.3S, 12M3.3S, 24M3.3S, 28M3.3S

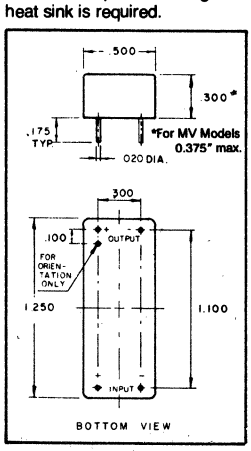


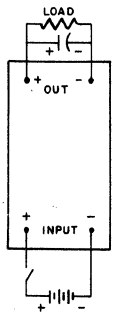
FEATURES

- Up to 1.25 watt output at 85°C ambient
- Ultra-miniature size (0.3" Height)
- 4 input voltage ranges 5, 12, 24 and 28 V DC
- 100 megohm @ 500V DC isolation
- Input/output isolation
- Single and dual output
- No heat sink required
- Shielded
- 24 Pin Dip compatible

OPTIONS AVAILABLE PER MIL-STD-883
- Stabilization Bake
- Temperature Cycle
- Hi Temperature Burn In 160 Hours at Full Power

This series of unregulated DC-DC converters are encapsulated in an ultra-miniature 5 sided shielding package. 54 different models are available. The units feature single and dual outputs. They will operate over the temperature range of −55°C to +85°C. No heat sink is required.





Delivery— stock to one week

Typical Weight: 9.0 Grams

SERIES M - SINGLE OUTPUT

PICO PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
5M5S	5	5	200	1.00	65	308	0.20	65	±0.25	315.65
5M9S	5	9	139	1.25	71	352	0.15	80	±0.3	315.65
5M12S	5	12	104	1.25	74	338	0.15	80	±0.4	315.65
5M15S	5	15	83	1.25	74	338	0.12	90	±0.4	315.65
5M24S	5	24	52	1.25	77	325	0.10	90	±0.5	315.65
5M28S	5	28	45	1.25	76	329	0.10	90	±0.5	315.65
12M5S	12	5	200	1.00	67	124	0.15	40	±0.25	315.65
12M9S	12	9	139	1.25	74	141	0.15	40	±0.3	315.65
12M12S	12	12	104	1.25	76	137	0.12	40	±0.4	315.65
12M15S	12	15	83	1.25	76	137	0.12	40	±0.4	315.65
12M24S	12	24	52	1.25	78	134	0.08	40	±0.5	315.65
12M28S	12	28	45	1.25	80	130	0.08	40	±0.5	315.65
12M48S	12	48	26	1.25	80	130	0.08	40	±0.7	315.65
24M5S	24	5	200	1.00	67	62	0.15	13	±0.25	315.65
24M9S	24	9	139	1.25	74	70	0.15	15	±0.3	315.65
24M12S	24	12	104	1.25	75	69	0.10	15	±0.4	315.65
24M15S	24	15	83	1.25	78	67	0.10	15	±0.4	315.65
24M24S	24	24	52	1.25	82	64	0.10	15	±0.5	315.65
24M28S	24	28	45	1.25	79	66	0.10	15	±0.5	315.65
24M48S	24	48	26	1.25	80	65	0.07	16	±0.7	315.65
28M5S	28	5	200	1.00	68	53	0.15	12	±0.25	315.65
28M9S	28	9	139	1.25	76	59	0.15	14	±0.3	315.65
28M12S	28	12	104	1.25	78	57	0.12	14	±0.4	315.65
28M15S	28	15	83	1.25	79	57	0.10	14	±0.4	315.65
28M24S	28	24	52	1.25	81	55	0.09	14	±0.5	315.65
28M28S	28	28	45	1.25	81	55	0.09	14	±0.5	315.65
28M48S	28	48	26	1.25	80	56	0.09	15	±0.7	315.65

*Ripple is measured with 10μF, 75 volt high quality tantalum capacitor which is required across the output.

Ordering Instructions: No minimum. Net 30 days.

SERIES "MV" HIGH VOLTAGE

PICO PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (Vp-p max)	FULL** LOAD OUTPUT VOLTAGE TOLERANCE (%)	PRICE 1-24
5MV100	5	100	12.50	1.25	78	321	0.90	±3	394.56
5MV150	5	150	8.30	1.25	76	329	0.90	±3	394.56
5MV200	5	200	6.25	1.25	75	333	0.90	±3	394.56
5MV250	5	250	5.00	1.25	75	333	0.90	±3	394.56
5MV300	5	300	4.16	1.25	70	357	1.20	±3	473.48
5MV350	5	350	3.57	1.25	70	357	1.20	±3	473.48
5MV400	5	400	3.12	1.25	70	357	1.20	±3	473.48
5MV450	5	450	2.77	1.25	70	357	1.50	±3	473.48
5MV500	5	500	2.50	1.25	70	357	1.50	±3	473.48
12MV100	12	100	12.50	1.25	80	130	0.90	±3	394.56
12MV150	12	150	8.30	1.25	79	132	0.90	±3	394.56
12MV200	12	200	6.25	1.25	78	134	0.90	±3	394.56
12MV250	12	250	5.00	1.25	75	139	0.90	±3	394.56
12MV300	12	300	4.16	1.25	75	139	1.20	±3	473.48
12MV350	12	350	3.57	1.25	75	139	1.20	±3	473.48
12MV400	12	400	3.12	1.25	75	139	1.20	±3	473.48
12MV450	12	450	2.77	1.25	75	139	1.50	±3	473.48
12MV500	12	500	2.50	1.25	75	139	1.50	±3	473.48
24MV100	24	100	12.50	1.25	76	69	0.90	±3	394.56
24MV150	24	150	8.30	1.25	73	71	0.90	±3	394.56
24MV200	24	200	6.25	1.25	73	71	0.90	±3	394.56
24MV250	24	250	5.00	1.25	70	74	0.90	±3	394.56
24MV300	24	300	4.16	1.25	73	71	1.20	±3	473.48
24MV350	24	350	3.57	1.25	73	71	1.20	±3	473.48
24MV400	24	400	3.12	1.25	73	71	1.20	±3	473.48
24MV450	24	450	2.77	1.25	73	71	1.50	±3	473.48
24MV500	24	500	2.50	1.25	73	71	1.50	±3	473.48
28MV100	28	100	12.50	1.25	75	60	0.90	±3	394.56
28MV150	28	150	8.30	1.25	76	59	0.90	±3	394.56
28MV200	28	200	6.25	1.25	75	60	0.90	±3	394.56
28MV250	28	250	5.00	1.25	70	64	0.90	±3	394.56
28MV300	28	300	4.16	1.25	73	61	1.20	±3	473.48
28MV350	28	350	3.57	1.25	73	61	1.20	±3	473.48
28MV400	28	400	3.12	1.25	73	61	1.20	±3	473.48
28MV450	28	450	2.77	1.25	73	61	1.50	±3	473.48
28MV500	28	500	2.50	1.25	73	61	1.50	±3	473.48

*Measured using 0.1μf, 1000 volt DC capacitor which is required across the output and maintain at least 10% of load at all times to prevent voltage surge. **For tighter tolerances consult factory.

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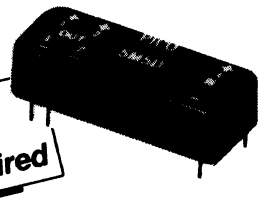
PICO's MILITARY DC-DC CONVERTERS

Low Profile 1.250" x .5" x .3" ht. up to 1.25 Watts



No Heat Sink or Electrical Derating Required

OPTIONS AVAILABLE PER MIL-STD-883
- Stabilization Bake
- Temperature Cycle
- Hi Temperature Burn In 160 Hours at Full Power

SERIES M - DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD* (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	PRICE 1-24
5M5D	5	5	100	0.5	65	308	0.20	65	±0.25	373.43
5M9D	5	9	69	0.625	71	352	0.15	80	±0.3	373.43
5M12D	5	12	52	0.625	74	338	0.15	80	±0.4	373.43
5M15D	5	15	42	0.625	74	338	0.12	90	±0.4	373.43
5M24D	5	24	26	0.625	77	325	0.10	90	±0.5	373.43
5M28D	5	28	22	0.625	76	329	0.10	90	±0.5	373.43
12M5D	12	5	100	0.5	67	124	0.15	40	±0.25	373.43
12M9D	12	9	69	0.625	74	141	0.15	40	±0.3	373.43
12M12D	12	12	52	0.625	76	137	0.12	40	±0.4	373.43
12M15D	12	15	42	0.625	76	137	0.12	40	±0.4	373.43
12M24D	12	24	26	0.625	78	134	0.08	40	±0.5	373.43
12M28D	12	28	22	0.625	80	130	0.08	40	±0.5	373.43
12M48D	12	48	13	0.625	80	130	0.05	40	±0.7	373.43
24M5D	24	5	100	0.5	67	62	0.15	13	±0.25	373.43
24M9D	24	9	69	0.625	74	70	0.15	15	±0.3	373.43
24M12D	24	12	52	0.625	75	69	0.10	15	±0.4	373.43
24M15D	24	15	42	0.625	78	67	0.10	15	±0.4	373.43
24M24D	24	24	26	0.625	82	64	0.10	15	±0.5	373.43
24M28D	24	28	22	0.625	79	66	0.10	15	±0.5	373.43
24M48D	24	48	13	0.625	80	65	0.07	16	±0.7	373.43
28M5D	28	5	100	0.5	68	53	0.15	12	±0.25	373.43
28M9D	28	9	69	0.625	76	59	0.15	14	±0.3	373.43
28M12D	28	12	52	0.625	78	57	0.12	14	±0.4	373.43
28M15D	28	15	42	0.625	79	57	0.10	14	±0.4	373.43
28M24D	28	24	26	0.625	81	55	0.09	14	±0.5	373.43
28M28D	28	28	22	0.625	81	55	0.09	14	±0.5	373.43
28M48D	28	48	13	0.625	80	56	0.09	15	±0.7	373.43

*The ripple is measured with 10μF, 75 volt high quality tantalum capacitor which is required across each output.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient and input voltage at nominal value unless otherwise specified.

LINE REGULATION: *OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT*

Input voltage range: 5V models 4 to 6.5V DC
12V models 9 to 15V DC
24V models 17 to 28V DC
28V models 21 to 32V DC

Output voltage tolerance at full load:
5V models ± 0.25V
9V models ± 0.3V
12V & 15V models ± 0.4V
24V & 28V models ± 0.5V
48V models ± 0.7V

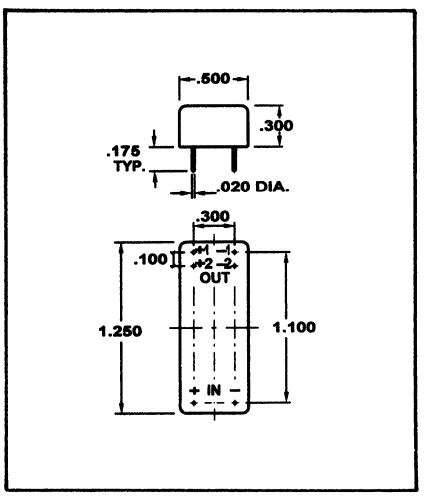
Converter frequency: 20 – 40 KHz

Output temperature coefficient:
0.05%/°C for 5V and 9V outputs.
0.02%/°C for 12, 15, 24, 28, 48V outputs.

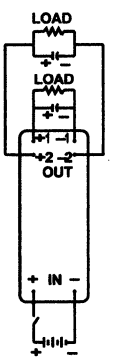
Operating temperature: –55°C to +85°C ambient.
No heat sink is required.
No electrical derating required.

Storage temperature: –55°C to +125°C

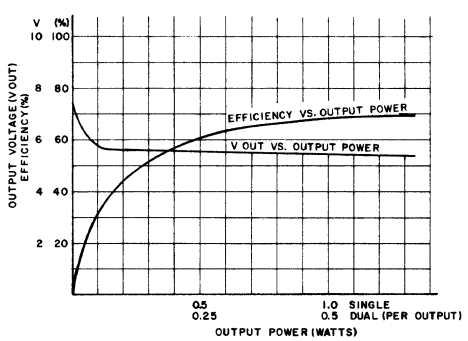
Isolation: 100 megohms min. @ 500V DC



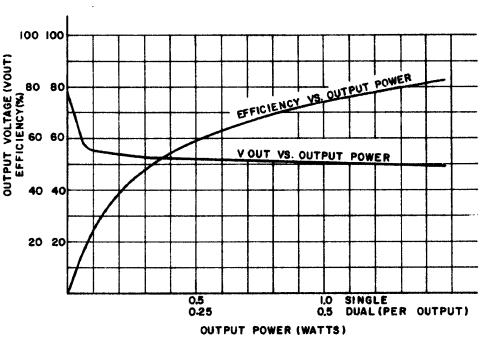
BOTTOM VIEW
Typical Weight: 9.0 Grams
NOTE: ALL DIMENSIONS ARE IN INCHES



SERIES M SINGLE & DUAL 24V-5V



SERIES M SINGLE & DUAL 28V-48V



Delivery— stock to one week

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E-Mail:HLSC73A@prodigy.com

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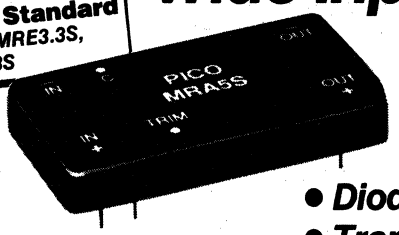
SERIES MR

Wide Input–Low Profile .300"

MILITARY DC-DC CONVERTERS

3.3 Volts Output Now Standard for PICO Part Numbers: MRE3.3S, MRF3.3S, MRA3.3S



Hi Reliability
Ultra-Miniature
Fully Regulated 2.5 Watts
Isolated DC-DC Converters
−55°C to +85°C
Wide Input Range
All Units Shielded

- *Diodes JAN TX*
- *Transformers Manufactured to MIL-T-27 (TF5S03ZZ)*
- *Capacitors MIL-C 55365/4 MIL-C 39003/03 MIL-C 20/27E MIL-C 39014/05*
- *Resistors MIL-R-39017 MIL-R-22097*
- *IC Hermetically Sealed (MIL-STD-883 Screened)*

FEATURES:

- Voltage regulation over input of

	LOW	HI
MRE	5V	15V
MRF	8V	24V
MRA	18V	36V

- Load regulation (see table for typical variation at different loads
- Line regulation = Typical values
  5-15V DC = ±1.0%
  8-24V DC = ±1.0%
  18-36V DC = ±2.0%
- High efficiency—up to 78%
- Will operate over a temperature range of −55°C to +85°C with no heat sink or electrical derating
- 6 sided shielding
- Isolation—100 megohms at 500 Volts DC
- External output trimming pin standard, +5%
- Single and dual isolated outputs
- Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (−) input, will disable the unit, allowing for remote shutdown.

SERIES MR-SINGLE OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC	MAX. LOAD CURRENT (mA)	MAX OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 25%-100% LOAD‡ (±%)*	LINE REGU-LATION (±%)*	PRICE 1-24
MRE5S	5–15	5	300	1.5	70	214	200	0.75	1.75	1.75	525.50
MRE9S	5–15	9	167	1.5	75	200	150	0.50	1.25	1.50	525.50
MRE12S	5–15	12	125	1.5	75	200	150	0.50	1.00	1.25	525.50
MRE15S	5–15	15	100	1.5	76	197	150	0.50	1.00	1.25	525.50
MRE24S	5–15	24	63	1.5	77	195	150	0.50	0.75	1.00	525.50
MRE28S	5–15	28	54	1.5	78	192	200	0.50	0.75	0.75	525.50
MRF5S	8–24	5	400	2.0	70	179	200	0.75	1.75	1.50	525.50
MRF9S	8–24	9	222	2.0	75	167	150	0.50	1.25	1.25	525.50
MRF12S	8–24	12	167	2.0	75	167	150	0.50	1.00	1.00	525.50
MRF15S	8–24	15	133	2.0	76	164	150	0.50	1.00	1.00	525.50
MRF24S	8–24	24	83	2.0	77	162	150	0.50	0.75	1.00	525.50
MRF28S	8–24	28	71	2.0	78	160	200	0.50	0.75	0.75	525.50
MRA5S	18–36	5	400	2.0	70	106	200	0.75	1.75	1.00	525.50
MRA9S	18–36	9	278	2.5	75	123	150	0.50	1.25	0.75	525.50
MRA12S	18–36	12	208	2.5	75	123	150	0.50	1.00	0.75	525.50
MRA15S	18–36	15	167	2.5	76	122	150	0.50	1.00	0.75	525.50
MRA24S	18–36	24	104	2.5	77	120	150	0.50	0.75	0.75	525.50
MRA28S	18–36	28	89	2.5	78	119	200	0.50	0.75	0.50	525.50

*Measurements taken with input voltage set at mid value. ‡ 10% minimum load required.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

For immediate engineering assistance or to place an order–
Call Toll Free 800-228-9747

PICO Electronics, Inc.

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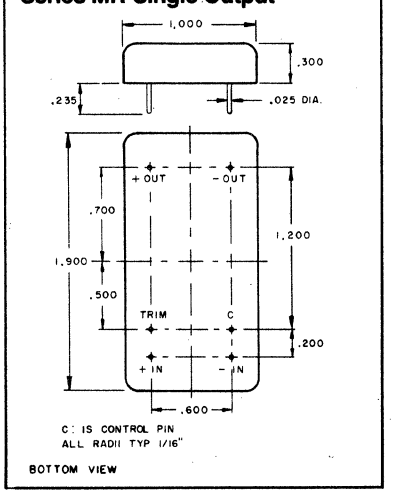
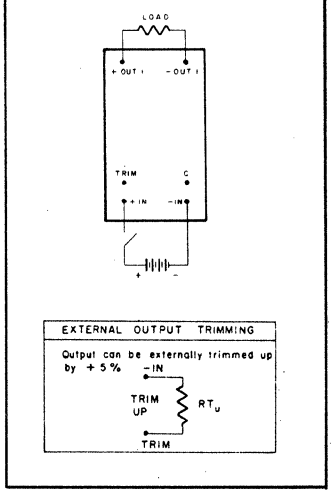
Delivery— stock to one week

Series MR-Single Output



TYPICAL WEIGHT. 26 Grams



Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.

This series of high efficiency wide input range, encapsulated regulators come in 36 different models. Manufactured using high grade military components, this unit will operate from −55°C to +85°C with no heat sink or electrical derating required. The 6 sided shielding and 32 pin DIP compatability combined with input/output isolation and the wide input range capabilities will meet your most stringent military requirements.

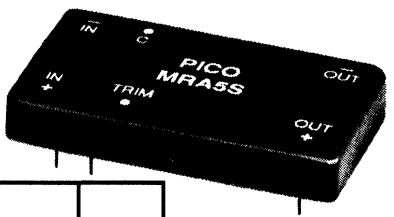
Wide Input Range Isolated – Regulated MILITARY DC-DC CONVERTERS

Low Profile .300" up to 2.5 Watts

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient
Operating temperature: −55°C to 85°C ambient
Output voltage tolerance: ±1% at typical input voltage
Output voltage temperature coefficient: 0.02%/°C
Storage temperature: −55°C to +125°C
Short circuit protection: Temporary
Operating frequency: 40 Khtz, typ.

No Heat Sink or Electrical Derating Required



(1.9" x 1.0" x .300")

SERIES MR-DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT (mA) PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 25%-100% LOAD ‡ (±%)*	LINE REGULATION (±%)*	PRICE 1-24
MRE5D	5–15	5	150	.75	70	214	200	0.75	1.75	1.75	595.00
MRE9D	5–15	9	84	.75	75	200	150	0.50	1.25	1.50	595.00
MRE12D	5–15	12	63	.75	75	200	150	0.50	1.00	1.25	595.00
MRE15D	5–15	15	50	.75	76	197	150	0.50	1.00	1.25	595.00
MRE24D	5–15	24	32	.75	77	195	150	0.50	0.75	1.00	595.00
MRE28D	5–15	28	27	.75	78	192	200	0.50	0.75	0.75	595.00
MRF5D	8–24	5	200	1.00	70	179	200	0.75	1.75	1.50	595.00
MRF9D	8–24	9	111	1.00	75	167	150	0.50	1.25	1.25	595.00
MRF12D	8–24	12	84	1.00	75	167	150	0.50	1.00	1.00	595.00
MRF15D	8–24	15	67	1.00	76	164	150	0.50	1.00	1.00	595.00
MRF24D	8–24	24	42	1.00	77	162	150	0.50	0.75	1.00	595.00
MRF28D	8–24	28	36	1.00	78	160	200	0.50	0.75	0.75	595.00
MRA5D	18–36	5	200	1.00	70	106	200	0.75	1.75	1.00	595.00
MRA9D	18–36	9	139	1.25	75	123	150	0.50	1.25	0.75	595.00
MRA12D	18–36	12	104	1.25	75	123	150	0.50	1.00	0.75	595.00
MRA15D	18–36	15	84	1.25	76	122	150	0.50	1.00	0.75	595.00
MRA24D	18–36	24	52	1.25	77	120	150	0.50	0.75	0.75	595.00
MRA28D	18–36	28	45	1.25	78	119	200	0.50	0.75	0.50	595.00

‡ 10% minimum load required.

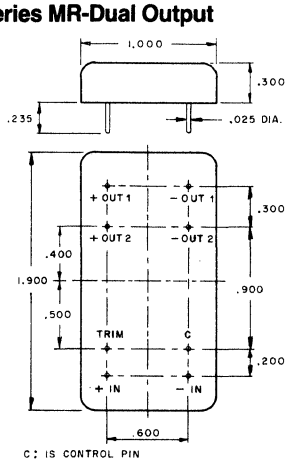
*Measurements taken with input voltage set at mid value.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

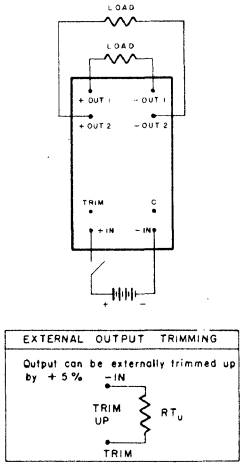
OPTIONS AVAILABLE PER MIL-STD-883
- Stabilization Bake
- Temperature Cycle
- Hi Temperature Burn In 160 Hours at Full Power

Standard Operating Temperature −55°C to +85°C

Series MR-Dual Output



TYPICAL. WEIGHT. 26 Grams



Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (−) input, will disable the unit, allowing for remote shutdown.

For immediate engineering assistance or to place an order–
Call Toll Free 800-228-9747

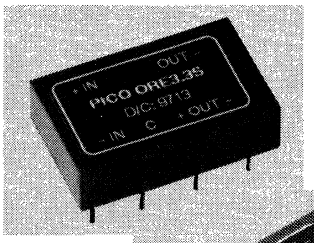
PICO Electronics, Inc.

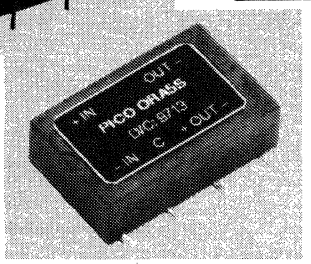
143 Sparks Ave., Pelham, NY 10803-1837
FAX 914-738-8225
Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

Delivery– stock to one week

SERIES OR/SOR
Isolated Regulated up to 2.5 Watts
DC-DC Converters
Wide Input Range
Fully Regulated
All Units Shielded

Wide Input–Low Profile .300"





NOW AVAILABLE SURFACE MOUNT

THESE UNITS AVAILABLE FOR $30 in OEM Quantity

FEATURES:
- Voltage regulation over input of

	LOW	HI
SORE/ORE	5V	15V
SORF/ORF	8V	24V
SORA/ORA	18V	6 V

- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads)
- Line regulation = Typical values
  5-15 V DC= ±1.5%
  8-24 V DC= ±1.5%
  18-36 V DC= ±1.0%
- High efficiency–up to 80%
- Will operate over a temperature range of –25°C to +70°C with no heat sink or electrical derating
- Isolation–100 megohms at 1500 volts DC
- Single and dual isolated outputs
- Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (-) input, will disable the unit, allowing for remote shut down.

OPTIONS AVAILABLE
- Expanded operating temp. (–55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (–55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

Low Profile 0.3" Height

Series OR-Single Output

PICO PART NUMBER	SURFACE MOUNT PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT (mA) PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT @ FULL LOAD TYPICAL mA*	OUT VOLT RIPPLE @ FULL LD 1-1 MHz BW MV P-P	OUTPUT TOLERANCE ±%	V LD. REG. 25%-100% LOAD† (±%)*†	LINE REGULATION (±%)*	PRICE 1-24
ORE5S	SORE5S	5-15	5	300	1.5	70	215	200	0.75	1.75	1.75	98.70
ORE9S	SORE9S	5-15	9	167	1.5	75	200	150	0.5	1.25	1.50	98.70
ORE12S	SORE12S	5-15	12	125	1.5	77	195	150	0.5	1.00	1.25	98.70
ORE15S	SORE15S	5-15	15	100	1.5	77	195	150	0.5	1.00	1.25	98.70
ORE24S	SORE24S	5-15	24	63	1.5	77	195	150	0.5	0.75	1.00	98.70
ORE28S	SORE28S	5-15	28	54	1.5	78	190	200	0.5	0.75	0.75	98.70
ORF5S	SORF5S	8-24	5	400	2.0	74	170	200	0.75	1.75	1.50	98.70
ORF9S	SORF9S	8-24	9	222	2.0	76	165	150	0.5	1.25	1.25	98.70
ORF12S	SORF12S	8-24	12	167	2.0	77	160	150	0.5	1.00	1.00	98.70
ORF15S	SORF15S	8-24	15	133	2.0	78	160	150	0.5	1.00	1.00	98.70
ORF24S	SORF24S	8-24	24	83	2.0	78	160	150	0.5	0.75	1.00	98.70
ORF28S	SORF28S	8-24	28	71	2.0	79	155	200	0.5	0.75	0.75	98.70
ORA5S	SORA5S	18-36	5	400	2.0	76	98	200	0.75	1.75	1.00	98.70
ORA9S	SORA9S	18-36	9	278	2.5	78	120	150	0.5	1.25	0.75	98.70
ORA12S	SORA12S	18-36	12	208	2.5	78	120	150	0.5	1.00	0.75	98.70
ORA15S	SORA15S	18-36	15	167	2.5	79	115	150	0.5	1.00	0.75	98.70
ORA24S	SORA24S	18-36	24	104	2.5	80	115	150	0.5	0.75	0.75	98.70
ORA28S	SORA28S	18-36	28	89	2.5	80	115	200	0.5	0.75	0.50	98.70

*Measurements taken with input voltage at mid value.
†10% minimum load required.

NOTE: The ripple is measured across with a 0.1 μf ceramic capacitor.
Operating frequency: 100 KHz fized.
Operating temperature: –25°C to +70°C ambient.
Isolation input to output: 1500VDC

No Heat Sink or Electrical Derating Required

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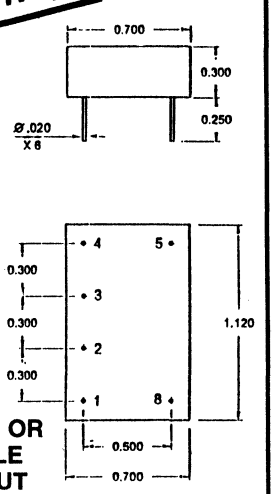
FAX 914-738-8225

Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

Delivery– stock to one week

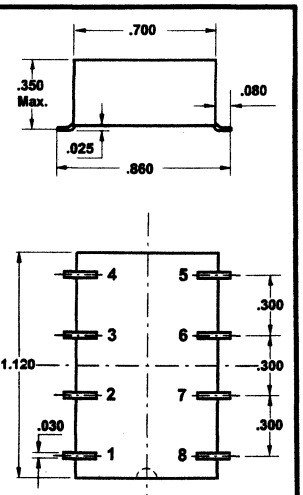
Pin N	SINGLE
1	- INP
2	CTRL
3	+ OUT
4	- OUT
5	N/C
6	
7	
8	+ INP



SERIES OR SINGLE OUTPUT

SERIES SOR SINGLE OUTPUT

Pin #	SINGLE
1	- INP
2	CTRL
3	+ OUT
4	- OUT
5	- OUT
6	N/C
7	N/C
8	+ INP



For Land Pattern Dimensions See Pg. D•2106 Fig.4

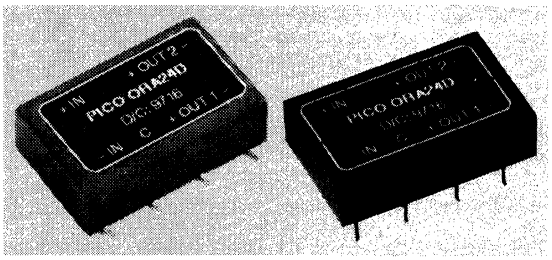
This series of high efficiency, wide input range, encapsulated regulators come in 36 different models. These units feature a 500 VOLT DC input to output isolation in both single and dual output models. The OR Series will operate over a temperature range of –25°C TO +70°C with no heat sink or electrical derating. These units are excellent for applications where input voltage varies dramatically, yet a high efficiency and output voltage regulation must be maintained.

Wide Input Range Isolated – Regulated

DC-DC CONVERTERS

Low Profile .300" up to 2.5 Watts

NOW AVAILABLE SURFACE MOUNT



TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Operating temperature: –25° C to +70° C ambient
Output voltage tolerance: ± 1% at typical input voltage
Output voltage temperature coefficient: 0.02%°C
Storage temperature: –55°C to 125°C
Short circuit protection: Temporary
Operating frequency: 100 Khtz, typ.

Series OR-Dual Output

PICO PART NUMBER	SURFACE MOUNT PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT (mA) PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT @ FULL LOAD TYPICAL mA*	OUT VOLT RIPPLE @ FULL LD 1-1 MHz BW MV P-P	OUTPUT TOLERANCE ±%	V LD. REG. 25%-100% LOAD† (±%)*†	LINE REGULATION (±%)*	PRICE 1-24
ORE5D	SORE5D	5-15	5	150	.75	70	215	200	0.75	1.75	1.75	121.15
ORE9D	SORE9D	5-15	9	84	.75	75	200	150	0.5	1.25	1.50	121.15
ORE12D	SORE12D	5-15	12	63	.75	77	195	150	0.5	1.00	1.25	121.15
ORE15D	SORE15D	5-15	15	50	.75	77	195	150	0.5	1.00	1.25	121.15
ORE24D	SORE24D	5-15	24	32	.75	77	195	150	0.5	0.75	1.00	121.15
ORE28D	SORE28D	5-15	28	27	.75	78	190	200	0.5	0.75	0.75	121.15
ORF5D	SORF5D	8-24	5	200	1.00	74	170	200	0.75	1.75	1.50	121.15
ORF9S	SORF9S	8-24	9	111	1.00	76	165	150	0.5	1.25	1.25	121.15
ORF12D	SORF12D	8-24	12	84	1.00	77	160	150	0.5	1.00	1.00	121.15
ORF15D	SORF15D	8-24	15	67	1.00	78	160	150	0.5	1.00	1.00	121.15
ORF24D	SORF24D	8-24	24	42	1.00	78	160	150	0.5	0.75	1.00	121.15
ORF28D	SORF28D	8-24	28	36	1.00	79	155	200	0.5	0.75	0.75	121.15
ORA5D	SORA5D	18-36	5	200	1.00	76	98	200	0.75	1.75	1.00	121.15
ORA9D	SORA9D	18-36	9	139	1.25	78	120	150	0.5	1.25	0.75	121.15
ORA12D	SORA12D	18-36	12	104	1.25	78	120	150	0.5	1.00	0.75	121.15
ORA15D	SORA15D	18-36	15	84	1.25	79	115	150	0.5	1.00	0.75	121.15
ORA24D	SORA24D	18-36	24	52	1.25	80	115	150	0.5	0.75	0.75	121.15
ORA28D	SORA28D	18-36	28	45	1.25	80	115	200	0.5	0.75	0.50	121.15

*Measurements taken with input voltage at mid value.
†10% minimum load required.

NOTE: The ripple is measured across with a 0.1 μf ceramic capacitor.
Operating frequency: 100 KHz fized.
Operating temperature: –25°C to +70°C ambient.
Isolation input to output: 1500VDC

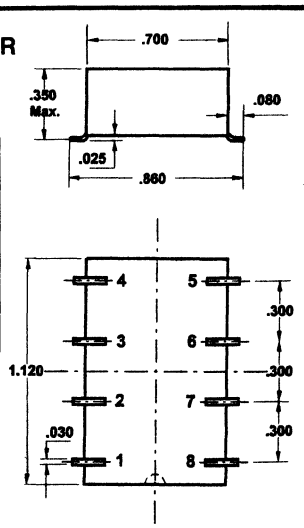
No Heat Sink or Electrical Derating Required

OPTIONS AVAILABLE
- Expended operating temp. (–55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (–55°C to +125°C)
- HI Temp, full power burn in (100% power, 125°C case temp)

Low Profile 0.3" Height

SERIES SOR DUAL OUTPUT

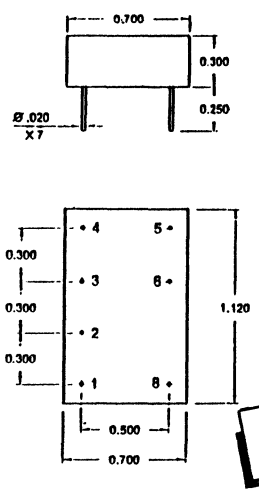
Pin #	SINGLE
1	- INP
2	CTRL
3	+ OUT 1
4	- OUT 1
5	- OUT 2
6	+ OUT 2
7	N/C
8	+ INP



For Land Pattern Dimensions See Pg. D•2106 Fig.4

SERIES OR DUAL OUTPUT

Pin N°	DUAL
1	- INP
2	CTRL
3	+ OUT 1
4	- OUT 1
5	- OUT 2
6	+ OUT 2
7	I
8	+ INP



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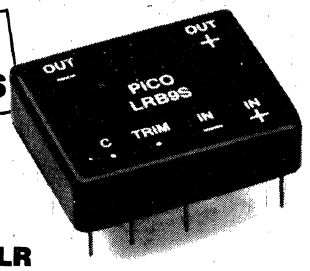
Delivery— stock to one week

SERIES LR
Isolated Regulated up to 5 Watt DC-DC Converters
Wide Input Range/up to 3.33:1
Fully Regulated
All Units Shielded

New 100 VDC Output Models



NOW 2 Volts and 3.3 Volts DC OUTPUT AVAILABLE

FEATURES:

- Voltage regulation over input of LOW HI
  LRE 5V 15V
  LRF 8V 24V
  LRA 18V 36V
  LRB 36V 60V
  LRC 18V 60V
- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads)
- Line regulation = Typical values
  5-15 V DC = ± 1.5%
  8-24 V DC = ± 1.5%
  18-36 V DC = ± 1.0%
  36-60 V DC = ± 1.0%
  18-60 V DC = ± 1.5%
- High efficiency—up to 80%
- Will operate over a temperature range of −25°C to +70°C with no heat sink or electrical derating
- 6 sided shielding
- Isolation—100 megohms at 500 volts DC
- External output trimming pin standard, +5%
- Single and dual isolated outputs
- Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.

OPTIONS AVAILABLE
- Expanded operating temp. (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

Low Profile Less Than 0.5" ht.
For 0.3" ht. see pages D•2058-2059

SERIES LR SINGLE OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYUPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	VLD. REG. 25%-100% LOAD‡ (±%)*	LINE REGU-LATION (±%)*	PRICE 1-24
LRE2S	5–15	2	1000	2	68	294	150	1.5	3.5	3.5	117.70
LRE3.3S	5–15	3.3	910	3	75	400	200	1	3	2.75	117.70
LRE5S	5–15	5	600	4	78	385	150	0.75	1.50	2.00	117.70
LRE9S	5–15	9	444	4	78	515	125	0.50	1.25	1.50	117.70
LRE12S	5–15	12	333	4	79	605	125	0.50	1.25	1.25	117.70
LRE15S	5–15	15	207	4	79	605	125	0.50	1.25	1.25	117.70
LRE24S	5–15	24	167	4	80	600	125	0.50	1.00	1.25	117.70
LRE28S	5–15	28	143	4	80	600	125	0.50	1.00	1.00	117.70
LRE48S	5–15	48	83	4	80	600	175	0.50	1.00	1.00	117.70
LRE100S	5–15	100	40	4	80	600	200	0.50	1.00	1.00	147.13
LRF2S	8–24	2	1500	3	69	272	150	1.5	3.5	3	117.70
LRF3.3S	8–24	3.3	1212	4	75	333	200	1	3	2.75	117.70
LRF5S	8–24	5	1000	5	78	400	150	0.75	1.50	2.00	117.70
LRF9S	8–24	9	556	5	78	400	125	0.50	1.25	1.50	117.70
LRF12S	8–24	12	417	5	79	395	125	0.50	1.25	1.25	117.70
LRF15S	8–24	15	333	5	79	395	125	0.50	1.25	1.25	117.70
LRF24S	8–24	24	208	5	80	390	125	0.50	1.00	1.25	117.70
LRF28S	8–24	28	179	5	80	390	125	0.50	1.00	1.00	117.70
LRF48S	8–24	48	104	5	80	390	175	0.50	1.00	1.00	117.70
LRF100	8–24	100	50	5	80	390	200	0.50	1.00	1.00	147.13
LRA2S	18–36	2	1500	3	69	161	150	1.5	4	2	117.70
LRA3.3S	18–36	3.3	1212	4	76	195	150	1	3	1.5	117.70
LRA5S	18–36	5	1000	5	76	245	100	0.75	2.00	0.75	117.70
LRA9S	18–36	9	556	5	76	245	100	0.50	2.00	0.50	117.70
LRA12S	18–36	12	417	5	77	240	100	0.50	2.00	0.50	117.70
LRA15S	18–36	15	333	5	79	235	100	0.50	1.50	0.50	117.70
LRA24S	18–36	24	208	5	80	230	100	0.50	1.50	0.25	117.70
LRA28S	18–36	28	179	5	80	230	100	0.50	1.50	0.25	117.70
LRA48S	18–36	48	104	5	80	230	150	0.50	1.00	0.25	117.70
LRA100S	18–36	100	50	5	80	230	250	0.50	1.00	0.50	147.13
LRB2S	36–60	2	1500	3	67	93	150	1.5	4	2	139.10
LRB3.3S	36–60	3.3	1212	4	74	113	150	1	3	1.5	139.10
LRB5S	36–60	5	1000	5	74	140	100	0.75	1.25	0.50	139.10
LRB9S	36–60	9	556	5	74	140	100	0.50	1.00	0.25	139.10
LRB12S	36–60	12	417	5	74	140	100	0.50	1.00	0.25	139.10
LRB15S	36–60	15	333	5	76	135	100	0.50	1.00	0.25	139.10
LRB24S	36–60	24	208	5	76	135	100	0.50	0.75	0.25	139.10
LRB28S	36–60	28	179	5	76	135	100	0.50	0.75	0.25	139.10
LRB48S	36–60	48	104	5	76	135	150	0.50	0.75	0.25	139.10
LRB100S	36–60	100	50	5	78	135	250	0.50	1.00	0.50	173.88
LRC2S	18–60	2	1500	3	67	115	150	1.5	4	2.5	149.80
LRC3.3S	18–60	3.3	1212	4	74	139	150	1	3	1.75	149.80
LRC5S	18–60	5	1000	5	76	170	100	0.75	2.00	1.25	149.80
LRC9S	18–60	9	556	5	76	170	100	0.50	1.00	0.75	149.80
LRC12S	18–60	12	417	5	76	170	100	0.50	1.00	0.75	149.80
LRC15S	18–60	15	333	5	77	185	100	0.50	1.00	0.75	149.80
LRC24S	18–60	24	208	5	78	185	100	0.50	0.75	0.50	149.80
LRC28S	18–60	28	179	5	78	185	100	0.50	0.75	0.50	149.80
LRC48S	18–60	48	104	5	78	185	150	0.50	0.75	0.50	149.80
LRC100S	18–60	100	50	5	78	185	250	0.50	1.00	0.50	187.50

*Measurements taken with input voltage set at mid value. ‡10% minimum load required.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.

For immediate engineering assistance or to place an order–
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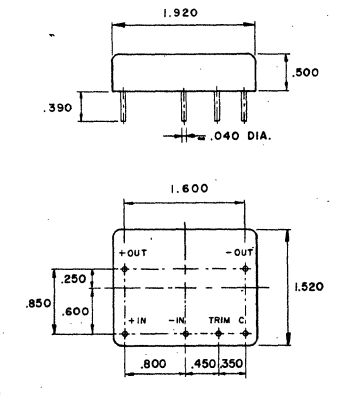
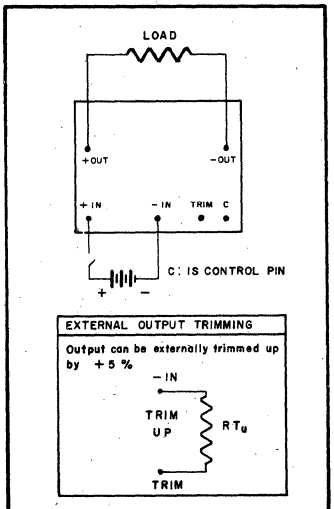
Delivery— stock to one week

Series LR-Single Output

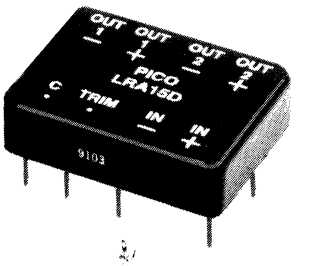




Typical Weight: 65 Grams

This series of high efficiency, wide input range, encapsulated regulators come in 75 different models. These units feature a 500 VOLT DC input to output isolation in both single and dual output models. The LR Series will operate over a temperature range of −25°C TO +70°C with no heat sink or electrical derating. These units are excellent for applications where input voltage varies dramatically, yet a high efficiency and output voltage regulation must be maintained.

TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Operating temperature: −25° C to +70° C ambient
Output voltage tolerance: ± 1% at typical input voltage
Output voltage temperature coefficient: 0.02%°C
Storage temperature: −55°C to 125°C
Short circuit protection: Temporary
Operating frequency: 40 Khtz, typ.



SERIES LR - DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT (mA) PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V L.D. REG. 25%-100% LOAD‡ (±%)*	LINE REGU-LATION (±%)*	PRICE 1-24
LRE5D	5–15	5	300	1.5	78	385	150	0.75	1.50	2.00	144.45
LRE9D	5–15	9	222	2.0	78	515	125	0.50	1.25	1.50	144.45
LRE12D	5–15	12	167	2.0	79	505	125	0.50	1.25	1.25	144.45
LRE15D	5–15	15	134	2.0	79	505	125	0.50	1.25	1.25	144.45
LRE24D	5–15	24	84	2.0	80	500	125	0.50	1.00	1.25	144.45
LRE28D	5–15	28	72	2.0	80	500	125	0.50	1.00	1.00	144.45
LRE48D	5–15	48	42	2.0	80	500	175	0.50	1.00	1.00	144.45
LRF5D	8–24	5	500	2.5	78	400	150	0.75	1.50	2.00	144.45
LRF9D	8–24	9	278	2.5	78	400	125	0.50	1.25	1.50	144.45
LRF12D	8–24	12	208	2.5	79	395	125	0.50	1.25	1.25	144.45
LRF15D	8–24	15	167	2.5	79	395	125	0.50	1.25	1.25	144.45
LRF24D	8–24	24	104	2.5	80	390	125	0.50	1.00	1.25	144.45
LRF28D	8–24	28	89	2.5	80	390	125	0.50	1.00	1.00	144.45
LRF48D	8–24	48	52	2.5	80	390	175	0.50	1.00	1.00	144.45
LRA5D	18–36	5	500	2.5	76	245	100	0.75	2.00	0.75	144.45
LRA9D	18–36	9	278	2.5	76	245	100	0.50	2.00	0.50	144.45
LRA12D	18–36	12	208	2.5	77	240	100	0.50	2.00	0.50	144.45
LRA15D	18–36	15	167	2.5	79	235	100	0.50	1.50	0.50	144.45
LRA24D	18–36	24	104	2.5	80	230	100	0.50	1.50	0.25	144.45
LRA28D	18–36	28	89	2.5	80	230	100	0.50	1.50	0.25	144.45
LRA48D	18–36	48	52	2.5	80	230	150	0.50	1.0	0.25	144.45
LRB5D	36–60	5	500	2.5	74	140	100	0.75	1.25	0.50	165.85
LRB9D	36–60	9	278	2.5	74	140	100	0.50	1.00	0.25	165.85
LRB12D	36–60	12	208	2.5	74	140	100	0.50	1.00	0.25	165.85
LRB15D	36–60	15	167	2.5	76	135	100	0.50	1.00	0.25	165.85
LRB24D	36–60	24	104	2.5	76	135	100	0.50	0.75	0.25	165.85
LRB28D	36–60	28	89	2.5	76	135	100	0.50	0.75	0.25	165.85
LRB48D	36–60	48	52	2.5	76	135	150	0.50	0.75	0.25	165.85
LRC5D	18–60	5	500	2.5	75	170	100	0.75	2.00	1.25	176.55
LRC9D	18–60	9	278	2.5	75	170	100	0.50	1.00	0.75	176.55
LRC12D	18–60	12	208	2.5	75	170	100	0.50	1.00	0.75	176.55
LRC15D	18–60	15	167	2.5	77	165	100	0.50	1.00	0.75	176.55
LRC24D	18–60	24	104	2.5	78	165	100	0.50	0.75	0.50	176.55
LRC28D	18–60	28	89	2.5	78	165	100	0.50	0.75	0.50	176.55
LRC48D	18–60	48	52	2.5	78	165	150	0.50	0.75	0.50	176.55

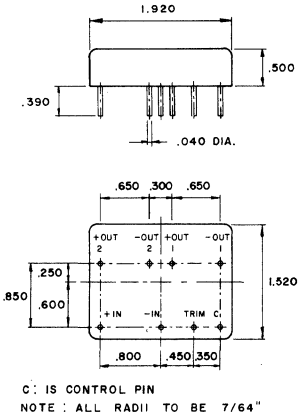
*Measurements taken with input voltage set at mid value.
‡ 10% minimum load required.
Ordering Instructions: No minimum.
Net 30 days F.O.B. Pelham, New York

No Heat Sink or Electrical Derating Required

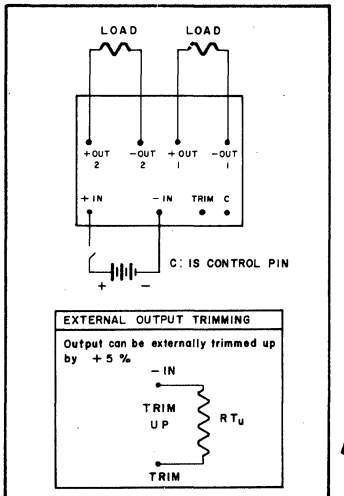
OPTIONS AVAILABLE
- Expanded operating temp. (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

Low Profile Less Than 0.5" ht.
For 0.3" ht. see pages D•2058-2059

Series LR-Dual Output



Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (−) input, will disable the unit, allowing for remote shutdown.



Typical Weight: 65 Grams

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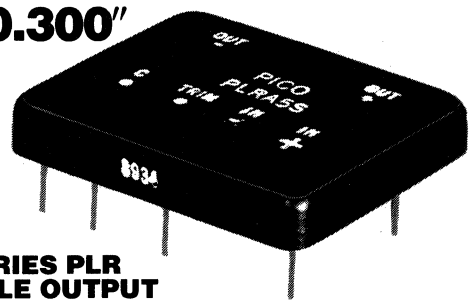
Delivery— stock to one week

SERIES PLR- Lowest Profile Series 0.300"

Isolated Regulated up to 5 Watt DC-DC Converters
Wide Input Range/up to 3.33:1
Fully Regulated
All Units Shielded



3.3 Volts Output Now Standard
for Part Numbers: PLRE3.3S, PLRF3.3S, PLRA3.3S, PLRB3.3S, PLRC3.3S

New 100 VDC Output Models

FEATURES:

- Voltage regulation over input of

	LOW	HI
PLRE	5V	15V
PLRF	8V	24V
PLRA	18V	36V
PLRB	36V	60V
PLRC	18V	60V

- .300" Height
- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads)
- Line regulation = Typical values
  - 5–15 V DC = ± 1.5%
  - 8–24 V DC = ± 1.5%
  - 18–36 V DC = ± 1.0%
  - 36–60 V DC = ± 1.0%
  - 18–60 V DC = ± 1.5%
- High efficiency—up to 80%
- Will operate over a temperature range of –25°C to +70°C with no heat sink or electrical derating
- 6 sided shielding
- Isolation—100 megohms at 500 volts DC
- External output trimming pin standard, +5%
- Single and dual isolated outputs
- Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.

OPTIONS AVAILABLE
- *Expanded operating temp (–55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (–55°C to +125°C)*
- *Hi Temp, full power burn in (100% power, 125°C case temp)*

Low Profile 0.3" Height

SERIES PLR SINGLE OUTPUT

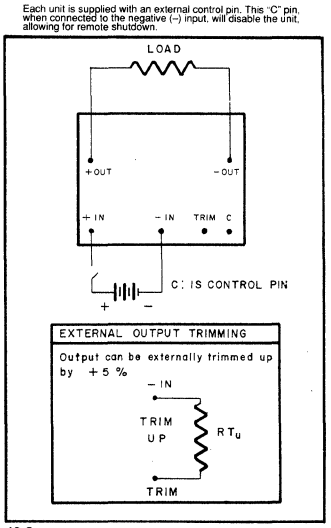
PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	VLD. REG. 25%-100% LOAD‡ (±%)*	LINE REGU-LATION (±%)*	PRICE 1-24
PLRE5S	5–15	5	600	3	78	385	175	0.75	1.75	2.00	176.55
PLRE9S	5–15	9	444	4	78	515	125	0.50	1.50	1.50	176.55
PLRE12S	5–15	12	333	4	79	505	125	0.50	1.25	1.25	176.55
PLRE15S	5–15	15	267	4	79	505	125	0.50	1.25	1.25	176.55
PLRE24S	5–15	24	167	4	80	500	125	0.50	1.00	1.25	176.55
PLRE28S	5–15	28	143	4	80	500	125	0.50	1.00	1.00	176.55
PLRE48S	5–15	48	83	4	80	500	300	0.50	1.00	1.00	176.55
PLRE100S	5–15	100	40	4	80	500	300	0.50	1.0	1.0	220.69
PLRF5S	8–24	5	1000	5	78	400	150	0.75	1.75	2.00	176.55
PLRF9S	8–24	9	556	5	78	400	125	0.50	1.50	1.50	176.55
PLRF12S	8–24	12	417	5	79	395	125	0.50	1.25	1.25	176.55
PLRF15S	8–24	15	333	5	79	395	125	0.50	1.25	1.25	176.55
PLRF24S	8–24	24	208	5	80	390	125	0.50	1.00	1.25	176.55
PLRF28S	8–24	28	179	5	80	390	125	0.50	1.00	1.00	176.55
PLRF48S	8–24	48	104	5	80	390	250	0.50	1.00	1.00	176.55
PLRF100S	8–24	100	50	5	80	390	300	0.50	1.0	1.0	220.69
PLRA5S	18–36	5	1000	5	76	245	100	0.75	2.00	1.00	176.55
PLRA9S	18–36	9	556	5	76	245	100	0.50	2.00	0.50	176.55
PLRA12S	18–36	12	417	5	77	240	100	0.50	2.00	0.50	176.55
PLRA15S	18–36	15	333	5	79	235	100	0.50	1.50	0.50	176.55
PLRA24S	18–36	24	208	5	80	230	100	0.50	1.50	0.50	176.55
PLRA28S	18–36	28	179	5	80	230	100	0.50	1.50	0.50	176.55
PLRA48S	18–36	48	104	5	80	230	250	0.50	1.00	0.50	176.55
PLRA100S	18-36	100	50	5	80	230	300	0.50	1.0	1.0	220.69
PLRB5S	36–60	5	1000	5	74	140	100	0.75	1.75	0.50	208.65
PLRB9S	36–60	9	556	5	74	140	100	0.50	1.50	0.50	208.65
PLRB12S	36–60	12	417	5	74	140	100	0.50	1.00	0.25	208.65
PLRB15S	36–60	15	333	5	76	135	100	0.50	1.00	0.25	208.65
PLRB24S	36–60	24	208	5	76	135	100	0.50	0.75	0.25	208.65
PLRB28S	36–60	28	179	5	76	135	100	0.50	0.75	0.25	208.65
PLRB48S	36–60	48	104	5	76	135	200	0.50	0.75	0.25	208.65
PLRB100S	36-60	100	50	5	76	135	300	0.50	1.0	1.0	260.81
PLRC5S	18–60	5	1000	5	75	170	100	0.75	2.00	1.50	224.70
PLRC9S	18–60	9	556	5	75	170	100	0.50	1.50	1.00	224.70
PLRC12S	18–60	12	417	5	75	170	100	0.50	1.00	0.75	224.70
PLRC15S	18–60	15	333	5	77	165	100	0.50	1.00	0.75	224.70
PLRC24S	18–60	24	208	5	78	165	100	0.50	0.75	0.75	224.70
PLRC28S	18–60	28	179	5	78	165	100	0.50	0.75	0.75	224.70
PLRC48S	18–60	48	104	5	78	165	225	0.50	0.75	0.75	224.70
PLRC100S	18-60	100	50	5	78	165	300	0.50	1.0	1.0	280.88

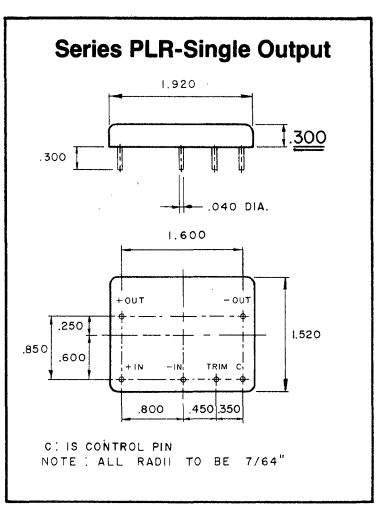
Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

‡ 10% minimum load required.

** Measurements taken with input voltage set at mid value.*

Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.





Typical Weight: 40 Grams

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Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

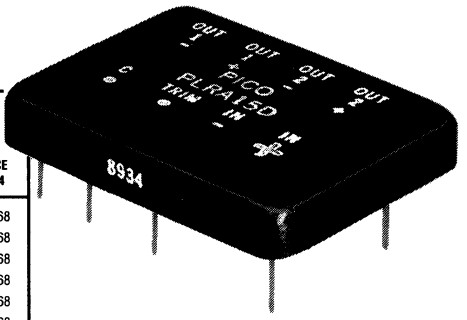
Delivery– stock to one week

This series of Low Profile 0.300, high efficiency, wide input range, encapsulated regulators come in 75 different models. These units feature a 500 VOLT DC input to output isolation in both single and dual output models. The PLR Series will operate over a temperature range of –25°C TO +70°C with no heat sink or electrical derating. These units are excellent for applications where input voltage varies dramatically, yet a high efficiency and output voltage regulation must be maintained.

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient
Operating temperature: –25°C to +70°C ambient
Output voltage tolerance: ±1% at typical input voltage
Output voltage temperature coefficient: 0.02%/°C
Storage temperature: –55°C to +125°C
Short circuit protection: Temporary
Operating frequency: 40 Khtz, typ.

Lowest Profile Series 0.300"



SERIES PLR - DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT (mA) PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF.@ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 25%-100% LOAD‡ (±%)*	LINE REGULATION (±%)*	PRICE 1-24
PLRE5D	5–15	5	300	1.5	78	385	175	0.75	1.75	2.00	216.68
PLRE9D	5–15	9	222	2.0	78	515	125	0.50	1.50	1.50	216.68
PLRE12D	5–15	12	167	2.0	79	505	125	0.50	1.25	1.25	216.68
PLRE15D	5–15	15	134	2.0	79	505	125	0.50	1.25	1.25	216.68
PLRE24D	5–15	24	84	2.0	80	500	125	0.50	1.00	1.25	216.68
PLRE28D	5–15	28	72	2.0	80	500	125	0.50	1.00	1.00	216.68
PLRE48D	5–15	48	42	2.0	80	500	300	0.50	1.00	1.00	216.68
PLRF5D	8–24	5	500	2.5	78	400	100	0.75	1.75	2.00	216.68
PLRF9D	8–24	9	278	2.5	78	400	125	0.50	1.50	1.50	216.68
PLRF12D	8–24	12	208	2.5	79	395	125	0.50	1.25	1.25	216.68
PLRF15D	8–24	15	167	2.5	79	395	125	0.50	1.25	1.25	216.68
PLRF24D	8–24	24	104	2.5	80	390	125	0.50	1.00	1.25	216.68
PLRF28D	8–24	28	89	2.5	80	390	125	0.50	1.00	1.00	216.68
PLRF48D	8–24	48	52	2.5	80	390	250	0.50	1.00	1.00	216.68
PLRA5D	18–36	5	500	2.5	76	245	100	0.75	2.00	1.00	216.68
PLRA9D	18–36	9	278	2.5	76	245	100	0.50	2.00	0.50	216.68
PLRA12D	18–36	12	208	2.5	77	240	100	0.50	2.00	0.50	216.68
PLRA15D	18–36	15	167	2.5	79	235	100	0.50	1.50	0.50	216.68
PLRA24D	18–36	24	104	2.5	80	230	100	0.50	1.50	0.50	216.68
PLRA28D	18–36	28	89	2.5	80	230	100	0.50	1.50	0.50	216.68
PLRA48D	18–36	48	52	2.5	80	230	250	0.50	1.00	0.50	216.68
PLRB5D	36–60	5	500	2.5	74	140	100	0.75	1.75	0.50	248.78
PLRB9D	36–60	9	278	2.5	74	140	100	0.50	1.50	0.50	248.78
PLRB12D	36–60	12	208	2.5	74	140	100	0.50	1.00	0.25	248.78
PLRB15D	36–60	15	167	2.5	76	135	100	0.50	1.00	0.25	248.78
PLRB24D	36–60	24	104	2.5	76	135	100	0.50	0.75	0.25	248.78
PLRB28D	36–60	28	89	2.5	76	135	100	0.50	0.75	0.25	248.78
PLRB48D	36–60	48	52	2.5	76	135	200	0.50	0.75	0.25	248.78
PLRC5D	18–60	5	500	2.5	75	170	100	0.75	2.00	1.50	264.83
PLRC9D	18–60	9	278	2.5	75	170	100	0.50	1.50	1.00	264.83
PLRC12D	18–60	12	208	2.5	75	170	100	0.50	1.00	0.75	264.83
PLRC15D	18–60	15	167	2.5	77	165	100	0.50	1.00	0.75	264.83
PLRC24D	18–60	24	104	2.5	78	165	100	0.50	0.75	0.75	264.83
PLRC28D	18–60	28	89	2.5	78	165	100	0.50	0.75	0.75	264.83
PLRC48D	18–60	48	52	2.5	78	165	225	0.50	0.75	0.75	264.83

Measurements taken with input voltage set at mid value.

‡ 10% minimum load required.

No Heat Sink or Electrical Derating Required

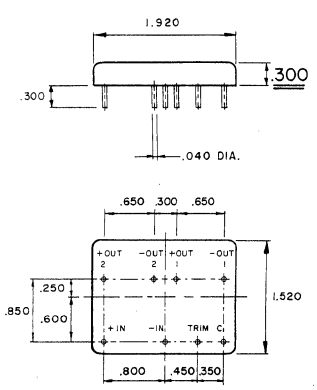
OPTIONS AVAILABLE
- Expanded operating temp. (–55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (–55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

Low Profile 0.3" Height

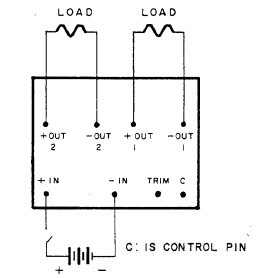
Ordering Instructions:
No minimum. Net 30 days F.O.B. Pelham, New York

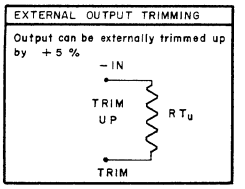
Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.

Series PLR-Dual Output



C: IS CONTROL PIN
NOTE : ALL RADII TO BE 7/64"





Typical Weight: 40 Grams

For immediate engineering assistance or to place an order–
Call Toll Free 800-228-9747

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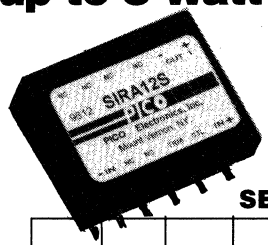
143 Sparks Ave., Pelham, NY 10803-1837
FAX: 914-738-8225
Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

Delivery– stock to one week

SERIES SIR

Isolated Regulated up to 8 Watt DC-DC Converters Wide Input Range/ up to 3.33:1 Fully Regulated All Units Shielded

SURFACE MOUNT



3.3 Volts Output Now Standard
for PICO Part Numbers: SIRE3.3S, SIRF3.3S, SIRA3.3S, SIRB3.3S, SIRC3.3S

FEATURES:

- Voltage regulation over input of

	LOW	HI
SIRE	5V	15V
SIRF	8V	24V
SIRA	18V	36V
SIRB	36V	60V
SIRC	18V	60V

- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads)
- Line regulations = Typical values
  5-15 V DC = ± 1.5%
  8-24 V DC = ± 1.5%
  18-36 V DC = ± 1.0%
  36-60 V DC = ± 1.0%
  18-60 V DC = ± 1.5%
- High efficiency—up to 82%
- Will operate over a temperature range of −25°C to +70°C with no heat sink or electrical derating
- 6 sided shielding
- Isolation—100 megohms at 500 volts DC
- External output trimming pin standard, +5%
- Single and dual isolated outputs.
- Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.

OPTIONS AVAILABLE
- *Expanded operating temp (−55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (−55°C to +125°C)*
- *Hi Temp, full power burn in (100% power, 125°C case temp)*

SERIES SIR - SINGLE OUTPUT

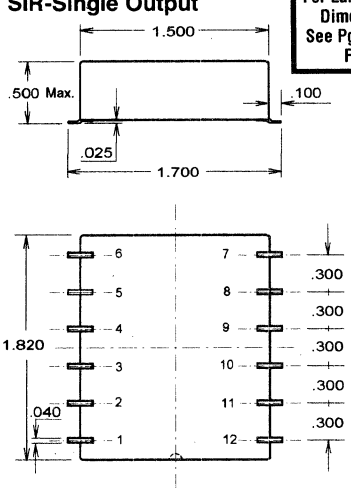
PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	VLD. REG. 25%-100% LOAD‡ (±%)*	LINE REGU-LATION (±%)*	PRICE 1-24
SIRE5S	5–15	5	1000	5	78	640	150	0.75	1.50	2.00	128.40
SIRE9S	5–15	9	667	6	78	770	125	0.50	1.25	1.50	128.40
SIRE12S	5–15	12	500	6	78	770	125	0.50	1.25	1.25	128.40
SIRE15S	5–15	15	400	6	78	770	125	0.50	1.25	1.25	128.40
SIRE24S	5–15	24	250	6	80	750	125	0.50	1.00	1.25	128.40
SIRE28S	5–15	28	214	6	81	740	125	0.50	1.00	1.00	128.40
SIRE48S	5–15	48	125	6	81	740	125	0.50	1.00	1.00	128.40
SIRE100S	5–15	100	60	6	81	740	150	0.50	1.00	1.00	160.50
SIRF5S	8–24	5	1600	8	79	635	150	0.75	1.50	2.00	128.40
SIRF9S	8–24	9	889	8	79	635	125	0.50	1.25	1.50	128.40
SIRF12S	8–24	12	667	8	79	635	125	0.50	1.25	1.25	128.40
SIRF15S	8–24	15	533	8	79	635	125	0.50	1.25	1.25	128.40
SIRF24S	8–24	24	333	8	80	625	125	0.50	1.00	1.25	128.40
SIRF28S	8–24	28	286	8	81	615	125	0.50	1.00	1.00	128.40
SIRF48S	8–24	48	167	8	82	610	125	0.50	1.00	1.00	128.40
SIRF100S	8–24	100	80	8	82	610	150	0.50	1.00	1.00	160.50
SIRA5S	18–36	5	1600	8	78	380	125	0.75	2.00	0.75	128.40
SIRA9S	18–36	9	889	8	78	380	100	0.50	2.00	0.50	128.40
SIRA12S	18–36	12	667	8	78	380	100	0.50	2.00	0.50	128.40
SIRA15S	18–36	15	533	8	78	380	100	0.50	1.50	0.50	128.40
SIRA24S	18–36	24	333	8	79	375	100	0.50	1.50	0.25	128.40
SIRA28S	18–36	28	286	8	80	370	100	0.50	1.50	0.25	128.40
SIRA48S	18–36	48	167	8	80	370	100	0.50	1.00	0.25	128.40
SIRA100S	18–36	100	80	8	80	370	125	0.50	1.00	0.50	160.50
SIRB5S	36–60	5	1600	8	80	210	100	0.75	1.25	0.50	149.80
SIRB9S	36–60	9	889	8	81	205	100	0.50	1.00	0.25	149.80
SIRB12S	36–60	12	667	8	81	205	100	0.50	1.00	0.25	149.80
SIRB15S	36–60	15	533	8	81	205	100	0.50	1.00	0.25	149.80
SIRB24S	36–60	24	333	8	82	200	100	0.50	0.75	0.25	149.80
SIRB28S	36–60	28	286	8	82	200	100	0.50	0.75	0.25	149.80
SIRB48S	36–60	48	167	8	82	200	100	0.50	0.75	0.25	149.80
SIRB100S	36–60	100	80	8	82	200	125	0.50	1.00	0.50	187.25
SIRC5S	18–60	5	1600	8	79	260	125	0.75	2.00	1.25	160.50
SIRC9S	18–60	9	889	8	80	255	100	0.50	1.00	0.75	160.50
SIRC12S	18–60	12	667	8	80	255	100	0.50	1.00	0.75	160.50
SIRC15S	18–60	15	533	8	81	255	100	0.50	1.00	0.75	160.50
SIRC24S	18–60	24	333	8	82	250	100	0.50	0.75	0.50	160.50
SIRC28S	18–60	28	286	8	82	250	100	0.50	0.75	0.50	160.50
SIRC48S	18–60	48	167	8	82	250	100	0.50	0.75	0.50	160.50
SIRC100S	18–60	100	80	8	82	250	125	0.50	1.00	0.50	200.63

*Measurements taken with input voltage set at mid value. ‡10% minimum load required.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

Series SIR-Single Output

PIN N°	SINGLE
1	- INP
2	N/C
3	N/C
4	TRIM
5	CONTROL
6	+ INP
7	+ OUT
8	- OUT
9	N/C
10	N/C
11	N/C
12	N/C



For Land Pattern Dimensions See Pg. D•2106 Fig.9

Delivery— stock to one week

For immediate engineering assistance or to place an order—

Call Toll Free 800-228-9747

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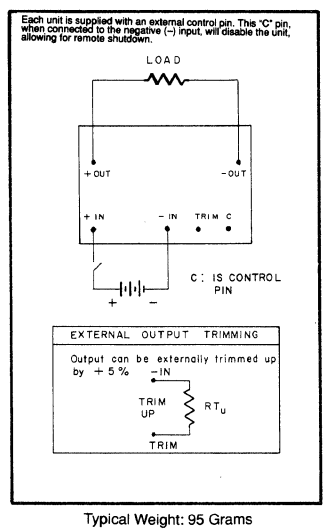
E-Mail:HLSC73A@prodigy.com



Typical Weight: 95 Grams

This series of high efficiency, wide input range, encapsulated regulators come in 75 different models. These units feature a 500 VOLT DC input to output isolation in both single and dual output models. The IR Series will operate over a temperature range of −25°C TO +70°C with no heat sink or electrical derating. These units are excellent for applications where input voltage varies dramatically, yet a high efficiency and output voltage regulation must be maintained.

SERIES SIR

TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Operating temperature: −25° C to +70° C ambient
Output voltage tolerance: ± 1% at typical input voltage
Output voltage temperature coefficient: 0.02%°C
Storage temperature: −55°C to 125°C
Short circuit protection: Temporary
Operating frequency: 40 Khtz, typ.

SERIES SIR - DUAL OUTPUT

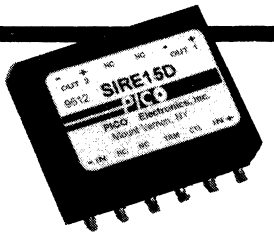
PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF.@ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE@ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	VLD. REG. 25%-100% LOAD‡ (±%)*	LINE REGULATION (±%)*	PRICE 1-24
SIRE5D	5–15	5	500	2.5	78	640	150	0.75	1.50	2.00	155.15
SIRE9D	5–15	9	333	3	78	770	125	0.50	1.25	1.50	155.15
SIRE12D	5–15	12	250	3	78	770	125	0.50	1.25	1.25	155.15
SIRE15D	5–15	15	200	3	78	770	125	0.50	1.25	1.25	155.15
SIRE24D	5–15	24	125	3	80	750	125	0.50	1.00	1.25	155.15
SIRE28D	5–15	28	107	3	81	740	125	0.50	1.00	1.00	155.15
SIRE48D	5–15	48	63	3	81	740	150	0.50	1.00	1.00	155.15
SIRF5D	8–24	5	800	4	79	635	150	0.75	1.50	2.00	155.15
SIRF9D	8–24	9	444	4	79	635	125	0.50	1.25	1.50	155.15
SIRF12D	8–24	12	333	4	79	635	125	0.50	1.25	1.25	155.15
SIRF15D	8–24	15	267	4	79	635	125	0.50	1.25	1.25	155.15
SIRF24D	8–24	24	167	4	80	625	125	0.50	1.00	1.25	155.15
SIRF28D	8–24	28	143	4	81	615	125	0.50	1.00	1.00	155.15
SIRF48D	8–24	48	83	4	82	610	150	0.50	1.00	1.00	155.15
SIRA5D	18–36	5	800	4	78	380	125	0.75	2.00	0.75	155.15
SIRA9D	18–36	9	444	4	78	380	100	0.50	2.00	0.50	155.15
SIRA12D	18–36	12	333	4	78	380	100	0.50	2.00	0.50	155.15
SIRA15D	18–36	15	267	4	78	380	100	0.50	1.50	0.50	155.15
SIRA24D	18–36	24	167	4	79	375	100	0.50	1.50	0.25	155.15
SIRA28D	18–36	28	143	4	80	370	100	0.50	1.50	0.25	155.15
SIRA48D	18–36	48	83	4	80	370	125	0.50	1.00	0.25	155.15
SIRB5D	36–60	5	800	4	80	210	100	0.75	1.25	0.50	155.15
SIRB9D	36–60	9	444	4	81	205	100	0.50	1.00	0.25	155.15
SIRB12D	36–60	12	333	4	81	205	100	0.50	1.00	0.25	155.15
SIRB15D	36–60	15	267	4	81	205	100	0.50	1.00	0.25	155.15
SIRB24D	36–60	24	167	4	82	200	100	0.50	0.75	0.25	155.15
SIRB28D	36–60	28	143	4	82	200	100	0.50	0.75	0.25	155.15
SIRB48D	36–60	48	83	4	82	200	125	0.50	0.75	0.25	155.15
SIRC5D	18–60	5	800	4	79	260	125	0.75	2.00	1.25	155.15
SIRC9D	18–60	9	444	4	80	255	100	0.50	1.00	0.75	155.15
SIRC12D	18–60	12	333	4	80	255	100	0.50	1.00	0.75	155.15
SIRC15D	18–60	15	267	4	81	255	100	0.50	1.00	0.75	155.15
SIRC24D	18–60	24	167	4	82	250	100	0.50	0.75	0.50	155.15
SIRC28D	18–60	28	143	4	82	250	100	0.50	0.75	0.50	155.15
SIRC48D	18–60	48	83	4	82	250	125	0.50	0.75	0.50	155.15

*Measurements taken with input voltage set at mid value.

‡10% minimum load required.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

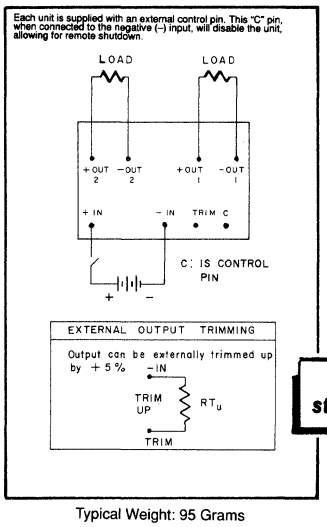
SURFACE MOUNT



No Heat Sink or Electrical Derating Required

OPTIONS AVAILABLE
- Expanded operating temp. (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

Low Profile Less Than 0.5" Height



Typical Weight: 95 Grams

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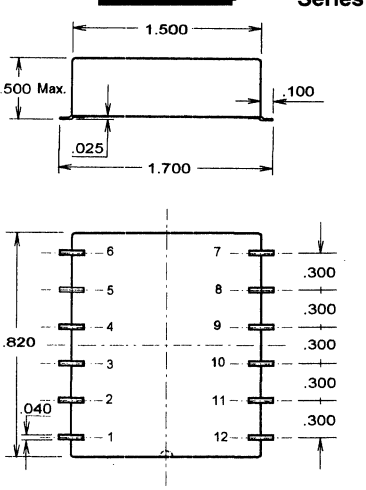
Delivery— stock to one week

For immediate engineering assistance or to place an order—

Call Toll Free 800-228-9747

For Land Pattern Dimensions See Pg. D•2106 Fig.9

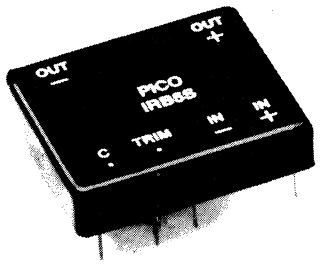
Series SIR··Dual Output



PIN N°	DUAL
1	- INP
2	N/C
3	N/C
4	TRIM
5	CONTROL
6	+ INP
7	+ OUT 1
8	- OUT 1
9	N/C
10	N/C
11	+ OUT 2
12	- OUT 2

SERIES IR

Isolated Regulated up to 10 Watt DC-DC Converters
Wide Input Range/up to 3.33:1
Fully Regulated
All Units Shielded



New 100 VDC Output Models

NOW 2 Volts and 3.3 Volts DC OUTPUT AVAILABLE

FEATURES:

- Voltage regulation over input of

	LOW	HI
IRE	5V	15V
IRF	8V	24V
IRA	18V	36V
IRB	36V	60V
IRC	18V	60V

- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads)
- Line regulatioin = Typical values
  - 5-15 V DC = ± 1.5%
  - 8-24 V DC = ± 1.5%
  - 18-36 V DC = ± 1.0%
  - 36-60 V DC = ± 1.0%
  - 18-60 V DC = ± 1.5%
- High efficiency—up to 84%
- Will operate over a temperature range of −25°C to +70°C with no heat sink or electrical derating
- 6 sided shielding
- Isolation—100 megohms at 500 volts DC
- External output trimming pin standard, +5%
- Single and dual isolated outputs.
- Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.

OPTIONS AVAILABLE
- **Expanded operating temp (–55°C to +85°C)**
- **Stabilization Bake (125°C ambient)**
- **Temperature Cycle (–55°C to +125°C)**
- **Hi Temp, full power burn in (100% power, 125°C case temp)**

Low Profile Less Than 0.5" Height

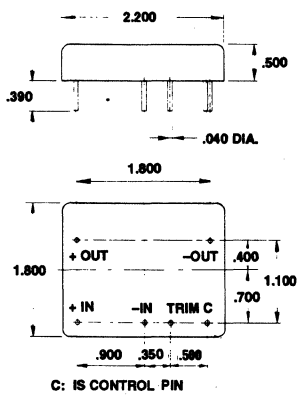
SERIES IR - SINGLE OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYUPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	VLD. REG. 25%-100% LOAD‡ (±%)*	LINE REGU-LATION (±%)*	PRICE 1-24
IRE2S	5–15	2	2000	4	68	588	250	1.5	5	5.5	128.40
IRE3.3S	5–15	3.3	1515	5	76	658	250	1	3.5	5	128.40
IRE5S	5–15	5	1200	8	80	750	176	0.75	2.00	2.00	128.40
IRE9S	5–15	9	889	8	80	1000	150	0.50	1.50	1.00	128.40
IRE12S	5–15	12	867	8	78	1025	150	0.50	1.50	1.00	128.40
IRE15S	5–15	15	533	8	78	1025	150	0.50	1.50	1.00	128.40
IRE24S	5–15	24	333	8	82	975	150	0.50	0.75	1.00	128.40
IRE28S	5–15	28	286	8	83	965	200	0.50	0.50	0.50	128.40
IRE48S	5–15	48	167	8	83	905	250	0.50	0.50	0.50	128.40
IRE100S	5–15	100	60	8	80	760	300	0.50	0.50	0.75	180.60
IRF2S	8–24	2	2500	5	70	446	250	1.5	4	4	128.40
IRF3.3S	8–24	3.3	2424	8	77	650	200	1	2.5	2.5	128.40
IRF5S	8–24	5	2000	10	80	780	200	0.75	1.50	1.75	128.40
IRF9S	8–24	9	1111	10	81	770	150	0.50	0.75	1.25	128.40
IRF12S	8–24	12	833	10	78	800	150	0.50	0.75	0.75	128.40
IRF15S	8–24	15	687	10	78	800	150	0.50	0.75	0.75	128.40
IRF24S	8–24	24	417	10	83	755	150	0.50	0.75	0.75	128.40
IRF28S	8–24	28	357	10	83	755	200	0.50	0.50	0.50	128.40
IRF48S	8–24	48	208	10	84	745	250	0.50	0.50	0.50	128.40
IRF100	8–24	100	100	10	80	780	300	0.50	0.50	0.75	180.60
IRA2S	18–36	2	3000	6	71	313	200	1.5	4	2.5	128.40
IRA3.3S	18–36	3.3	2727	9	78	427	200	1	2	1.5	128.40
IRA5S	18–36	5	2000	10	81	455	125	0.75	1.25	0.75	128.40
IRA9S	18–36	9	1111	10	83	445	100	0.50	1.00	0.50	128.40
IRA12S	18–36	12	833	10	78	475	75	0.50	1.00	0.25	128.40
IRA15S	18–36	15	687	10	78	475	75	0.50	0.75	0.25	128.40
IRA24S	18–36	24	417	10	83	445	75	0.50	0.75	0.25	128.40
IRA28S	18–36	28	357	10	83	445	100	0.50	0.75	0.25	128.40
IRA48S	18–36	48	208	10	84	440	150	0.50	0.50	0.25	128.40
IRA100S	18–36	100	100	10	81	455	250	0.50	0.50	0.50	180.60
IRB2S	36–60	2	3000	6	70	179	200	1.5	3.5	1.5	149.80
IRB3.3S	36–60	3.3	2727	9	76	247	200	1	2	1.5	149.80
IRB5S	36–60	5	2000	10	81	255	125	0.75	1.25	0.50	149.80
IRB9S	36–60	9	1111	10	83	250	100	0.50	0.75	0.50	149.80
IRB12S	36–60	12	833	10	83	260	75	0.50	0.75	0.25	149.80
IRB15S	36–60	15	687	10	83	250	75	0.50	0.75	0.25	149.80
IRB24S	36–60	24	417	10	83	260	75	0.50	0.75	0.25	149.80
IRB28S	36–60	28	357	10	83	260	100	0.50	0.50	0.25	149.80
IRB48S	36–60	48	208	10	84	250	150	0.50	0.50	0.25	149.80
IRB100S	36–60	100	100	10	81	255	250	0.50	0.50	0.50	187.25
IRC2S	18–60	2	3000	6	70	220	200	1.5	4	3	160.50
IRC3.3S	18–60	3.3	2727	9	76	304	200	1	2	1.5	160.50
IRC5S	18–60	5	2000	10	81	320	125	0.75	1.25	1.00	160.50
IRC9S	18–60	9	1111	10	83	310	100	0.50	0.75	0.75	160.50
IRC12S	18–60	12	833	10	83	310	75	0.50	0.75	0.50	160.50
IRC15S	18–60	15	687	10	83	310	75	0.50	0.75	0.50	160.50
IRC24S	18–60	24	417	10	83	310	75	0.50	0.75	0.50	160.50
IRC28S	18–60	28	357	10	83	310	100	0.50	0.50	0.50	160.50
IRC48S	18–60	48	208	10	84	305	150	0.50	0.50	0.50	160.50
IRC100S	18–60	100	100	10	81	310	250	0.50	0.50	0.75	200.63

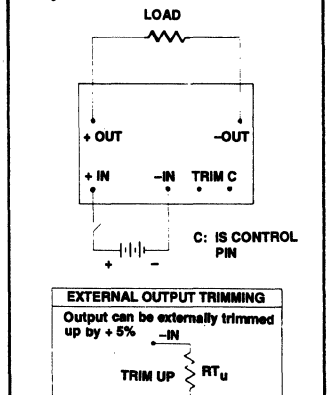
*Measurements taken with input voltage set at mid value. ‡ 10% minimum load required

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

Series IR-Single Output



C: IS CONTROL PIN
NOTE: ALL RADII TYP. 7/64"
BOTTOM VIEW



Typical Weight: 95 Grams

PICO Electronics, Inc.

For immediate engineering assistance or to place an order–

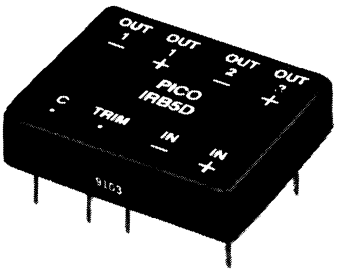
Call Toll Free 800-228-9747

143 Sparks Ave., Pelham, NY 10803-1837
FAX: 914-738-8225
Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

Delivery— stock to one week

This series of high efficiency, wide input range, encapsulated regulators come in 75 different models. These units feature a 500 VOLT DC input to output isolation in both single and dual output models. The IR Series will operate over a temperature range of −25°C TO +70°C with no heat sink or electrical derating. These units are excellent for applications where input voltage varies dramatically, yet a high efficiency and output voltage regulation must be maintained.

TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Operating temperature: −25° C to +70° C ambient
Output voltage tolerance: ± 1% at typical input voltage
Output voltage temperature coefficient: 0.02%°C
Storage temperature: −55°C to 125°C
Short circuit protection: Temporary
Operating frequency: 40 Khtz, typ.



SERIES IR - DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT mA PER OUTPUT	MAX OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	VLD. REG. 25%-100% LOAD‡ (±%)*	LINE REGU-LATION (±%)*	PRICE 1-24
IRE5D	5-15	5	600	3	80	750	175	0.75	2.00	2.00	155.15
IRE9D	5-15	9	444	4	80	1000	150	0.50	1.50	1.00	155.15
IRE12D	5-15	12	333	4	78	1025	150	0.50	1.50	1.00	155.15
IRE15D	5-15	15	267	4	78	1025	150	0.50	1.50	1.00	155.15
IRE24D	5-15	24	167	4	82	975	150	0.50	0.75	1.00	155.15
IRE28D	5-15	28	143	4	83	965	200	0.50	0.50	0.50	155.15
IRE48D	5-15	48	83	4	83	965	250	0.50	0.50	0.50	155.15
IRF5D	8-24	5	1000	5	80	780	200	0.75	1.50	1.75	155.15
IRF9D	8-24	9	556	5	81	770	150	0.50	0.75	1.25	155.15
IRF12D	8-24	12	417	5	78	800	150	0.50	0.75	0.75	155.15
IRF15D	8-24	15	333	5	78	800	150	0.50	0.75	0.75	155.15
IRF24D	8-24	24	208	5	83	755	150	0.50	0.75	0.75	155.15
IRF28D	8-24	28	179	5	83	755	200	0.50	0.50	0.50	155.15
IRF48D	8-24	48	104	5	84	745	250	0.50	0.50	0.50	155.15
IRA5D	18-36	5	1000	5	81	455	125	0.75	1.25	0.75	155.15
IRA9D	18-36	9	556	5	83	445	100	0.50	1.00	0.50	155.15
IRA12D	18-36	12	417	5	78	475	75	0.50	1.00	0.25	155.15
IRA15D	18-36	15	333	5	78	475	75	0.50	0.75	0.25	155.15
IRA24D	18-36	24	208	5	83	445	75	0.50	0.75	0.25	155.15
IRA28D	18-36	28	179	5	83	445	100	0.50	0.75	0.25	155.15
IRA48D	18-36	48	104	5	84	440	150	0.50	0.50	0.25	155.15
IRB5D	36-60	5	1000	5	81	255	125	0.75	1.25	0.50	176.55
IRB9D	36-60	9	556	5	83	250	100	0.50	0.75	0.50	176.55
IRB12D	36-60	12	417	5	83	250	75	0.50	0.75	0.25	176.55
IRB15D	36-60	15	333	5	83	250	75	0.50	0.75	0.25	176.55
IRB24D	36-60	24	208	5	83	250	75	0.50	0.75	0.25	176.55
IRB28D	36-60	28	179	5	83	250	100	0.50	0.50	0.25	176.55
IRB48D	36-60	48	104	5	84	250	150	0.50	0.50	0.25	176.55
IRC5D	18-60	5	1000	5	81	320	125	0.75	1.25	1.00	187.25
IRC9D	18-60	9	556	5	83	310	100	0.50	0.75	0.75	187.25
IRC12D	18-60	12	417	5	83	310	75	0.50	0.75	0.50	187.25
IRC15D	18-60	15	333	5	83	310	75	0.50	0.75	0.50	187.25
IRC24D	18-60	24	208	5	83	310	75	0.50	0.75	0.50	187.25
IRC28D	18-60	28	179	5	83	310	100	0.50	0.50	0.50	187.25
IRC48D	18-60	48	104	5	84	305	150	0.50	0.50	0.50	187.25

*Measurements taken with input voltage set at mid value.

‡ 10% minimum load required.

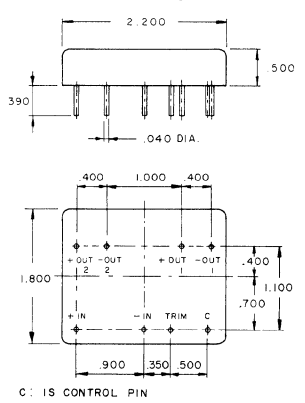
Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

No Heat Sink or Electrical Derating Required

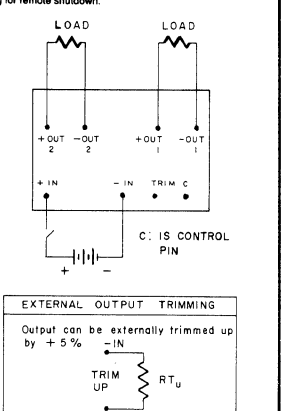
OPTIONS AVAILABLE
- Expanded operating temp. (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

Low Profile Less Than 0.5" Height

Series IR-Dual Output



Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (−) input, will disable the unit, allowing for remote shutdown.



Typical Weight: 95 Grams

For immediate engineering assistance or to place an order—

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143 Sparks Ave., Pelham, NY 10803-1837
FAX: 914-738-8225
Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

Delivery— stock to one week

SERIES JR

Isolated Regulated 15 Watt DC-DC Converters
Wide Input Range/up to 3.33:1
Fully Regulated
All Units Shielded

OPTIONS AVAILABLE
- Expanded operating temp (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- HI Temp, full power burn in (100% power, 125°C case temp)

New 100 VDC Output Models

No Heat Sink or Electrical Derating Required

Low Profile Less Than 0.5" Height

SERIES JR - SINGLE OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	VLD. REG. 25%-100% LOAD‡ (±%)*	LINE REGULATION (±%)*	PRICE 1-24
JRA5S	18–36	5	3000	15	78	710	50	0.75	2.00	1.50	154.08
JRA9S	18–36	9	1667	15	78	710	40	0.50	1.50	0.50	154.08
JRA12S	18–36	12	1250	15	78	710	40	0.50	1.00	0.50	154.08
JRA15S	18–36	15	1000	15	78	710	40	0.50	1.00	0.50	154.08
JRA24S	18–36	24	625	15	83	670	40	0.50	1.00	0.25	154.08
JRA28S	18–36	28	536	15	84	660	40	0.75	0.50	0.25	154.08
JRA48S	18–36	48	313	15	84	660	50	0.75	0.50	0.25	154.08
JRA100S	18–36	100	150	15	84	660	75	0.50	0.75	0.25	192.60
JRB5S	36–60	5	3000	15	78	400	50	0.75	2.00	0.75	179.76
JRB9S	36–60	9	1667	15	78	400	40	0.50	1.50	0.50	179.76
JRB12S	36–60	12	1250	15	80	390	40	0.50	1.00	0.50	179.76
JRB15S	36–60	15	1000	15	81	385	40	0.50	1.00	0.50	179.76
JRB24S	36–60	24	625	15	83	375	40	0.50	1.00	0.25	179.76
JRB28S	36–60	28	536	15	84	370	40	0.50	0.50	0.25	179.76
JRB48S	36–60	48	313	15	84	370	50	0.50	0.50	0.25	179.76
JRB100S	36-60	100	150	15	84	370	75	0.50	0.50	0.25	224.70
JRC5S	18–60	5	3000	15	78	495	50	0.75	2.00	1.50	192.60
JRC9S	18–60	9	1667	15	78	495	40	0.50	1.50	0.75	192.60
JRC12S	18–60	12	1250	15	80	480	40	0.50	1.00	0.75	192.60
JRC15S	18–60	15	1000	15	81	475	40	0.50	1.00	0.75	192.60
JRC24S	18–60	24	625	15	83	465	40	0.50	1.00	0.50	192.60
JRC28S	18–60	28	536	15	84	460	40	0.50	0.50	0.50	192.60
JRC48S	18–60	48	313	15	84	460	50	0.50	0.50	0.50	192.60
JRC100S	18-60	100	150	15	84	460	75	0.50	0.50	0.50	240.75

*Measurements taken with input voltage set at mid value. ‡ 10% minimum load required

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

FEATURES:

- Voltage regulation over input of

	LOW	HI
JRA	18V	36V
JRB	36V	60V
JRC	18V	60V

- Encapsulated semi-conductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads
- Line regulation = Typical values
  18–36V DC = ±1.0%
  36–60V DC = ±1.0%
  18–60V DC = ±2.0%
- High efficiency—up to 84%
- Will operate over a temperature range of −25°C to +70°C with no heat sink or electrical derating
- 6 sided shielding
- Isolation—100 megohms at 500 Volts DC
- External output trimming pin standard, +5%
- Single and dual isolated outputs
- Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.

For immediate engineering assistance or to place an order–
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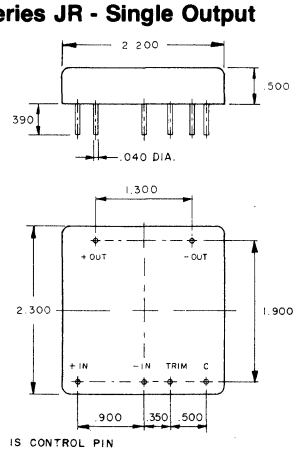
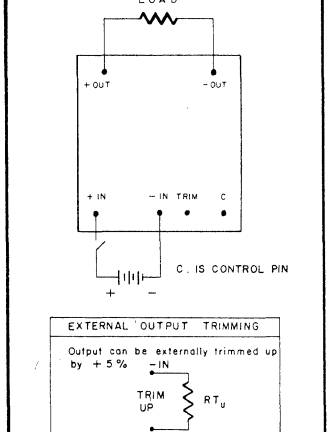
E-Mail:HLSC73A@prodigy.com

Delivery— stock to one week

Series JR - Single Output



Typical Weight: 115 Grams



Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (–) input, will disable the unit, allowing for remote shutdown.

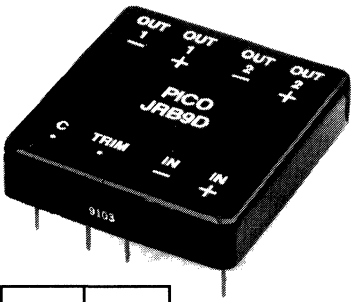
This series of high efficiency, wide input range, encapsulated regulators come in 45 different models. These units feature a 500 Volt DC input to output isolation in both single and dual output models. The JR Series will operate over a temperature range of −25°C to +70°C with no heat sink or electrical derating. These units are excellent for applications where input voltage varies dramatically, yet a high efficiency and output voltage regulation must be maintained.

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient
Operating temperature: −25°C to +70°C ambient
Output voltage tolerance: ±2% at typical input voltage
Output voltage temperature coefficient: 0.02%/°C
Storage temperature: −55°C to +125°C
Short circuit protection: Temporary
Operating frequency: 40 Khtz, typ.

OPTIONS AVAILABLE
- Expanded operating temp (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

No Heat Sink or Electrical Derating Required



SERIES JR - DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF.@ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 25%-100% LOAD‡ (±%)*	LINE REGULATION (±%)*	PRICE 1-24
JRA5D	18-36	5	1500	7.5	78	710	50	0.75	2.00	1.50	180.83
JRA9D	18-36	9	833	7.5	78	710	40	0.50	1.50	0.50	180.83
JRA12D	18-36	12	625	7.5	78	710	40	0.50	1.00	0.50	180.83
JRA15D	18-36	15	500	7.5	78	710	40	0.50	1.00	0.50	180.83
JRA24D	18-36	24	313	7.5	83	670	40	0.50	1.00	0.25	180.83
JRA28D	18-36	28	268	7.5	84	660	40	0.75	0.75	0.25	180.83
JRA48D	18-36	48	156	7.5	84	660	50	0.75	0.75	0.25	180.83
JRB5D	36-60	5	1500	7.5	78	400	50	0.75	2.00	0.75	206.51
JRB9D	36-60	9	833	7.5	78	400	40	0.50	1.50	0.50	206.51
JRB12D	36-60	12	625	7.5	80	390	40	0.50	1.00	0.50	206.51
JRB15D	36-60	15	500	7.5	81	385	40	0.50	1.00	0.50	206.51
JRB24D	36-60	24	313	7.5	83	375	40	0.50	1.00	0.25	206.51
JRB28D	36-60	28	268	7.5	84	370	40	0.50	0.50	0.25	206.51
JRB48D	36-60	48	156	7.5	84	370	50	0.50	0.50	0.25	206.51
JRC5D	18-60	5	1500	7.5	78	495	50	0.75	2.00	1.50	219.35
JRC9D	18-60	9	833	7.5	78	495	40	0.50	1.50	0.75	219.35
JRC12D	18-60	12	625	7.5	80	480	40	0.50	1.00	0.75	219.35
JRC15D	18-60	15	500	7.5	81	475	40	0.50	1.00	0.75	219.35
JRC24D	18-60	24	313	7.5	83	465	40	0.50	1.00	0.50	219.35
JRC28D	18-60	28	268	7.5	84	460	40	0.50	0.50	0.50	219.35
JRC48D	18-60	48	156	7.5	84	460	50	0.50	0.50	0.50	219.35

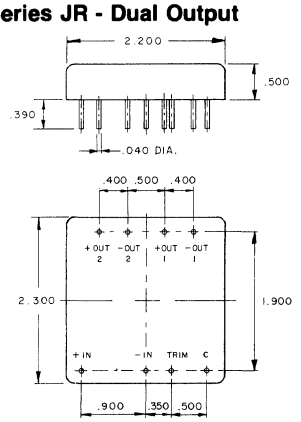
Low Profile Less Than 0.5" Height

*Measurements taken with input voltage set at mid value.

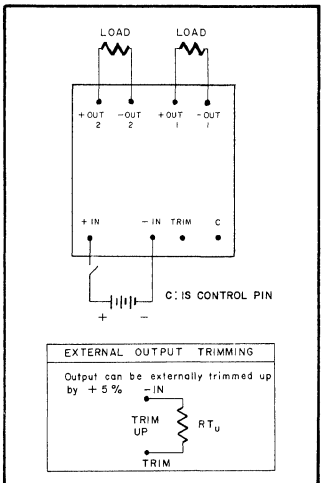
‡ 10% minimum load required.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

Series JR - Dual Output



Typical Weight: 115 Grams



Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (−) input, will disable the unit, allowing for remote shutdown.

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E-Mail:HLSC73A@prodigy.com

Delivery— stock to one week

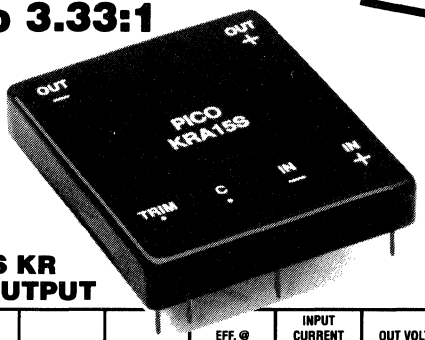
SERIES KR

Isolated Regulated 20 Watt DC-DC Converters
Wide Input Range/up to 3.33:1
Fully Regulated
All Units Shielded

OPTIONS AVAILABLE
- Expanded operating temp (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

Low Profile Less Than 0.5" Height

New 100 VDC Output Models



SERIES KR SINGLE OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	VLD. REG. 25%-100% LOAD‡ (±%)*	LINE REGU-LATION (±%)*	PRICE 1-24
KRA5S	18–36	5	4000	20	78	950	60	0.75	2.50	1.50	185.11
KRA9S	18–36	9	2222	20	80	925	60	0.50	1.25	0.75	185.11
KRA12S	18–36	12	1667	20	78	950	60	0.50	1.00	0.50	185.11
KRA15S	18–36	15	1333	20	78	950	60	0.50	1.00	0.50	185.11
KRA24S	18–36	24	833	20	81	915	60	0.50	0.50	0.25	185.11
KRA28S	18–36	28	714	20	82	905	60	0.50	0.50	0.25	185.11
KRA48S	18–36	48	417	20	83	890	80	0.50	0.50	0.25	185.11
KRA100S	18–36	100	200	20	83	890	100	0.50	0.50	0.25	231.39
KRB5S	36-60	5	4000	20	78	535	60	0.75	2.50	1.00	216.14
KRB9S	36–60	9	2222	20	80	520	60	0.50	1.25	0.50	216.14
KRB12S	36–60	12	1667	20	78	535	60	0.50	1.00	0.50	216.14
KRB15S	36–60	15	1333	20	78	535	60	0.50	1.00	0.50	216.14
KRB24S	36–60	24	833	20	81	515	60	0.50	0.50	0.25	216.14
KRB28S	36–60	28	714	20	82	510	60	0.50	0.50	0.25	216.14
KRB48S	36–60	48	417	20	83	500	80	0.50	0.50	0.25	216.14
KRB100S	36-60	100	200	20	83	500	100	0.50	0.50	0.25	270.18
KRC5S	18–60	5	4000	20	78	660	60	0.75	2.50	2.00	231.12
KRC9S	18–60	9	2222	20	80	640	60	0.50	1.25	1.00	231.12
KRC12S	18–60	12	1667	20	78	660	60	0.50	1.00	0.75	231.12
KRC15S	18–60	15	1333	20	78	660	60	0.50	1.00	0.75	231.12
KRC24S	18–60	24	833	20	81	635	60	0.50	0.50	0.50	231.12
KRC28S	18–60	28	714	20	82	625	60	0.50	0.50	0.50	231.12
KRC48S	18–60	48	417	20	83	615	80	0.50	0.50	0.50	231.12
KRC100S	18-60	100	200	20	83	615	100	0.50	0.50	0.50	288.50

*Measurements taken with input voltage set at mid value.

‡ 10% minimum load required.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

FEATURES

- Voltage regulation over input of

	LOW	HI
KRA	18V	36V
KRB	36V	60V
KRC	18V	60V

- Encapsulated semi-conductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads
- Line regulation = Typical values
  18–36V DC = +1.5%
  36–60V DC = ±1.5%
  18–60V DC = ±3.0%
- High efficiency—up to 84%
- Will operate over a temperature range of −25°C to +70°C with no heat sink or electrical derating
- 6 sided shielding
- Isolation—100 megohms at 500 Volts DC
- External output trimming pin standard, +5%
- Single and dual isolated outputs
- Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (−) input, will disable the unit, allowing for remote shutdown.

For immediate engineering assistance or to place an order–

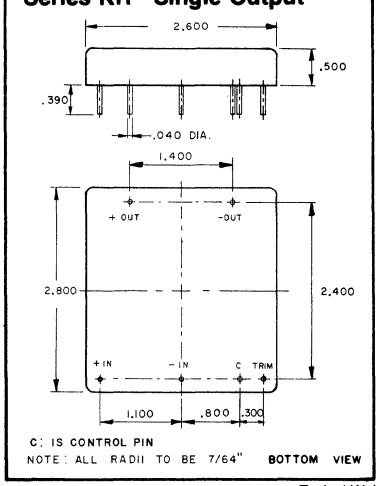
Call Toll Free 800-228-9747

PICO Electronics, Inc.

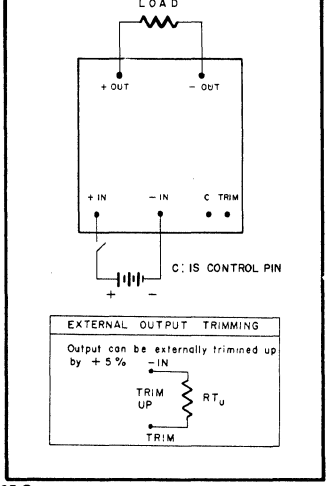
143 Sparks Ave., Pelham, NY 10803-1837
FAX: 914-738-8225
Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

Delivery— stock to one week

Series KR - Single Output



Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (−) input, will disable the unit, allowing for remote shutdown.



Typical Weight: 165 Grams

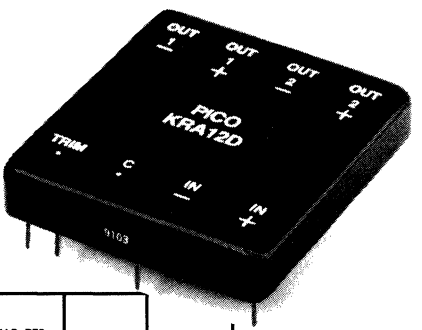
This series of high efficiency, wide input range, encapsulated regulators come in 45 different models. These units feature a 500 Volt DC input to output isolation in both single and dual output models. The KR Series will operate over a temperature range of −25°C to +70°C with no heat sink or electrical derating. These units are excellent for applications where input voltage varies dramatically, yet a high efficiency and output voltage regulation must be maintained.

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient
Operating temperature: −25°C to +70°C ambient
Output voltage tolerance: ±3% at typical input voltage
Output voltage temperature coefficient: 0.02%/°C
Storage temperature: −55°C to +125°C
Short circuit protection: Temporary
Operating frequency: 40 Khtz, typ.

OPTIONS AVAILABLE
- Expanded operating temp (−55°C to +85°C)
- Stabilization Bake (125°C ambient)
- Temperature Cycle (−55°C to +125°C)
- Hi Temp, full power burn in (100% power, 125°C case temp)

No Heat Sink or Electrical Derating Required



SERIES KR - DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 25%-100% LOAD‡ (±%)*	LINE REGULATION (±%)*	PRICE 1-24
KRA5D	18–36	5	2000	10	78	950	60	0.75	2.50	1.50	211.86
KRA9D	18–36	9	1111	10	80	925	60	0.50	1.25	0.75	211.86
KRA12D	18–36	12	833	10	78	950	60	0.50	1.00	0.50	211.86
KRA15D	18–36	15	667	10	78	950	60	0.50	1.00	0.50	211.86
KRA24D	18–36	24	417	10	81	915	60	0.50	0.50	0.25	211.86
KRA28D	18–36	28	357	10	82	905	60	0.50	0.50	0.25	211.86
KRA48D	18–36	48	208	10	83	890	80	0.50	0.50	0.25	211.86
KRB5D	36–60	5	2000	10	78	535	60	0.75	2.50	1.00	242.89
KRB9D	36–60	9	1111	10	80	520	60	0.50	1.25	0.50	242.89
KRB12D	36–60	12	833	10	78	535	60	0.50	1.00	0.50	242.89
KRB15D	36–60	15	667	10	78	535	60	0.50	1.00	0.50	242.89
KRB24D	36–60	24	417	10	81	515	60	0.50	0.50	0.25	242.89
KRB28D	36–60	28	357	10	82	510	60	0.50	0.50	0.25	242.89
KRB48D	36–60	48	208	10	83	500	80	0.50	0.50	0.25	242.89
KRC5D	18–60	5	2000	10	78	660	60	0.75	2.50	2.00	257.87
KRC9D	18–60	9	1111	10	80	640	60	0.50	1.25	1.00	257.87
KRC12D	18–60	12	833	10	78	660	60	0.50	1.00	0.75	257.87
KRC15D	18–60	15	667	10	78	660	60	0.50	1.00	0.75	257.87
KRC24D	18–60	24	417	10	81	635	60	0.50	0.50	0.50	257.87
KRC28D	18–60	28	357	10	82	625	60	0.50	0.50	0.50	257.87
KRC48D	18–60	48	208	10	83	615	80	0.50	0.50	0.50	257.87

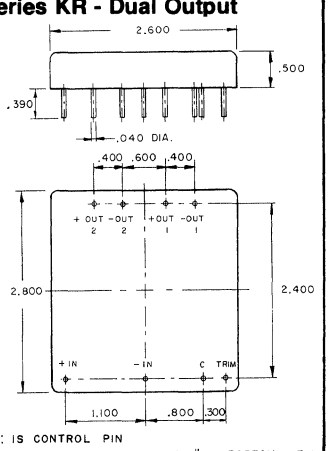
Low Profile Less Than 0.5" Height

*Measurements taken with input voltage set at mid value.

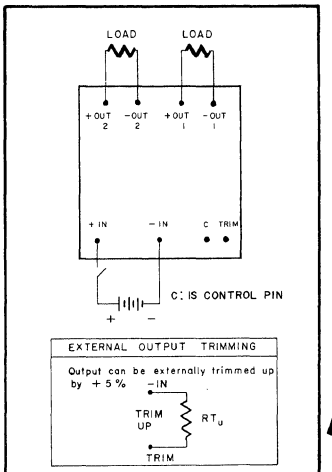
‡ 10% minimum load required.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

Series KR - Dual Output



Each unit is supplied with an external control pin. This "C" pin, when connected to the negative (−) input, will disable the unit, allowing for remote shutdown.



Typical Weight: 165 Grams

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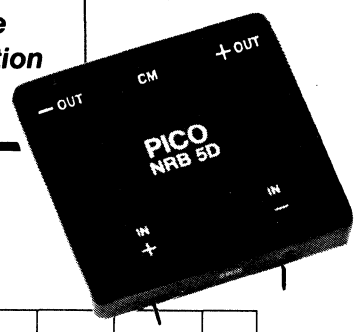
FAX: 914-738-8225
Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

Delivery– stock to one week

SERIES NR

Isolated Regulated up to 30 Watt DC-DC Converters
Wide Input Range/up to 72V DC
30 Triple Output Models
Highly Regulated
No Heat Sink Required

- *30 Triple Output Models*
- *72 V Input Voltage*
- *0.2% Line Regulation*
- *Continuous Short Circuit Protection*



Low Profile Less Than 0.5" Height

No Heat Sink or Electrical Derating Required

FEATURES:

- 30 triple output models
- Voltage regulation over input of

	LOW	HI
NRA	18V	36V
NRB	36V	72V

- Encapsulated semiconductors, conservatively rated for maximum reliability.
- Load regulation (see table for typical variation at different loads
- Line regulation = Typical values
  18 – 36V DC = 0.2%
  36 – 72V DC = 0.2%
- High efficiency—up to 87
- Will operate over a ambient temperature range of – 25°C to + 70°C with no heat sink or electrical derating required.
- Short circuit protection
- Current limited
- 6 sided shielding
- Isolation–100 megohms at 500 Volts DC
- Screw inserts for mounting

SERIES NR SINGLE OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 10%–100% LOAD ‡ (±%)*	LINE REGULATION (±%)*	PRICE 1-24
NRF5S	10-30	5	4000	20	78	1068	50	0.5	0.3	0.2	260.00
NRF9S	10-30	9	2777	25	80	1302	50	0.5	0.2	0.2	260.00
NRF12S	10-30	12	2083	25	81	1286	50	0.5	0.2	0.2	260.00
NRF15S	10-30	15	1666	25	83	1255	50	0.5	0.2	0.2	260.00
NRF24S	10-30	24	1042	25	84	1240	50	0.5	0.2	0.2	260.00
NRF28S	10-30	28	893	25	85	1225	50	0.5	0.2	0.2	260.00
NRA5S	18-36	5	4000	20	78	950	50	0.5	0.3	0.2	260.00
NRA9S	18-36	9	2777	25	80	1155	50	0.5	0.2	0.2	260.00
NRA12S	18-36	12	2083	25	81	1145	50	0.5	0.2	0.2	260.00
NRA15S	18-36	15	1666	25	83	1115	50	0.5	0.2	0.2	260.00
NRA24S	18-36	24	1042	25	84	1100	50	0.5	0.2	0.2	260.00
NRA28S	18-36	28	893	25	85	1090	50	0.5	0.2	0.2	260.00
NRB5S	36-72	5	4400	22	78	520	50	0.5	0.3	0.2	289.00
NRB9S	36-72	9	2777	25	83	560	50	0.5	0.2	0.2	289.00
NRB12S	36-72	12	2083	25	83	560	50	0.5	0.3	0.2	289.00
NRB15S	36-72	15	2000	30	85	655	50	0.5	0.3	0.2	289.00
NRB24S	36-72	24	1250	30	86	645	50	0.5	0.3	0.2	289.00
NRB28S	36-72	28	1071	30	87	640	50	0.5	0.3	0.2	289.00

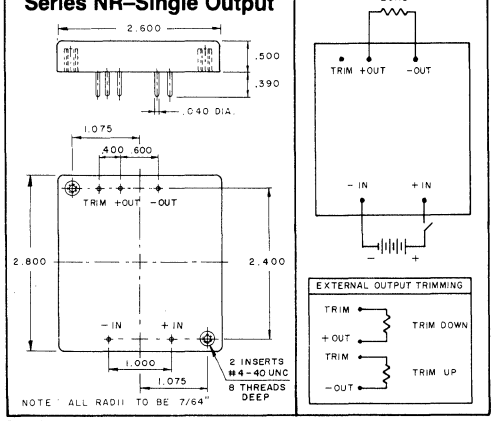
SERIES NR DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC	MAX. LOAD CURRENT mA	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	OUT VOLT TOLERANCE (±%)*	V LD. REG. 10%–100% LOAD ‡ (±%)*	LINE REGULATION (±%)*	PRICE 1-24
NRF5D	10-30	± 5	2000	10.0	78	1068	50	0.5	0.3	0.2	310.00
NRF9D	10-30	± 9	1390	12.5	80	1302	50	0.5	0.2	0.2	310.00
NRF12D	10-30	±12	1042	12.5	81	1286	50	0.5	0.2	0.2	310.00
NRF15D	10-30	±15	833	12.5	83	1255	50	0.5	0.2	0.2	310.00
NRA5D	18-36	± 5	2000	10.0	78	950	50	0.5	0.3	0.2	310.00
NRA9D	18-36	± 9	1390	12.5	80	1155	50	0.5	0.2	0.2	310.00
NRA12D	18-36	±12	1042	12.5	81	1145	50	0.5	0.2	0.2	310.00
NRA15D	18-36	±15	833	12.5	83	1115	50	0.5	0.2	0.2	310.00
NRB5D	36-72	± 5	2200	11.0	78	520	50	0.5	0.2	0.2	339.00
NRB9D	36-72	± 9	1390	12.5	80	580	50	0.5	0.2	0.2	339.00
NRB12D	36-72	±12	1042	12.5	82	565	50	0.5	0.2	0.2	339.00
NRB15D	36-72	±15	833	12.5	84	550	50	0.5	0.2	0.2	339.00

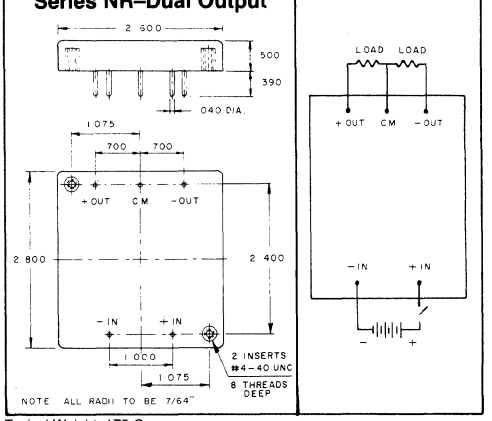
**Measurements taken with input voltage set at mid value.*

‡ 10% minimum load required.

Series NR–Single Output



Series NR–Dual Output



Typical Weight: 175 Grams

Delivery— stock to one week

PICO Electronics, Inc.

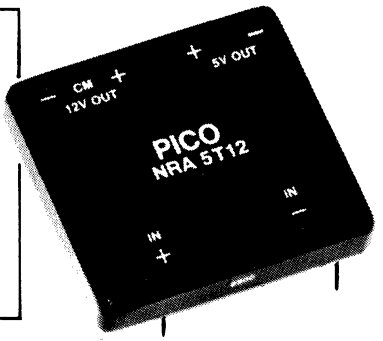
143 Sparks Ave.,
Pelham, N.Y. 10803-1837

800-228-9747

Fax 914-738-8225

Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

This series of high efficiency wide input range, encapsulated regulators come in 50 different models including 30 Triple Output Models to ease board designs. These units feature a 500 Volt DC input to output isolation in both single, dual and triple output models. The NR Series will operate over an ambient temperature range of −25°C to +70°C with no heat sink or electrical derating. These units are excellent for applications where input voltage varies dramatically, yet a high efficiency and output voltage regulation must be maintained.



SERIES NR

TYPICAL CHARACTERISTICS:
Test conditions: 25°C ambient
Operating temperature: −25°C to +70°C ambient
Output voltage tolerance: 0.5% main outputs
Output voltage temperature coefficient: 0.01%/°C
Storage temperature: −55°C to 125°C
Short circuit protection: Continuous
Operating frequency: 30 Khtz, typ.

SERIES NR TRIPLE OUTPUT

		MAIN OUTPUT VOLTAGE					AUXILIARY OUTPUT VOLTAGE							
PICO PART NUMBER	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE DC OUTPUT	MAX. LOAD CURRENT mA OUTPUT	MAX. OUTPUT POWER (watts) OUTPUT	V LD. REG. 25%–100% LOAD (±%)*	OUT VOLT RIPPLE @ FULL LD. 1-1MHz BW mv p-p	OUTPUT VOLTAGE DC PER OUTPUT	MAX. LOAD CURRENT mA PER OUTPUT	MAX. OUTPUT POWER (watts) PER OUTPUT	VOLT. LOAD REG. 25%–100% LOAD ‡ (±%)*	OUT VOLT RIPPLE @ FULL LD. 1-1 MHz BW mv p-p	EFF. @ FULL LOAD TYPICAL (%)*	INPUT CURRENT FULL LOAD TYPICAL (mA)*	PRICE 1-24
NRA5T12	18–36	5	3000	15	0.2	50	±12	208	2.5	5	50	78	950	360.00
NRA5T15	18–36	5	3000	15	0.2	50	±15	167	2.5	5	50	78	950	360.00
NRA9T5	18–36	9	2220	20	0.2	50	± 5	500	2.5	5	50	80	1155	360.00
NRA9T12	18–36	9	2220	20	0.2	50	±12	208	2.5	5	50	80	1155	360.00
NRA9T15	18–36	9	2220	20	0.2	50	±15	167	2.5	5	50	80	1155	360.00
NRA12T5	18–36	12	1660	20	0.2	50	± 5	500	2.5	5	50	81	1145	360.00
NRA12T15	18–36	12	1660	20	0.2	50	±15	167	2.5	5	50	81	1145	360.00
NRA15T5	18–36	15	1330	20	0.2	50	± 5	500	2.5	5	50	83	1115	360.00
NRA15T12	18–36	15	1330	20	0.2	50	±12	208	2.5	5	50	83	1115	360.00
NRA24T5	18–36	24	830	20	0.2	50	± 5	500	2.5	5	50	84	1100	360.00
NRA24T12	18–36	24	830	20	0.2	50	±12	208	2.5	5	50	84	1100	360.00
NRA24T15	18–36	24	830	20	0.2	50	±15	167	2.5	5	50	84	1100	360.00
NRA28T5	18–36	28	714	20	0.2	50	± 5	500	2.5	5	50	85	1090	360.00
NRA28T12	18–36	28	714	20	0.2	50	±12	208	2.5	5	50	85	1090	360.00
NRA28T15	18–36	28	714	20	0.2	50	±15	167	2.5	5	50	85	1090	360.00
NRB5T12	36–72	5	3400	17	0.2	50	±12	208	2.5	5	50	78	520	389.00
NRB5T15	36–72	5	3400	17	0.2	50	±15	167	2.5	5	50	78	520	389.00
NRB9T5	36–72	9	2220	20	0.2	50	± 5	500	2.5	5	50	80	580	389.00
NRB9T12	36–72	9	2220	20	0.2	50	±12	208	2.5	5	50	80	580	389.00
NRB9T15	36–72	9	2220	20	0.2	50	±15	167	2.5	5	50	80	580	389.00
NRB12T5	36–72	12	1660	20	0.2	50	± 5	500	2.5	5	50	84	550	389.00
NRB12T15	36–72	12	1660	20	0.2	50	±15	167	2.5	5	50	84	550	389.00
NRB15T5	36–72	15	1667	25	0.2	50	± 5	500	2.5	5	50	85	655	389.00
NRB15T12	36–72	15	1667	25	0.2	50	±12	208	2.5	5	50	85	655	389.00
NRB24T5	36–72	24	1042	25	0.2	50	± 5	500	2.5	5	50	86	645	389.00
NRB24T12	36–72	24	1042	25	0.2	50	±12	208	2.5	5	50	86	645	389.00
NRB24T15	36–72	24	1042	25	0.2	50	±15	167	2.5	5	50	86	645	389.00
NRB28T5	36–72	28	893	25	0.2	50	± 5	500	2.5	5	50	87	640	389.00
NRB28T12	36–72	28	893	25	0.2	50	±12	208	2.5	5	50	87	640	389.00
NRB28T15	36–72	28	893	25	0.2	50	±15	167	2.5	5	50	87	640	389.00

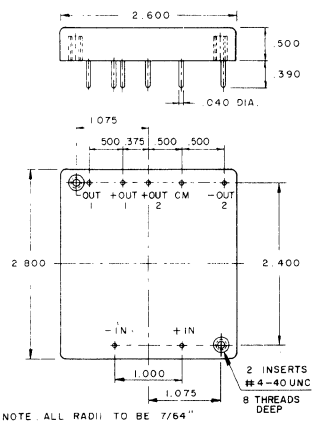
Common Characteristics
Main Output Voltage Tolerance ±0.5%*
Main Line Regulation ±0.2%*

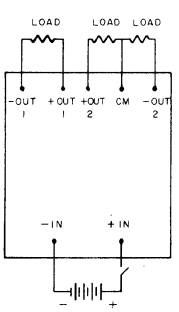
Common Characteristics
Auxiliary Output Voltage Tolerance ±4%*
Auxiliary Line Regulation ±0.2%*

‡ 10% minimum load required.

Measurements taken with input voltage set at mid value.

Series NR–Triple Output





Typical Weight: 175 Grams

30 Triple Output Models

OPTIONS AVAILABLE
- *Expanded operating temp (−55°C to +85°C)*
- *Stabilization Bake (125°C ambient)*
- *Temperature Cycle (−55°C to +125°C)*
- *Hi Temp, full power burn in (100% power, 125°C case temp)*

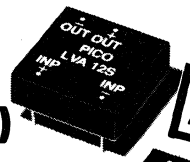
For immediate engineering assistance or to place an order–
Call Toll Free 800-228-9747

Delivery– stock to one week

PICO Electronics, Inc.
143 Sparks Ave., Pelham, NY 10803-1837
FAX: 914-738-8225
Internet:http://www.picoelectronics.com
E-Mail:HLSC73A@prodigy.com

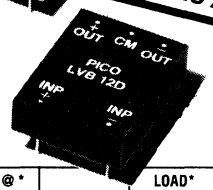
Series LV-Single Output-DC-DC Converters

Hi Reliability
Industrial Grade
Wide Input Voltage (36-80VDC)
Isolated 1000 VDC
Fully Regulated—up to 10 Watts
Short Circuit Protected

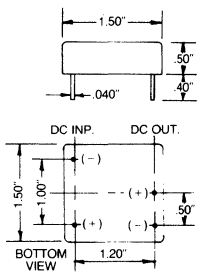


NO EXTERNAL CAPACITORS REQUIRED

TLV Standard Terminal Strip Models Available****



Series LVA-Single Output-3 Watts

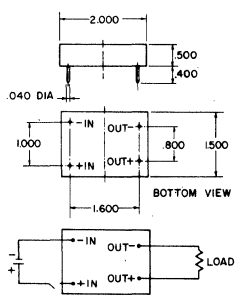


**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD* REGULATION 25%-100% LOAD (±%)**	LINE* REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE TYPICAL (mv p-p)	**** PRICE 1-24
LVA5S	5	600	3	64	2	2	1	20	69.00
LVA5.25S	5.2	577	3	64	2	2	1	20	69.00
LVA12S	12	250	3	65	2	2	1	20	69.00
LVA15S	15	200	3	65	2	2	1	15	69.00
LVA24S	24	125	3	66	2	2	1	15	69.00
LVA28S	28	107	3	66	2	2	1	15	69.00
LVA48S	48	62	3	66	2	2	1	15	69.00

*Measurements taken at nominal input voltage.
**10% minimum load required.

Terminal strip not available LVA

Series LVB-Single Output-5 Watts

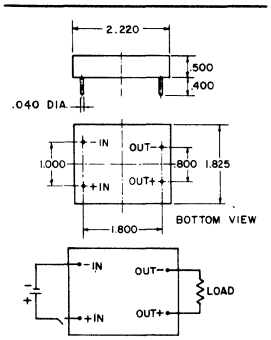


**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD* REGULATION 25%-100% LOAD (±%)**	LINE* REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE TYPICAL (mv p-p)	**** PRICE 1-24
LVB5S	5	1000	5	68	2	2	1	50	79.00
LVB5.25S	5.2	961	5	68	2	2	1	50	79.00
LVB12S	12	415	5	70	2	2	1	25	79.00
LVB15S	15	330	5	70	2	2	1	25	79.00
LVB24S	24	210	5	72	2	2	1	25	79.00
LVB28S	28	175	5	72	2	2	1	25	79.00
LVB48S	48	105	5	74	2	2	1	25	79.00

*Measurements taken at nominal input voltage.
**10% minimum load required.

****For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown.

Series LVC-Single Output-8 Watts

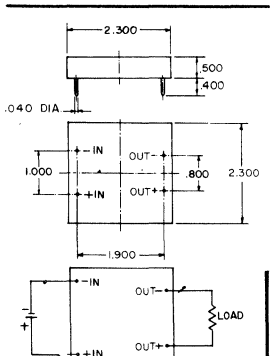


**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD* REGULATION 25%-100% LOAD (±%)**	LINE* REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE TYPICAL (mv p-p)	**** PRICE 1-24
LVC5S	5	1400	7	68	2	2	1	50	89.00
LVC5.25S	5.2	1346	7	68	2	2	1	50	89.00
LVC12S	12	666	8	74	2	2	1	25	89.00
LVC15S	15	533	8	74	2	2	1	25	89.00
LVC24S	24	333	8	74	2	2	1	25	89.00
LVC28S	28	285	8	74	2	2	1	25	89.00
LVC48S	48	166	8	74	2	2	1	25	89.00

*Measurements taken at nominal input voltage.
**10% minimum load required.
***Max. power at nominal input. At 36 volt input derate by approx. 15%.

****For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown.

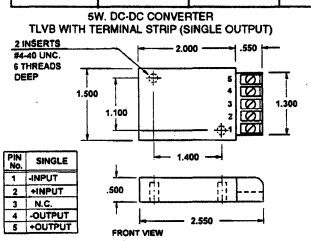
Series LVD-Single Output-10 Watts



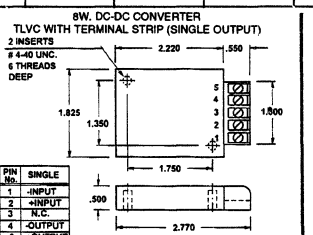
**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD* REGULATION 25%-100% LOAD (±%)**	LINE* REGULATION @ FULL LOAD (±%)	OUTPUT* VOLTAGE RIPPLE TYPICAL (mv p-p)	**** PRICE 1-24
LVD5S	5	1800	9	70	2	2	1	50	99.00
LVD5.25S	5.2	1730	9	70	2	2	1	50	99.00
LVD12S	12	833	10	74	2	2	1	25	99.00
LVD15S	15	666	10	74	2	2	1	25	99.00
LVD24S	24	416	10	74	2	2	1	25	99.00
LVD28S	28	357	10	74	2	2	1	25	99.00
LVD48S	48	208	10	74	2	2	1	25	99.00

PART#	in oz.	in grams
LVA Single	1.2 oz.	34.01
LVB Single	1.5 oz.	42.52
LVC Single	2.0 oz.	56.69
LVD Single	2.8 oz.	79.37
TLVA Single		
TLVB Single	1.9 oz.	53.86
TLVC Single	2.5 oz.	70.87
TLVD Single	3.2 oz.	90.71

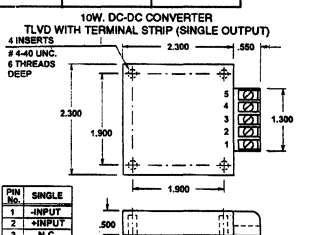
5W. DC-DC CONVERTER
TLVB WITH TERMINAL STRIP (SINGLE OUTPUT)



8W. DC-DC CONVERTER
TLVC WITH TERMINAL STRIP (SINGLE OUTPUT)



10W. DC-DC CONVERTER
TLVD WITH TERMINAL STRIP (SINGLE OUTPUT)



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Series LV-Dual Output-DC-DC Converters

.5" Height

FEATURES:

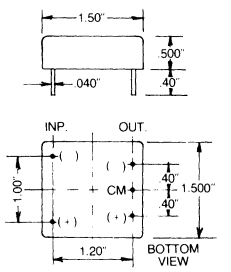
- Excellent line regulation ±1% (36–80 VDC)
- Excellent load regulation, from 25% to 100%, ± 2%
- Continuous short circuit protection
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Isolation: 100 megohms at 1000 VDC
- Wide input 36 VDC to 80 VDC

PICO's LV Series with wide input voltages are available in 36 different models. As switchers they accommodate a 36 to 80 VDC input, and offer both single and dual, regulated outputs. These isolated units will operate over a temperature range of −25°C to 70°C with no heat sink or electrical derating required. They are excellent for applications where the input voltage is highly variable such as in telecommunication systems.

TLV Standard Terminal Strip Models Available****

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient
Input voltage: 36–80 VDC
Converter frequency: 200 KHz to 1 MHz
Operating temperature: −20°C to +70°C ambient
Storage temperature: −55°C to +105°C
Output voltage temperature coefficient: 0.02%/°C
Isolation: 1000 VDC

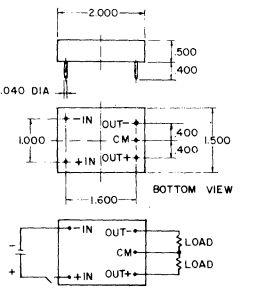


Series LVA-Dual Output-3 Watts

* * * * PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUT. (mA)	MAX OUTPUT POWER PER OUT. (watts)	EFF. @ * FULL LOAD TYPICAL (%)	OUTPUT * VOLTAGE TOLERANCE (± %)	LOAD * REGULATION 25%-100% LOAD (± %) **	LINE * REGULATION @ FULL LOAD (± %)	OUTPUT * VOLTAGE RIPPLE TYPICAL (mv p-p)	* * * * PRICE 1-24
LVA5D	±5	300	1.5	60	2	2	1	25	82.00
LVA12D	±12	125	1.5	65	2	2	1	25	82.00
LVA15D	±15	100	1.5	67	2	2	1	25	82.00

*Measurements taken at nominal input voltage.
**10% minimum load required.

Terminal strip not available LVA



Series LVB-Dual Output-5 Watts

* * * * PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUT. (mA)	MAX OUTPUT POWER PER OUT. (watts)	EFF. @ * FULL LOAD TYPICAL (%)	OUTPUT * VOLTAGE TOLERANCE (± %)	LOAD * REGULATION 25%-100% LOAD (± %) **	LINE * REGULATION @ FULL LOAD (± %)	OUTPUT * VOLTAGE RIPPLE (mv p-p)	* * * * PRICE 1-24
LVB5D	+5	500	2.5	68	2	2	1	50	92.00
LVB12D	+12	200	2.5	70	2	2	1	25	92.00
LVB15D	+15	165	2.5	70	2	2	1	25	92.00

*Measurements taken at nominal input voltage.
**10% minimum load required.

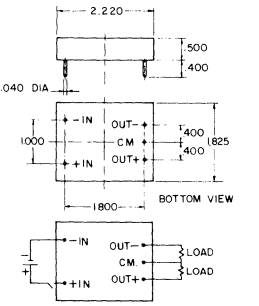
****For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown

Series LVC-Dual Output 8 Watts

* * * * PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX.*** LOAD CURRENT PER OUT. (mA)	MAX OUTPUT POWER PER OUT. (watts)	EFF. @* FULL LOAD TYPICAL (%)	OUTPUT * VOLTAGE TOLERANCE (± %)	LOAD * REGULATION 25%-100% LOAD (± %) **	LINE * REGULATION @ FULL LOAD (± %)	OUTPUT * VOLTAGE RIPPLE TYPICAL (mv p-p)	* * * * PRICE 1-24
LVC5D	+5	700	3.5	68	2	2	1	50	102.00
LVC12D	+12	333	4	74	2	2	1	25	102.00
LVC15D	+15	266	4	74	2	2	1	25	102.00

*Measurements taken at nominal input voltage.
**10% minimum load required.
***Max. power at nominal input. At 36 volt input derate by approx. 15%.

****For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown

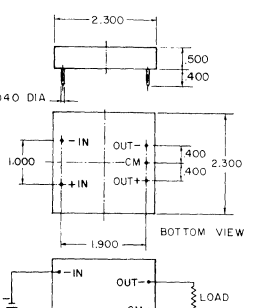


Series LVD-Dual Output 10 Watts

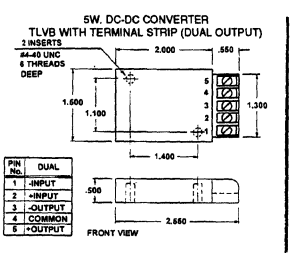
* * * * PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX.*** LOAD CURRENT PER OUT. (mA)	MAX OUTPUT POWER PER OUT. (watts)	EFF. @ * FULL LOAD TYPICAL (%)	OUTPUT * VOLTAGE TOLERANCE (± %)	LOAD * REGULATION 25%-100% LOAD (± %) **	LINE * REGULATION @ FULL LOAD (± %)	OUTPUT * VOLTAGE RIPPLE TYPICAL (mv p-p)	* * * * PRICE 1-24
LVD5D	+5	900	4.5	70	2	2	1	50	112.00
LVD12D	+12	415	5	74	2	2	1	25	112.00
LVD15D	+15	333	5	74	2	2	1	25	112.00

*Measurements taken at nominal input voltage.
**10% minimum load required.
***Max. power at nominal input. At 36 volt input derate by approx. 15%.

****For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown

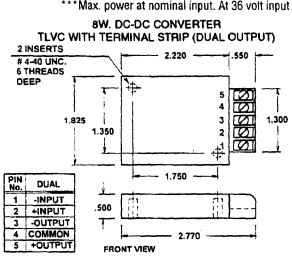


5W. DC-DC CONVERTER
TLVB WITH TERMINAL STRIP (DUAL OUTPUT)



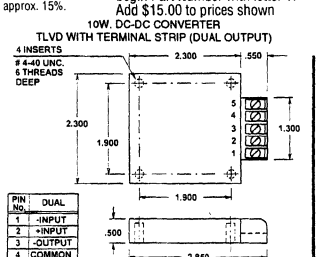
PIN No.	DUAL
1	-INPUT
2	+INPUT
3	-OUTPUT
4	COMMON
5	+OUTPUT

8W. DC-DC CONVERTER
TLVC WITH TERMINAL STRIP (DUAL OUTPUT)



PIN No.	DUAL
1	-INPUT
2	+INPUT
3	-OUTPUT
4	COMMON
5	+OUTPUT

10W. DC-DC CONVERTER
TLVD WITH TERMINAL STRIP (DUAL OUTPUT)



PIN No.	DUAL
1	-INPUT
2	+INPUT
3	-OUTPUT
4	COMMON
5	+OUTPUT

PART#	In oz.	In grams
LVA Dual*	1.2 oz.	34.01
LVB Dual*	1.5 oz.	42.52
LVC Dual*	2.0 oz.	56.69
LVD Dual*	2.8 oz.	79.37
TLVA Dual		
TLVB Dual	1.9 oz.	53.86
TLVC Dual	2.5 oz.	70.87
TLVD Dual*	3.2 oz.	90.71

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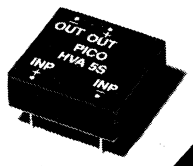
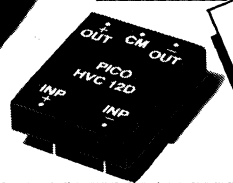
Series HV-Single Output-DC-DC Converters

Hi Reliability
Industrial Grade
Hi Input Voltage (70–170 VDC)
Isolated 1000 VDC
Fully Regulated—up to 15 Watts
Short Circuit Protected

No Heat Sink





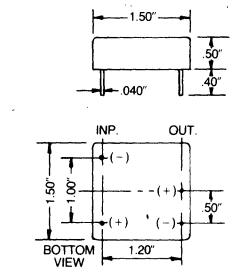
NO EXTERNAL CAPACITORS REQUIRED

THV Standard Terminal Strip Models Available***

No Heat Sink or Electrical Derating Required

Series HVA-Single Output-3 Watts

**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD* REGULATION 25%-100% LOAD (±%)	LINE* REGULATION @ FULL LOAD (±%)**	OUTPUT* VOLTAGE RIPPLE (mv p-p)	**** PRICE 1-24
HVA3.3S	3.3	600	2	63	2	2	1	50	69.00
HVA5S	5	600	3	65	2	2	0.5	50	69.00
HVA5.25S	5.2	577	3	65	2	2	1	50	69.00
HVA12S	12	250	3	67	2	2	0.5	25	69.00
HVA15S	15	200	3	67	2	2	0.5	25	69.00
HVA24S	24	125	3	68	2	2	0.5	25	69.00
HVA28S	28	105	3	68	2	2	0.5	25	69.00

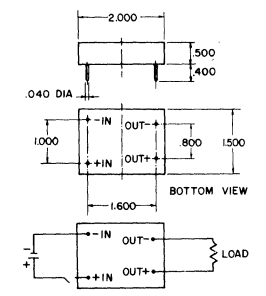


*Measurements taken at nominal input voltage.
**10% minimum load required.

Terminal strip not available HVA

Series HVB-Single Output-5 Watts

**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD* REGULATION 25%-100% LOAD (±%)	LINE* REGULATION @ FULL LOAD (±%)**	OUTPUT* VOLTAGE RIPPLE TYPICAL (mv p-p)	**** PRICE 1-24
HVB3.3S	3.3	1000	3.3	67	2	2	1	50	79.00
HVB5S	5	600	5	70	2	2	1	50	79.00
HVB5.25S	5.2	961	5	70	2	2	1	50	79.00
HVB12S	12	415	5	73	2	2	1	25	79.00
HVB15S	15	330	5	73	2	2	1	25	79.00
HVB24S	24	200	5	74	2	2	1	25	79.00
HVB28S	28	175	5	74	2	2	1	25	79.00

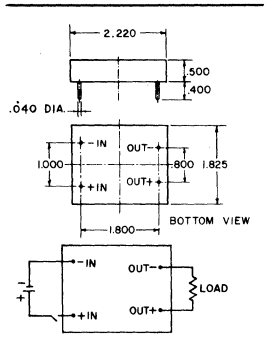


*Measurements taken at nominal input voltage.
**10% minimum load required.

****For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown.

Series HVC-Single Output-10 Watts

**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD* REGULATION 25%-100% LOAD (±%)	LINE* REGULATION @ FULL LOAD (±%)**	OUTPUT* VOLTAGE RIPPLE TYPICAL (mv p-p)	**** PRICE 1-24
HVC3.3S	3.3	1515	5	67	2	2	1	50	89.00
HVC5S	5	1600	8	69	2	2	1	50	89.00
HVC5.25S	5.2	1538	8	69	2	2	1	50	89.00
HVC12S	12	830	10	75	2	2	1	25	89.00
HVC15S	15	660	10	77	2	2	1	25	89.00
HVC24S	24	415	10	77	2	2	1	25	89.00
HVC28S	28	355	10	77	2	2	1	25	89.00

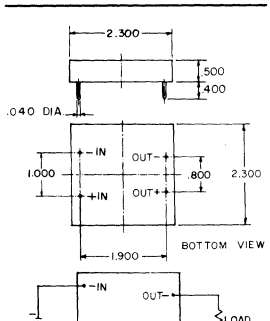


*Measurements taken at nominal input voltage.
**10% minimum load required.

****For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown.

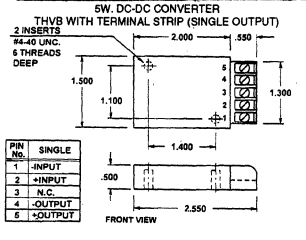
Series HVD-Single Output-15 Watts

**** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ * FULL LOAD TRYPICAL (%)	OUTPUT* VOLTAGE TOLERANCE (±%)	LOAD* REGULATION 25%-100% LOAD (±%)	LINE* REGULATION @ FULL LOAD (±%)**	OUTPUT* VOLTAGE RIPPLE TYPICAL (mv p-p)	**** PRICE 1-24
HVD3.3S	3.3	1818	6	68	2	2	1	50	99.00
HVD5S	5	2000	10	70	2	2	1	50	99.00
HVD5.25S	5.2	1923	10	70	2	2	1	50	99.00
HVD12S	12	1250	15	75	2	2	1	25	99.00
HVD15S	15	1000	15	76	2	2	1	25	99.00
HVD24S	24	625	15	76	2	2	1	25	99.00
HVD28S	28	535	15	76	2	2	1	25	99.00

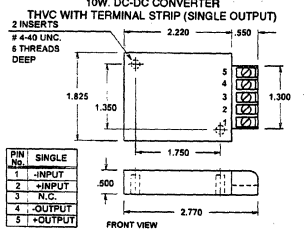


PART#	lb oz.	In grams
HVA Single	1.2 oz.	34.01
HVB Single	1.6 oz.	45.35
HVC Single	2.1 oz.	59.53
HVD Single	2.9 oz.	82.21
THVA Single		
THVB Single	1.9 oz.	53.86
THVC Single	2.5 oz.	70.87
THVD Single	3.1 oz.	87.88

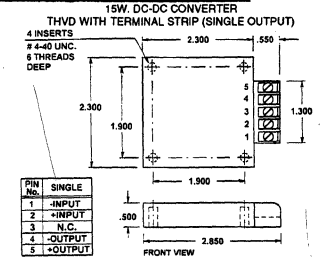
5W. DC-DC CONVERTER
THVB WITH TERMINAL STRIP (SINGLE OUTPUT)



10W. DC-DC CONVERTER
THVC WITH TERMINAL STRIP (SINGLE OUTPUT)



15W. DC-DC CONVERTER
THVD WITH TERMINAL STRIP (SINGLE OUTPUT)



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Series HV-Dual Output-DC-DC Converters

.5" Height

FEATURES:

- Excellent line regulation ±1% (70 VDC–170 VDC)
- Excellent load regulation, from 25% to 100%, ±2%
- Continuous short circuit protection
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Isolation: 100 megohms at 1000 VDC
- Wide input 70 VDC to 170 VDC

PICO's HV Series with wide input voltages are available in 32 different models. As switchers they accommodate a 70 to 170 VDC input, and offer both single and dual, regulated outputs. These isolated units will operate over a temperature range of −25°C to +70°C with no heat sink or electrical derating required. They are excellent for applications where a rectified output from a 110 VAC source is available.

TYPICAL CHARACTERISTICS

Test conditions: 25°C ambient
Input voltage: 70–170 VDC
Converter frequency: 200 KHz to 1 MHz
Operating temperature: −20°C to +70°C ambient
Storage temperature: −55°C to +105°C
Output voltage temperature coefficient: 0.02%/°C
Isolation: 1000 VDC

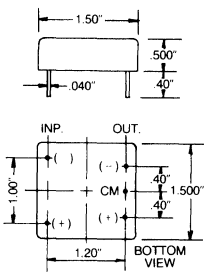
THV Standard Terminal Strip Models Available**

Series HVA-Dual Output-3 Watts

*** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUT. (mA)	MAX. OUTPUT POWER PER OUT. (watts)	EFF. @ * FULL LOAD TYPICAL (%)	OUTPUT * VOLTAGE TOLERANCE (± %)	LOAD * REGULATION 25%-100% LOAD (± %)	LINE * REGULATION @ FULL LOAD (± %) **	OUTPUT * VOLTAGE RIPPLE TYPICAL (mv p-p)	*** PRICE 1-24
HVA5D	±5	300	1.5	63	2	2	1	50	82.00
HVA12D	±12	125	1.5	65	2	2	1	25	82.00
HVA15D	±15	100	1.5	67	2	2	1	25	82.00

*Measurements taken at nominal input voltage.
**10% minimum load required.

Terminal strip not available HVA

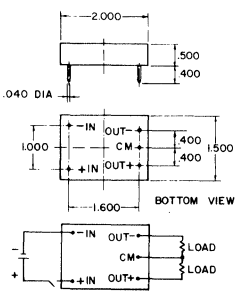


Series HVB-Dual Output-5 Watts

*** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUT. (mA)	MAX. OUTPUT POWER PER OUT. (watts)	EFF. @* FULL LOAD TYPICAL (%)	OUTPUT * VOLTAGE TOLERANCE (± %)	LOAD * REGULATION 25%-100% LOAD (± %)	LINE * REGULATION @ FULL LOAD (± %) **	OUTPUT * VOLTAGE RIPPLE TYPICAL (mv p-p)	*** PRICE 1-24
HVB5D	±5	500	2.5	70	2	2	1	50	92.00
HVB12D	±12	200	2.5	73	2	2	1	25	92.00
HVB15D	±15	165	2.5	73	2	2	1	25	92.00

*Measurements taken at nominal input voltage.
**10% minimum load required.

***For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown

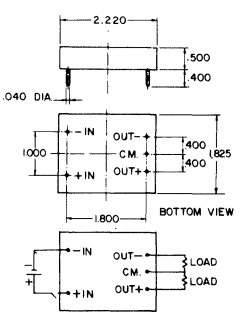


Series HVC-Dual Output-10 Watts

*** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUT. (mA)	MAX. OUTPUT POWER PER OUT. (watts)	EFF. @* FULL LOAD TYPICAL (%)	OUTPUT * VOLTAGE TOLERANCE (± %)	LOAD * REGULATION 25%-100% LOAD (± %)	LINE * REGULATION @ FULL LOAD (± %) **	OUTPUT * VOLTAGE RIPPLE TYPICAL (mv p-p)	*** PRICE 1-24
HVC5D	±5	800	4	68	2	2	1	50	102.00
HVC12D	±12	415	5	75	2	2	1	25	102.00
HVC15D	±15	335	5	76	2	2	1	25	102.00

*Measurements taken at nominal input voltage.
**10% minimum load required.

***For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown

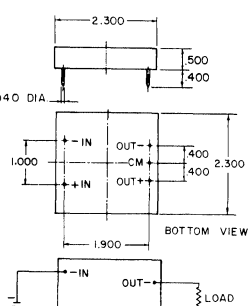


Series HVD-Dual Output-15 Watts

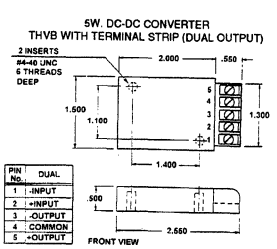
*** PICO PART NUMBER	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUT. (mA)	MAX. OUTPUT POWER PER OUT. (watts)	EFF. @* FULL LOAD TYPICAL (%)	OUTPUT * VOLTAGE TOLERANCE (± %)	LOAD * REGULATION 25%-100% LOAD (± %)	LINE * REGULATION @ FULL LOAD (± %) **	OUTPUT * VOLTAGE RIPPLE TYPICAL (mv p-p)	*** PRICE 1-24
HVD5D	±5	1000	5	69	2	5	1	50	112.00
HVD12D	±12	625	7.5	75	2	2	1	25	112.00
HVD15D	±15	500	7.5	76	2	2	1	25	112.00

*Measurements taken at nominal input voltage.
**10% minimum load required.

***For terminal strip models begin Part Number with letter T. Add $15.00 to prices shown

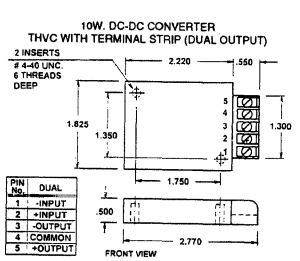


5W. DC-DC CONVERTER
THVB WITH TERMINAL STRIP (DUAL OUTPUT)



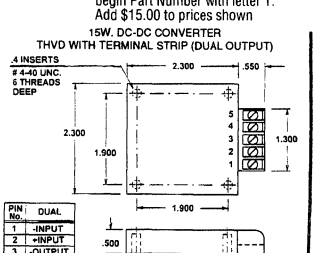
PIN No.	DUAL
1	-INPUT
2	+INPUT
3	-OUTPUT
4	COMMON
5	+OUTPUT

10W. DC-DC CONVERTER
THVC WITH TERMINAL STRIP (DUAL OUTPUT)



PIN No.	DUAL
1	-INPUT
2	+INPUT
3	-OUTPUT
4	COMMON
5	+OUTPUT

15W. DC-DC CONVERTER
THVD WITH TERMINAL STRIP (DUAL OUTPUT)



PIN No.	DUAL
1	-INPUT
2	+INPUT
3	-OUTPUT
4	COMMON
5	+OUTPUT

PART#	In oz.	In grams
HVA Dual	1.2 oz.	34.01
HVB Dual	1.6 oz.	45.35
HVC Dual	2.2 oz.	62.36
HVD Dual	2.9 oz.	82.21
THVA Dual		
THVB Dual	1.9 oz.	53.86
THVC Dual*	2.5 oz.	70.87
THVD Dual*	3.1 oz.	87.88

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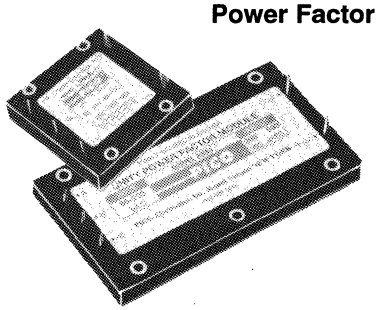
New Unity Power Factor Front End *for... AC-DC Applications!*

250 Watt and 500 Watt Models
Power Factor Corrected

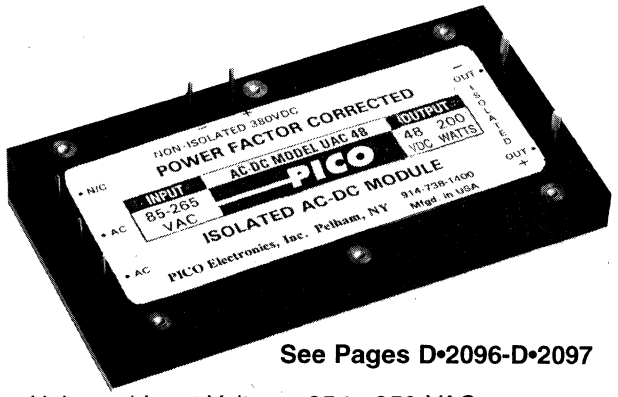


PICO's New Harmonic Attenuators (LPHA-1/ PHA-1) for use with PICO High Power DC-DC Converters for 3.3 to 100 VDC Single and Dual Outputs or 365 VDC regulated output direct from unit.

See Pages D•2098-D•2099

PICO's NEW UAC SERIES

Power Factor Corrected
Universal AC Input, Regulated, Isolated
DC Output to 200 Watts in ONE Module



See Pages D•2096-D•2097

- Universal Input Voltage, 85 to 250 VAC
- Isolated Output
- Power Factor Corrected, 0.99%*
- Space Saving Design, One Module Replaces Two
- Special Output Voltages Available
- Regulated Output Voltage
- Made in the USA, Fully Encapsulated

DC-DC Converters & AC-DC Power Supplies

OPTIONAL ENVIRONMENTAL SCREENING

All Pico DC-DC Converters and AC-DC Power Supplies are available with high reliability Screening options to insure the maximum quality unit for your system. Select from the list below or call factory for review of your specific applications.

OPTIONS AVAILABLE

Operating Temperature: expanded −55°C to +85°C*

Stabilization Bake: per MIL-STD-883, method 1008, 24 hours TA = 125°C

Temperature Cycle: per MIL-STD-883, method 1010, Cond. B. (−55C to +125°C)

Burn In: per MIL-STD-883, method 1015, 160 hours

Isolation between input and output: 100 megohms at 1000V D.C.

Reduced QA Lot Acceptance: 0.25 AQL per MIL-STD-105D

SURGE	*Meets MIL STD 704*
VIBRATION	*Meets MIL STD 202 Method 204 Cond. D*
HUMIDITY	*Meets MIL STD 202 Method 106*
SHOCK	*Meets MIL STD 202 Method 213 Cond. D*
ALTITUDE	*Meets MIL STD 202 Method 105 Cond. D*
Selected MIL STD 883 Options also available	

**AC-DC Power Supplies: No heat sink—20% derating required.*

All Transformers manufactured to MIL-T-27. All assembly and testing done in U.S.A.

Call today for price and delivery of your custom screened unit. Call factory to review any of your other military requirements

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DUAL ISOLATED OUTPUTS

Now Underwriters Laboratories Inc. Recognized Component Mark

100 VDC Output Models

PICO High Power DC-DC Converters

Special Voltage Combinations Available

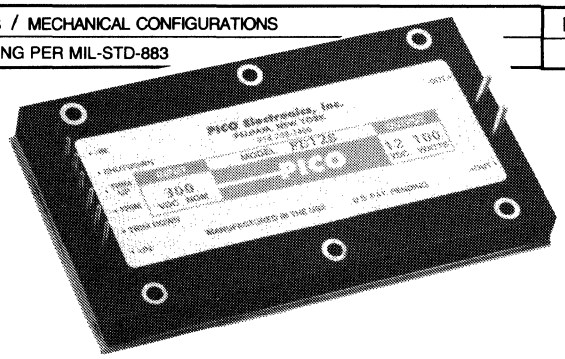
187 Standard Models

Hi Density 100 Watts 2.4"×4.6"×0.5" Ht.

Fixed Frequency

Parallel Operation

Fixed Frequency–DC-DC–75 Watts . . . **Series LPA** Wide Input 18-36 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2076
Fixed Frequency–DC-DC–75 Watts . . . **Series LPB** Wide Input 36-72 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2077
Fixed Frequency–DC-DC–75 Watts . . . **Series LPC** Wide Input 100-180 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2078
Fixed Frequency–DC-DC–75 Watts . . . **Series LPD** Wide Input 200-380 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2079
Fixed Frequency–DC-DC–100 Watts . . . **Series PA** Wide Input 18-36V DC, Regulated, 17 Standard ***Dual*** and Single Models	D•2080
Fixed Frequency–DC-DC–100 Watts . . . **Series PB** Wide Input 36-72V DC, Regulated, 17 Standard ***Dual*** and Single Models	D•2081
Fixed Frequency–DC-DC–100 Watts . . . **Series PC** Wide Input 100-180V DC, Regulated, 17 Standard ***Dual*** and Single Models	D•2082
Fixed Frequency–DC-DC–100 Watts . . . **Series PD** Wide Input 200-380V DC, Regulated, 17 Standard ***Dual*** and Single Models	D•2083
Fixed Frequency–DC-DC– 150 Watts . . . **Series HPB** Wide Input 36-72 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2084
Fixed Frequency–DC-DC–200 Watts . . . **Series HPC** Wide Input 100-180 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2085
Fixed Frequency–DC-DC–200 Watts . . . **Series HPD** Wide Input 200-380 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2086
MILITARY SERIES *Isolated Regulated 75 to 100 Watts Standard Dual and Single Models*	D•2087-2097
APPLICATION NOTES / MECHANICAL CONFIGURATIONS	D•2101-2106
OPTIONAL SCREENING PER MIL-STD-883	D•2074



For AC-DC Application
See Pages D•2098-D•2099
Unity Power Factor Front End

See Pages D•2096-D•2097 for
Power Factor Corrected
New UAC Series
• Universal Input • Isolated Output • Regulated
• DC Output to 200 Watts in ONE Module

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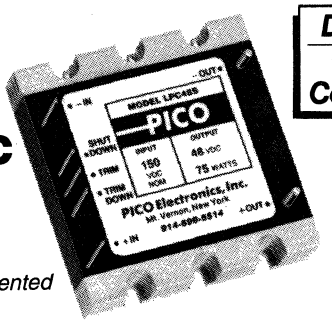
SERIES LPC

Isolated Regulated 75 Watts DC-DC Converters Wide Input Range/100-180 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation



Patented

Dual Isolated Outputs
Special Voltage Combinations Available

The new PICO LPC Series of high power DC-DC Converters allow a wide input voltage of 100–180 VDC while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
The high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

‡Parallel Operation
Consult factory to optimize for your application

SERIES LPC SINGLE • 75 WATTS • INPUT 100–180 VDC

*PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	100-150	150-180			
LPC3.3S	100-180	3.3	30	74	1.25	1.25	0.75	0.75	50	2	129.00
LPC5S	100-180	5	50	81	1.00	1.00	0.75	0.75	50	1.5	129.00
LPC5.2S	100-180	5.2	50	81	1.00	1.00	0.75	0.75	50	1.5	129.00
LPC9S	100-180	9	65	84	0.75	0.75	0.5	0.5	50	1	129.00
LPC12S	100-180	12	75	85	0.75	0.75	0.5	0.5	50	1	129.00
LPC15S	100-180	15	75	86	0.75	0.75	0.5	0.5	50	1	129.00
LPC24S	100-180	24	75	87	0.5	0.5	0.5	0.5	50	0.5	129.00
LPC28S	100-180	28	75	87	0.5	0.5	0.3	0.3	50	0.5	129.00
LPC48S	100-180	48	75	85	0.5	0.5	0.3	0.3	50	0.5	129.00
LPC100S	100-180	100	75	85	0.5	0.5	0.3	0.3	100	0.5	129.00

10% Minimum load required at all times
**Reading taken at nominal 150 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES LPC DUAL • 75 WATTS • INPUT 100–180 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	100-150	150-180			
LPC5D	100-180	5	50	81	1	1	0.75	0.75	50	1.5	174.00
LPC9D	100-180	9	65	84	1	1	0.75	0.75	50	1	174.00
LPC12D	100-180	12	75	85	0.75	0.75	0.5	0.5	50	1	174.00
LPC15D	100-180	15	75	86	0.75	0.75	0.5	0.5	50	1	174.00
LPC24D	100-180	24	75	87	0.5	0.5	0.5	0.5	50	0.5	174.00
LPC28D	100-180	28	75	87	0.5	0.5	0.5	0.5	50	0.5	174.00
LPC48D	100-180	48	75	85	0.5	0.5	0.5	0.5	50	0.5	174.00

10% Minimum load required at all times
**Reading taken at nominal 150 VDC input
*Using proper thermal management maximum temp of +85°C (case)

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 1000 VDC
Isolation Input Output: 1000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations Call Factory

17 Standard Models

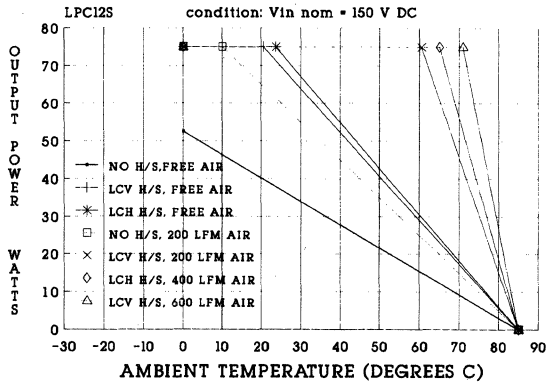
Fixed Frequency

Hi Density 75 Watts

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

100 VDC Output Models

Full thermal analysis can be determined using application notes on page D•2100 By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation.
The curves below were generated for Part #LPC12S using Application Notes Please consult factory with any questions.



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Call Toll Free 800-228-9747

Delivery— stock to one week

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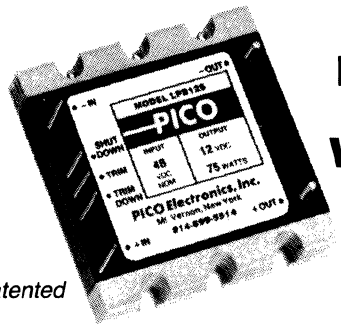
Dual Isolated Outputs
Special Voltage Combinations Available

100 VDC Output Models



Patented

SERIES LPB

Isolated Regulated 75 Watts DC-DC Converters Wide Input Range/36-72 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

The new PICO LPB Series of high power DC-DC Converters allow a wide input voltage of 36–72 VDC while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.

The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.

This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

SERIES LPB SINGLE • 75 WATTS • INPUT 36–72 VDC

*PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	36-48	48-72			
LPB3.3S	36-72	3.3	30	74	1.5	1.5	0.75	0.75	50	2	129.00
LPB5S	36-72	5	50	80	1	1	0.75	0.75	50	1.5	129.00
LPB5.2S	36-72	5.2	50	80	1	1	0.75	0.75	50	1.5	129.00
LPB9S	36-72	9	65	84	1	1	0.75	0.75	50	1	129.00
LPB12S	36-72	12	75	84	0.75	0.75	0.5	0.5	50	1	129.00
LPB15S	36-72	15	75	84	0.75	0.75	0.5	0.5	50	1	129.00
LPB24S	36-72	24	75	87	0.5	0.5	0.5	0.5	50	0.5	129.00
LPB28S	36-72	28	75	87	0.5	0.5	0.5	0.5	50	0.5	129.00
LPB48S	36-72	48	75	85	0.5	0.5	0.5	0.5	50	0.5	129.00
LPB100S	36-72	100	75	85	0.5	0.5	0.5	0.5	100	0.5	129.00

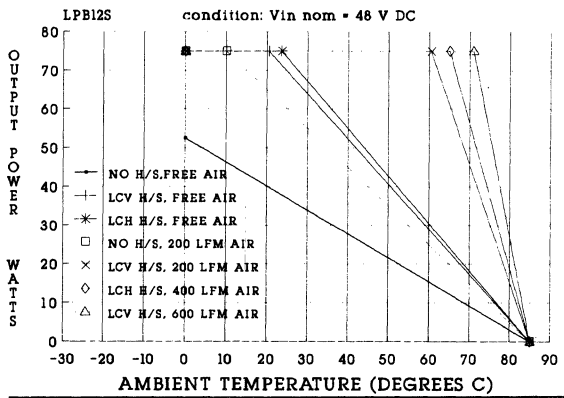
10% Minimum load required at all times
**Reading taken at nominal 48 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES LPB DUAL • 75 WATTS • INPUT 36–72 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	36-48	48-72			
LPB5D	36-72	5	50	80	1	1	0.75	0.75	50	1.5	174.00
LPB9D	36-72	9	65	84	1	1	0.75	0.75	50	1	174.00
LPB12D	36-72	12	75	84	0.75	0.75	0.5	0.5	50	1	174.00
LPB15D	36-72	15	75	85	0.75	0.75	0.5	0.5	50	1	174.00
LPB24D	36-72	24	75	87	0.5	0.5	0.5	0.5	50	0.5	174.00
LPB28D	36-72	28	75	87	0.5	0.5	0.5	0.5	50	0.5	174.00
LPB48D	36-72	48	75	85	0.5	0.5	0.5	0.5	50	0.5	174.00

10% Minimum load required at all times
**Reading taken at nominal 48 VDC input
*Using proper thermal management maximum temp of +85°C (case)

Full thermal analysis can be determined using application notes on page D•2100 By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation.
The curves below were generated for Part #LPB12S using Application Notes Please consult factory with any questions.



FEATURES:

- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:

Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 1000 VDC
Isolation Input Output: 1000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations Call Factory

‡Parallel Operation
Consult factory to optimize for your application

17 Standard Models

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

Hi Density 75 Watts

Fixed Frequency

Delivery— stock to one week

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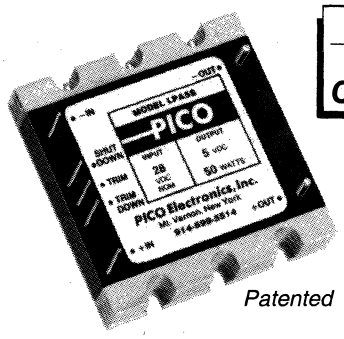
SERIES LPA

Isolated Regulated 75 Watts DC-DC Converters Wide Input Range/18-36 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation



Patented

Dual Isolated Outputs
Special Voltage Combinations Available

The new PICO LPA Series of high power DC-DC Converters, allow a wide input voltage of 18–36 VDC, while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

‡Parallel Operation *Consult factory to optimize for your application*

FEATURES:

- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:

Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 1000 VDC
Isolation Input Output: 1000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations Call Factory

SERIES LPA SINGLE • 75 WATTS • INPUT 18–36 VDC

*PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	18-28	28-36			
LPA3.3S	18-36	3.3	30	73	1.5	1.5	1	1	50	2	129.00
LPA5S	18-36	5	50	80	1.25	1.25	1	1	50	1.5	129.00
LPA5.2S	18-36	5.2	50	80	1.25	1.25	1	1	50	1.5	129.00
LPA9S	18-36	9	60	84	1.25	1.25	1	1	50	1	129.00
LPA12S	18-36	12	60	85	1.25	1.25	1	1	50	0.75	129.00
LPA15S	18-36	15	65	85	1	1	0.75	0.75	50	0.75	129.00
LPA24S	18-36	24	75	87	0.75	0.75	0.5	0.5	50	0.75	129.00
LPA28S	18-36	28	75	87	0.5	0.5	0.5	0.5	50	0.5	129.00
LPA48S	18-36	48	75	85	0.5	0.5	0.5	0.5	50	0.5	129.00
LPA100S	18-36	100	75	85	0.5	0.5	0.5	0.5	100	0.5	129.00

10% Minimum load required at all times
**Reading taken at nominal 28 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES LPA DUAL • 75 WATTS • INPUT 18–36 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	18-28	28-36			
LPA5D	18-36	5	50	80	1.25	1.25	1	1	50	1.5	174.00
LPA9D	18-36	9	60	84	1.25	1.25	1	1	50	1	174.00
LPA12D	18-36	12	60	85	1.25	1.25	1	1	50	0.75	174.00
LPA15D	18-36	15	65	85	1	1	0.75	0.75	50	0.75	174.00
LPA24D	18-36	24	75	87	0.75	0.75	0.5	0.5	50	0.5	174.00
LPA28D	18-36	28	75	87	0.5	0.5	0.5	0.5	50	0.5	174.00
LPA48D	18-36	48	75	85	0.5	0.5	0.5	0.5	50	0.5	174.00

10% Minimum load required at all times
**Reading taken at nominal 28 VDC input
*Using proper thermal management maximum temp of +85°C (case)

17 Standard Models

Meets MIL STD 704 Surge Requirements

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

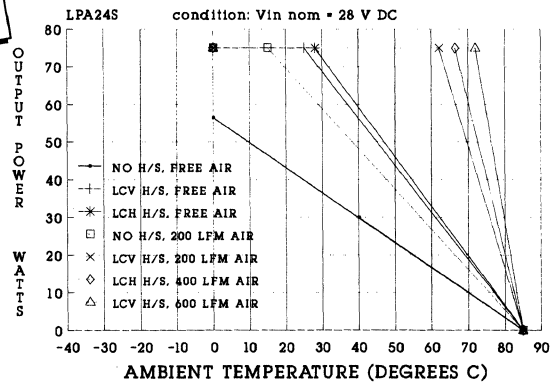
Fixed Frequency

Hi Density 75 Watts

100 VDC Output Models

Delivery— stock to one week

Full thermal analysis can be determined using application notes on page D•2100
By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation.
The curves below were generated for Part #LPA24S using Application Notes
Please consult factory with any questions.



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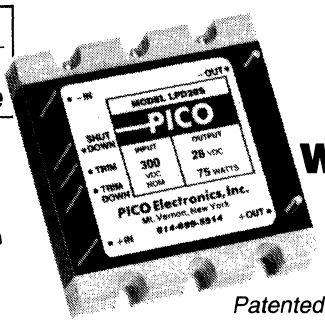
Dual Isolated Outputs
Special Voltage Combinations Available



Patented

100 VDC Output Models

SERIES LPD

Isolated Regulated 75 Watts DC-DC Converters
Wide Input Range/200-380 VDC
Fully Regulated
Short Circuit Protected
‡Parallel Operation

The new PICO HPD Series of high power DC-DC Converters allow a wide input voltage of 200-380 VDC while maintaining a regulated output. They are fully safeguarded for over temperature and continuous short circuit protection.

The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.

This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

SERIES LPD SINGLE • 75 WATTS • INPUT 200–380 VDC

*PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	200-300	300-380			
LPD3.3S	200-380	3.3	30	73	1.50	1.50	1.00	1.00	50	2	129.00
LPD5S	200-380	5	50	80	1.25	1.25	1.00	1.00	50	1.5	129.00
LPD5.2S	200-380	5.2	50	80	1.25	1.25	1.00	1.00	50	1.5	129.00
LPD9S	200-380	9	65	84	1.25	1.25	0.75	0.75	50	1	129.00
LPD12S	200-380	12	75	84	1.00	1.00	0.75	0.75	50	1	129.00
LPD15S	200-380	15	75	84	1.00	1.00	0.75	0.75	50	1	129.00
LPD24S	200-380	24	75	85	0.75	0.75	0.5	0.5	50	0.5	129.00
LPD28S	200-380	28	75	86	0.5	0.5	0.5	0.5	50	0.5	129.00
LPD48S	200-380	48	75	85	0.5	0.5	0.5	0.5	50	0.5	129.00
LPD100S	200-380	100	75	85	0.5	0.5	0.5	0.5	100	0.5	129.00

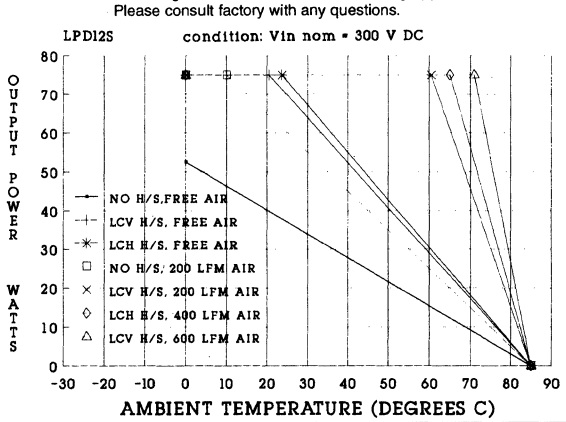
10% Minimum load required at all times
**Reading taken at nominal 300 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES LPD DUAL • 75 WATTS • INPUT 200–380 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	200-300	300-380			
LPD5D	200-380	5	50	80	1.25	1.25	1	1	50	1.5	174.00
LPD9D	200-380	9	65	84	1.25	1.25	0.75	0.75	50	1	174.00
LPD12D	200-380	12	75	84	1	1	0.75	0.75	50	1	174.00
LPD15D	200-380	15	75	84	1	1	0.5	0.5	50	1	174.00
LPD24D	200-380	24	75	85	0.75	0.75	0.5	0.5	50	0.5	174.00
LPD28D	200-380	28	75	86	0.5	0.5	0.5	0.5	50	0.5	174.00
LPD48D	200-380	48	75	85	0.5	0.5	0.5	0.5	50	0.5	174.00

10% Minimum load required at all times
**Reading taken at nominal 300 VDC input
*Using proper thermal management maximum temp of +85°C (case)

Full thermal analysis can be determined using application notes on page D•2100
By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation.
The curves below were generated for Part #LPD12S using Application Notes
Please consult factory with any questions.



FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 1000 VDC
Isolation Input Output: 1500 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C
For All Variations Call Factory

‡Parallel Operation — Consult factory to optimize for your application
Meets MIL STD 704 Surge Requirements
17 Standard Models
Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106
Hi Density 75 Watts
Fixed Frequency
Delivery— stock to one week

For immediate engineering assistance or to place an order–
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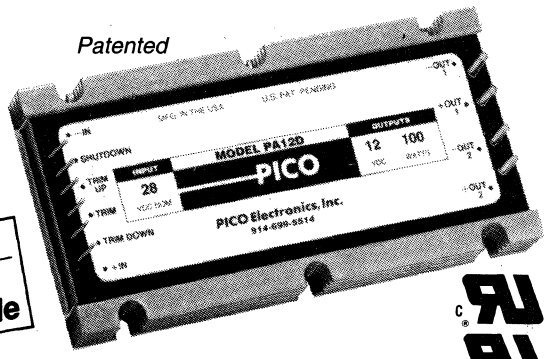
SERIES PA

Isolated Regulated 100 Watts DC-DC Converters Wide Input Range/18-36 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

Patented



Dual Isolated Outputs
Special Voltage Combinations Available

The new PICO PA Series of high power DC-DC Converters, allow a wide input voltage of 18–36 VDC, while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.

The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.

This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

‡Parallel Operation
Consult factory to optimize for your application

SERIES PA SINGLE • 100 WATTS • INPUT 18–36 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%) **		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10–50%	50–100%	18–28V	28–36V			
PA3.3S	18–36	3.3	50	74	2.00	2.00	1.50	1.50	50	2.0	104.00
PA5S	18–36	5	75	76	2.00	2.00	1.50	1.50	50	2.0	104.00
PA5.2S	18–36	5.2	75	76	2.00	2.00	1.50	1.50	50	2.0	104.00
PA9S	18–36	9	100	81	1.50	1.50	1.25	1.25	50	1.5	104.00
PA12S	18–36	12	100	83	1.25	1.25	1.00	1.00	50	1.0	104.00
PA15S	18–36	15	100	84	1.00	1.00	0.75	0.75	50	1.0	104.00
PA24S	18–36	24	100	86	0.75	0.75	0.50	0.50	50	1.0	104.00
PA28S	18–36	28	100	86	0.50	0.50	0.50	0.50	50	0.50	104.00
PA48S	18–36	48	100	86	0.50	0.50	0.50	0.50	50	0.50	104.00
PA100S	18–36	100	100	85	0.50	0.50	0.50	0.50	50	0.50	104.00

10% Minimum load required at all times
** Reading taken at nominal 28 VDC input
* Using proper thermal management, maximum temp. of +85°C (case)

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

SERIES PA DUAL • 100 WATTS • INPUT 18–36 VDC

PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION *** (%)		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10–50%	50–100%	18–28V	28–36V			
PA5D	18–36	5	37.5/37.5	76	2.00	2.00	1.50	1.50	50	2.0	149.00
PA9D	18–36	9	50/50	81	1.50	1.50	1.25	1.25	50	1.5	149.00
PA12D	18–36	12	50/50	83	1.25	1.25	1.00	1.00	50	1.0	149.00
PA15D	18–36	15	50/50	84	1.00	1.00	0.75	0.75	50	1.0	149.00
PA24D	18–36	24	50/50	85	0.75	0.75	0.50	0.50	50	1.0	149.00
PA28D	18–36	28	50/50	86	0.50	0.50	0.50	0.50	50	0.50	149.00
PA48D	18–36	48	50/50	86	0.50	0.50	0.50	0.50	50	0.50	149.00

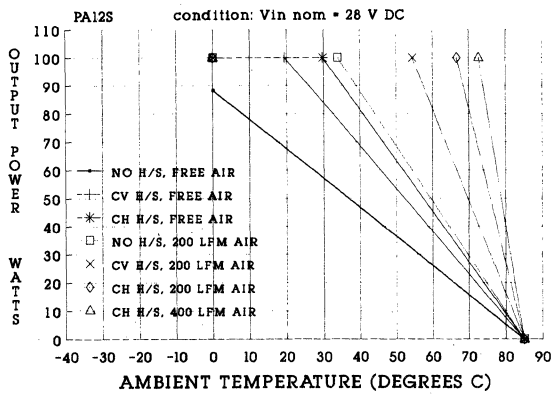
10% minimum load required at all times
** Reading taken at nominal 28 VDC input
*** Balance Load
* Using proper thermal management, maximum temp. of +85°C (case)

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations See Factory

17 Standard Models
Meets MIL STD 704 Surge Requirements
Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106
Fixed Frequency
Hi Density 100 Watts 2.4"×4.6"×0.5" Ht.
Delivery— stock to one week
100 VDC Output Models

Full thermal analysis can be determined using application notes on page D•2100
By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #PA12S using Application Notes Please consult factory with any questions.



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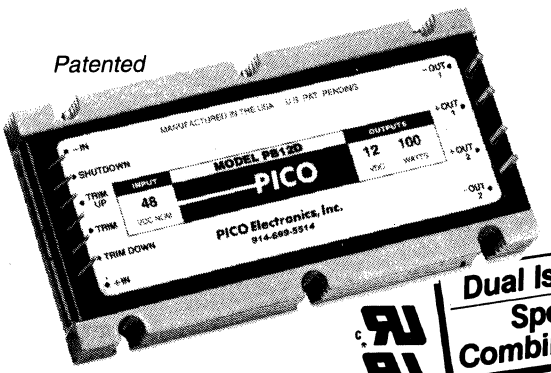


Patented

SERIES PB

Isolated Regulated 100 Watts DC-DC Converters Wide Input Range/36–72 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

Dual Isolated Outputs
Special Voltage Combinations Available

The new PICO PB Series of high power DC-DC Converters allow a wide input voltage of 36–72 VDC while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.

The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.

This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

SERIES PB SINGLE • 100 WATTS • INPUT 36–72 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%) **		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10–50%	50–100%	36-48V	48-72V			
PB3.3S	36-72	3.3	50	76	1.50	1.50	0.75	0.75	50	2.0	104.00
PB5S	36-72	5	75	78	1.00	1.00	0.75	0.75	50	1.5	104.00
PB5.2S	36-72	5.2	75	78	1.00	1.00	0.75	0.75	50	1.5	104.00
PB9S	36-72	9	100	82	1.00	1.00	0.75	0.75	50	1.0	104.00
PB12S	36-72	12	100	84	0.75	0.75	0.50	0.50	50	1.0	104.00
PB15S	36-72	15	100	85	0.75	0.75	0.50	0.50	50	1.0	104.00
PB24S	36-72	24	100	87	0.50	0.50	0.50	0.50	50	0.5	104.00
PB28S	36-72	28	100	87	0.50	0.50	0.50	0.50	50	0.5	104.00
PB48S	36-72	48	100	88	0.50	0.50	0.50	0.50	50	0.5	104.00
PB100S	36-72	100	100	87	0.50	0.50	0.50	0.50	50	0.5	104.00

10% Minimum load required at all times
** Reading taken at nominal 48 VDC input
* Using proper thermal management, maximum temp. of +85°C (case)

SERIES PB DUAL • 100 WATTS • INPUT 36–72 VDC

PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION *** (%)		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10–50%	50–100%	36-48V	48-72V			
PB5D	36-72	5	37.5/37.5	78	1.00	1.00	0.75	0.75	50	1.5	149.00
PB9D	36-72	9	50/50	82	1.00	1.00	0.75	0.75	50	1.0	149.00
PB12D	36-72	12	50/50	84	0.75	0.75	0.50	0.50	50	1.0	149.00
PB15D	36-72	15	50/50	85	0.75	0.75	0.50	0.50	50	1.0	149.00
PB24D	36-72	24	50/50	87	0.50	0.50	0.50	0.50	50	0.5	149.00
PB28D	36-72	28	50/50	87	0.50	0.50	0.50	0.50	50	0.5	149.00
PB48D	36-72	48	50/50	88	0.50	0.50	0.50	0.50	50	0.5	149.00

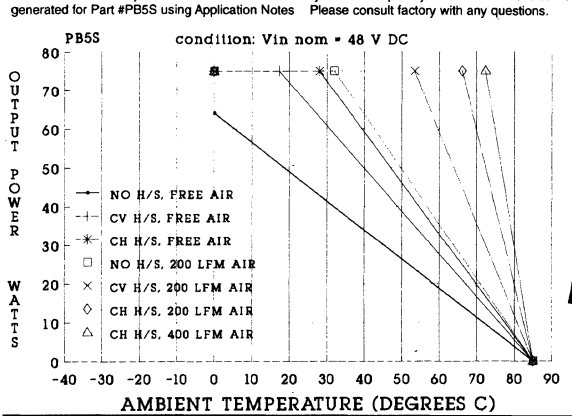
10% minimum load required at all times
** Reading taken at nominal 48 VDC input
* Using proper thermal management, maximum temp. of +85°C (case)
*** Balance Load

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations See Factory

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #PB5S using Application Notes Please consult factory with any questions.



Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

‡Parallel Operation — Consult factory to optimize for your application

17 Standard Models

100 VDC Output Models

Fixed Frequency

Hi Density 100 Watts 2.4"×4.6"×0.5" Ht.

Delivery— stock to one week

For immediate engineering assistance or to place an order–
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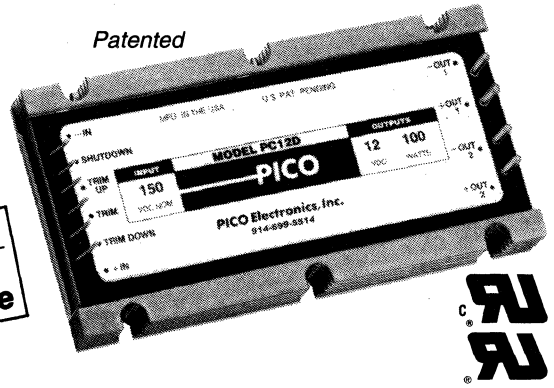
SERIES PC

Isolated Regulated 100 Watts DC-DC Converters Wide Input Range/100-180 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

Patented



Dual Isolated Outputs
Special Voltage Combinations Available

The new PICO PC Series of high power DC-DC Converters allow a wide input voltage of 100–180 VDC while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.

The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.

The high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

‡Parallel Operation
Consult factory to optimize for your application

SERIES PC SINGLE • 100 WATTS • INPUT 100–180 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%) **		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10–50%	50–100%	100-150V	150-180V			
PC3.3S	100-180	3.3	50	76	1.00	1.00	0.75	0.75	50	2.0	104.00
PC5S	100-180	5	75	78	1.00	1.00	0.75	0.75	50	1.5	104.00
PC5.2S	100-180	5.2	75	78	1.00	1.00	0.75	0.75	50	1.5	104.00
PC9S	100-180	9	100	84	0.75	0.75	0.50	0.50	50	1.0	104.00
PC12S	100-180	12	100	86	0.75	0.75	0.50	0.50	50	1.0	104.00
PC15S	100-180	15	100	87	0.75	0.75	0.50	0.50	50	1.0	104.00
PC24S	100-180	24	100	88	0.50	0.50	0.30	0.30	50	0.5	104.00
PC28S	100-180	28	100	88	0.50	0.50	0.20	0.20	50	0.5	104.00
PC48S	100-180	48	100	88	0.50	0.50	0.20	0.20	50	0.5	104.00
PC100S	100-180	100	100	87	0.50	0.50	0.30	0.30	50	0.5	104.00

10% Minimum load required at all times
** Reading taken at nominal 150 VDC input
* Using proper thermal management, maximum temp. of +85°C (case)

SERIES PC DUAL • 100 WATTS • INPUT 100–180 VDC

PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION *** (%)		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10–50%	50–100%	100-150V	150-180V			
PC5D	100-180	5	37.5/37.5	78	1.00	1.00	0.75	0.75	50	1.5	149.00
PC9D	100-180	9	50/50	84	0.75	0.75	0.50	0.50	50	1.0	149.00
PC12D	100-180	12	50/50	86	0.75	0.75	0.50	0.50	50	1.0	149.00
PC15D	100-180	15	50/50	87	0.75	0.75	0.50	0.50	50	1.0	149.00
PC24D	100-180	24	50/50	88	0.50	0.50	0.30	0.30	50	0.5	149.00
PC28D	100-180	28	50/50	88	0.50	0.50	0.20	0.20	50	0.5	149.00
PC48D	100-180	48	50/50	88	0.50	0.50	0.20	0.20	50	0.5	149.00

10% minimum load required at all times
** Reading taken at nominal 150 VDC input
*** Balance Load
* Using proper thermal management, maximum temp. of +85°C (case)

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

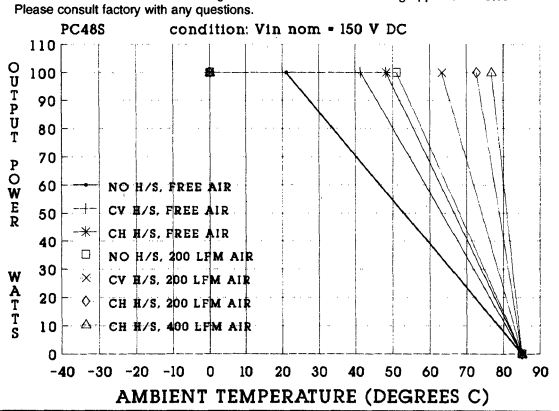
TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations See Factory

17 Standard Models
100 VDC Output Models
Fixed Frequency
Hi Density 100 Watts 2.4"×4.6"×0.5" Ht.
Delivery— stock to one week

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #PC48S using Application Notes Please consult factory with any questions.



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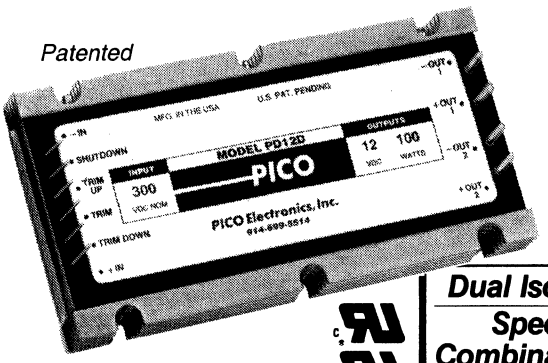


Patented

SERIES PD

Isolated Regulated 100 Watts DC-DC Converters Wide Input Range/200-380 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

Dual Isolated Outputs
Special Voltage Combinations Available

The new PICO HPD Series of high power DC-DC Converters allow a wide input voltage of 200-380 VDC while maintaining a regulated output. They are fully safeguarded for over temperature and continuous short circuit protection.

The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.

This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

SERIES PD SINGLE • 100 WATTS • INPUT 200–380 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%) **		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10–50%	50–100%	200-300V	300-380V			
PD3.3S	200-380	3.3	50	76	1.50	1.50	1.25	1.25	50	2.0	104.00
PD5S	200-380	5	75	78	1.25	1.25	1.00	1.00	50	1.5	104.00
PD5.2S	200-380	5.2	75	78	1.25	1.25	1.00	1.00	50	1.5	104.00
PD9S	200-380	9	100	84	1.25	1.25	1.00	1.00	50	1.0	104.00
PD12S	200-380	12	100	85	1.00	1.00	0.75	0.75	50	1.0	104.00
PD15S	200-380	15	100	86	1.00	1.00	0.75	0.75	50	1.0	104.00
PD24S	200-380	24	100	87	0.75	0.75	0.50	0.50	50	0.5	104.00
PD28S	200-380	28	100	87	0.50	0.50	0.50	0.50	50	0.5	104.00
PD48S	200-380	48	100	88	0.50	0.50	0.20	0.20	50	0.5	104.00
PD100S	200-380	100	100	88	0.50	0.50	0.20	0.20	50	0.5	104.00

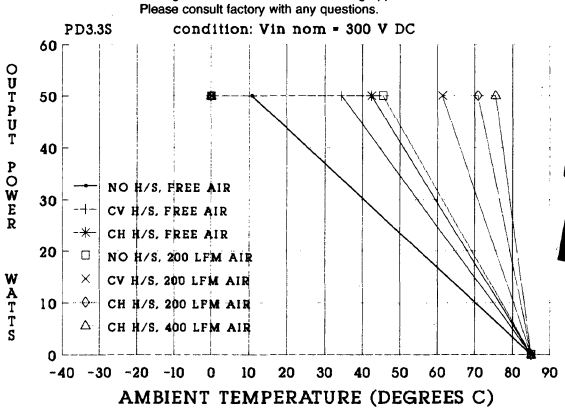
10% Minimum load required at all times
** Reading taken at nominal 300 VDC input
* Using proper thermal management. maximum temp. of +85°C (case)

SERIES PD DUAL • 100 WATTS • INPUT 200–380 VDC

PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION *** (%)		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10–50%	50–100%	200-300V	300-380V			
PD5D	200-380	5	37.5/37.5	78	1.25	1.25	1.00	1.00	50	1.5	149.00
PD9D	200-380	9	50/50	84	1.25	1.25	1.00	1.00	50	1.0	149.00
PD12D	200-380	12	50/50	85	1.00	1.00	0.75	0.75	50	1.0	149.00
PD15D	200-380	15	50/50	86	1.00	1.00	0.75	0.75	50	1.0	149.00
PD24D	200-380	24	50/50	87	0.75	0.75	0.50	0.50	50	0.5	149.00
PD28D	200-380	28	50/50	87	0.50	0.50	0.50	0.50	50	0.5	149.00
PD48D	200-380	48	50/50	88	0.50	0.50	0.20	0.20	50	0.5	149.00

10% minimum load required at all times
** Reading taken at nominal 300 VDC input
* Using proper thermal management, maximum temp. of +85°C (case)
*** Balance Load

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation.
The curves below were generated for Part #PD3.3S using Application Notes
Please consult factory with any questions.



FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations See Factory

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

***‡Parallel Operation** Add Suffix P ie: PD5SP*

17 Standard Models

Hi Density 100 Watts 2.4"×4.6"×0.5" Ht.

100 VDC Output Models

Meets MIL STD 704 Surge Requirements

Fixed Frequency

Delivery— stock to one week

For immediate engineering assistance or to place an order–
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Dual Isolated Outputs
Special Voltage Combinations Available

Patent Pending

SERIES HPB

Isolated Regulated 150 Watts DC-DC Converters Wide Input Range/36-72 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

The new PICO HPB Series of high power DC-DC Converters allow a wide input voltage of 36-72 VDC while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.

The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.

This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

SERIES HPB SINGLE • 150 WATTS • INPUT 36–72 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	36-48	48-72			
HPB3.3S	36-72	3.3	60	72	2.00	2.00	1.50	1.50	50	1.5	149.00
HPB5S	36-72	5	100	75	1.50	1.50	1.00	1.00	50	1.5	149.00
HPB5.2S	36-72	5.2	100	75	1.50	1.50	1.00	1.00	50	1.5	149.00
HPB9S	36-72	9	150	80	1.50	1.50	1.00	1.00	50	1.0	149.00
HPB12S	36-72	12	150	82	1.25	1.25	0.75	0.75	50	1.0	149.00
HPB15S	36-72	15	150	83	1.25	1.25	0.75	0.75	50	1.0	149.00
HPB24S	36-72	24	150	84	1.00	1.00	0.75	0.75	50	1.0	149.00
HPB28S	36-72	28	150	85	0.75	0.75	0.50	0.50	50	0.5	149.00
HPB48S	36-72	48	150	84	0.75	0.75	0.50	0.50	50	0.5	149.00
HPB100S	36-72	100	150	84	0.75	0.75	0.50	0.50	50	0.5	149.00

10% Minimum load required at all times
**Reading taken at nominal 48 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES HPB DUAL • 150 WATTS • INPUT 36–72 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	36-48	48-72			
HPB5D	36-72	5/5	50/50	75	1.5	1.5	1.00	1.00	50	1.5	199.00
HPB9D	36-72	9	75/75	80	1.5	1.5	1.0	1.0	50	1.0	199.00
HPB12D	36-72	12	75/75	82	1.25	1.25	0.75	0.75	50	1.0	199.00
HPB15D	36-72	15	75/75	83	1.25	1.25	0.75	0.75	50	1.0	199.00
HPB24D	36-72	24	75/75	84	1.00	1.00	0.75	0.75	50	1.0	199.00
HPB28D	36-72	28	75/75	85	0.75	0.75	0.75	0.75	50	0.75	199.00
HPB48D	36-72	48	75/75	84	0.75	0.75	0.75	0.75	50	0.5	199.00

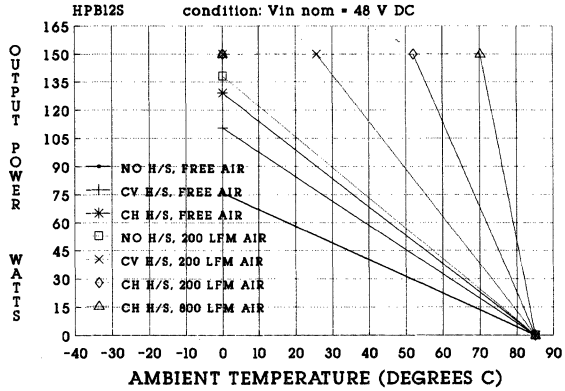
10% Minimum load required at all times
**Reading taken at nominal 48 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

FEATURES:
- **Dual isolated outputs**
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations Call Factory

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #HPB12S using Application Notes Please consult factory with any questions.



Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106
‡Parallel Operation Consult factory to optimize for your application
Fixed Frequency
17 Standard Models
100 VDC Output Models
Hi Density 200 Watts 2.5"×4.6"×0.5" Ht.
Delivery— stock to one week

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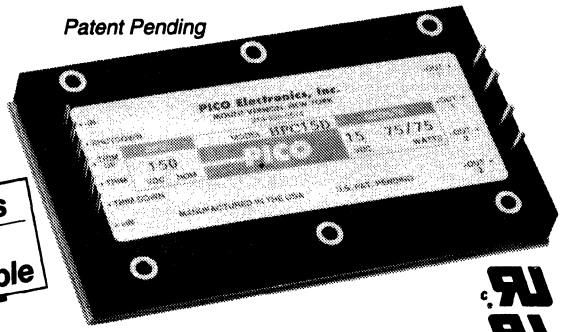
SERIES HPC

Isolated Regulated up to 200 Watts DC-DC Converters
Wide Input Range/100-180 VDC
Fully Regulated
Short Circuit Protected
‡Parallel Operation

Patent Pending



Dual Isolated Outputs
Special Voltage Combinations Available

The new PICO HPC Series of high power DC-DC Converters allow a wide input voltage of 100-180 VDC while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.

The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.

This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

SERIES HPC SINGLE • 200 WATTS • INPUT 100–180 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	100-150	150-180			
HPC3.3S	100-180	3.3	75	71	1.50	1.50	1.25	1.25	50	1.5	149.00
HPC5S	100-180	5	100	76	1.25	1.25	1.00	1.00	50	1.5	149.00
HPC5.2S	100-180	5.2	100	76	1.25	1.25	1.00	1.00	50	1.5	149.00
HPC9S	100-180	9	150	80	1.25	1.25	1.00	1.00	50	1.0	149.00
‡HPC12S	100-180	12	200	83	1.00	1.00	0.75	0.75	50	1.0	149.00
‡HPC15S	100-180	15	200	84	1.00	1.00	0.75	0.75	50	1.0	149.00
‡HPC24S	100-180	24	200	86	0.75	0.75	0.50	0.50	50	0.75	149.00
‡HPC28S	100-180	28	200	86	0.75	0.75	0.50	0.50	50	0.75	149.00
‡HPC48S	100-180	48	200	86	0.50	0.50	0.50	0.50	50	0.50	149.00
HPC100S	100-180	100	150	85	0.50	0.50	0.50	0.50	50	0.50	149.00

10% Minimum load required at all times
**Reading taken at nominal 150 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)
‡Derate below 120 VDC input

SERIES HPC DUAL • 150 WATTS • INPUT 100–180 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	100-150	150-180			
HPC5D	100-180	5	50/50	76	1.25	1.25	1.00	1.00	50	1.5	199.00
HPC9D	100-180	9	75/75	80	1.25	1.25	1.00	1.00	50	1.0	199.00
HPC12D	100-180	12	75/75	83	1.00	1.00	0.75	0.75	50	1.0	199.00
HPC15D	100-180	15	75/75	84	1.00	1.00	0.75	0.75	50	1.0	199.00
HPC24D	100-180	24	75/75	86	0.75	0.75	0.75	0.75	50	0.75	199.00
HPC28D	100-180	28	75/75	86	0.75	0.75	0.50	0.50	50	0.75	199.00
HPC48D	100-180	48	75/75	85	0.50	0.50	0.50	0.50	50	0.50	199.00

10% Minimum load required at all times
**Reading taken at nominal 150 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

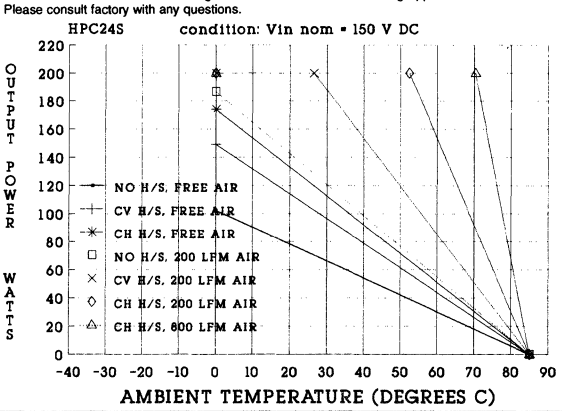
TYPICAL CHARACTERISTICS:

Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations See Factory

17 Standard Models | **Fixed Frequency** | **Hi Density 200 Watts 2.5"×4.6"×0.5" Ht.** | **100 VDC Output Models** | **Delivery– stock to one week** | **Application Notes Page D•2100** | **Mechanical Configuration Pages D•2101-2106** | **‡Parallel Operation** Consult factory to optimize for your application

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #HPC24S using Application Notes Please consult factory with any questions.



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Dual Isolated Outputs
Special Voltage Combinations Available

SERIES HPD

Isolated Regulated up to 200 Watts DC-DC Converters

Wide Input Range/200-380 VDC

Fully Regulated

Short Circuit Protected

‡Parallel Operation

Patent Pending

The new PICO HPD Series of high power DC-DC Converters allow a wide input voltage of 200-380 VDC while maintaining a regulated output. They are fully safeguarded for over temperature and continuous short circuit protection.

The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.

This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent commercial requirements.

SERIES HPD SINGLE • 200 WATTS • INPUT 200–380 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	200-300	300-380			
HPD3.3S	200-380	3.3	75	73	1.5	1.5	1.25	1.25	50	1.5	149.00
HPD5S	200-380	5	100	77	1.25	1.25	1.00	1.00	50	1.5	149.00
HPD5.2S	200-380	5.2	100	77	1.25	1.25	1.00	1.00	50	1.5	149.00
HPD9S	200-380	9	150	80	1.25	1.25	1.00	1.00	50	1.0	149.00
HPD12S	200-380	12	200	82	1.00	1.00	0.75	0.75	50	1.0	149.00
HPD15S	200-380	15	200	83	1.00	1.00	0.75	0.75	50	1.0	149.00
HPD24S	200-380	24	200	85	0.75	0.75	0.50	0.50	50	0.75	149.00
HPD28S	200-380	28	200	86	0.5	0.5	0.5	0.5	50	0.75	149.00
HPD48S	200-380	48	200	86	0.5	0.5	0.5	0.5	50	0.5	149.00
HPD100S	200-380	100	150	85	0.5	0.5	0.5	0.5	50	0.5	149.00

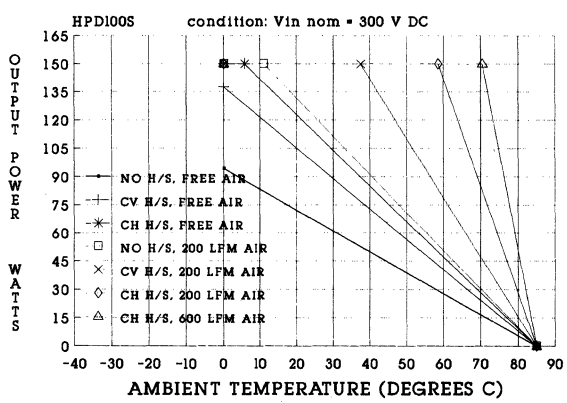
10% Minimum load required at all times
**Reading taken at nominal 300 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES HPD DUAL • 150 WATTS • INPUT 200–380 VDC

‡PICO PART NUMBER	INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1-1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	PRICE
					10-50%	50-100%	200-300	300-380			
HPD5D	200-380	5	50/50	77	1.25	1.25	1.00	1.00	50	1.5	199.00
HPD9D	200-380	9	75/75	80	1.25	1.25	1.00	1.00	50	1.0	199.00
HPD12D	200-380	12	75/75	82	1.00	1.00	0.75	0.75	50	1.0	199.00
HPD15D	200-380	15	75/75	83	1.00	1.00	0.75	0.75	50	1.0	199.00
HPD24D	200-380	24	75/75	85	0.75	0.75	0.75	0.75	50	0.75	199.00
HPD28D	200-380	28	75/75	86	0.75	0.75	0.50	0.50	50	0.75	199.00
HPD48D	200-380	48	75/75	86	0.5	0.5	0.5	0.5	50	0.50	199.00

10% Minimum load required at all times
**Reading taken at nominal 300 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #HPD100S using Application Notes Please consult factory with any questions.



FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:

Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, Min. 0°C ambient, Max. +85°C base plate temp.
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: −55°C to +105°C

For All Variations See Factory

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

17 Standard Models

Fixed Frequency

‡Parallel Operation
Consult factory to optimize for your application

100 VDC Output Models

Hi Density 200 Watts
2.5"×4.6"×0.5" Ht.

Delivery— stock to one week

For immediate engineering assistance or to place an order–
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DUAL ISOLATED OUTPUTS

Now UL®

MILITARY High Power DC-DC Converters

100 VDC Output Models

Special Voltage Combinations Available

187 Standard Models

Hi Density 100 Watts 2.4"×4.6"×0.5" Ht.

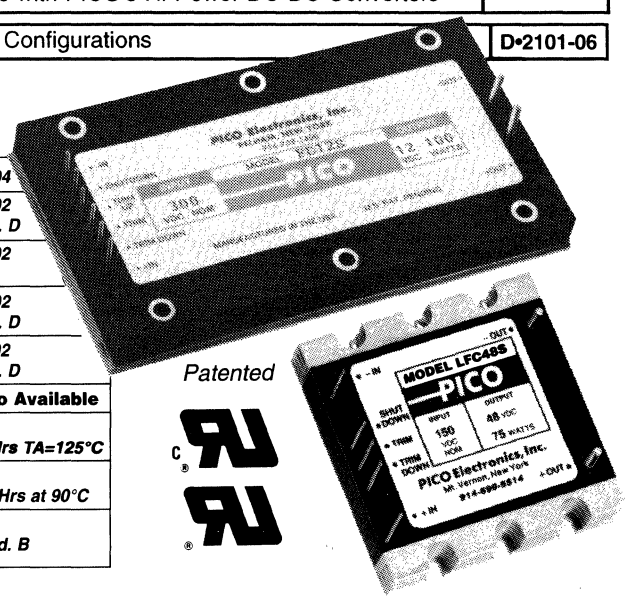
Fixed Frequency

Fixed Frequency-DC-DC-75 Watts...**SERIES LFA/LMA** UL® Wide Input 18-36 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2088
Fixed Frequency-DC-DC-75 Watts...**SERIES LFB/LMB** UL® Wide Input 36-72 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2089
Fixed Frequency-DC-DC-75 Watts...**SERIES LFC/LMC** UL® Wide Input 100-180 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2090
Fixed Frequency-DC-DC-75 Watts...**SERIES LFD/LMD** UL® Wide Input 200-380 VDC, Regulated, 17 Standard ***Dual*** and Single Models	D•2091
Fixed Frequency-DC-DC-100 Watts...**SERIES FA/MA** UL® Wide Input 18-36V DC, Regulated, 17 Standard ***Dual*** and Single Models	D•2092
Fixed Frequency-DC-DC-100 Watts...**SERIES FB/MB** UL® Wide Input 36-72V DC, Regulated, 17 Standard ***Dual*** and Single Models	D•2093
Fixed Frequency-DC-DC-100 Watts...**SERIES FC/MC** UL® Wide Input 100-180V DC, Regulated, 17 Standard ***Dual*** and Single Models	D•2094
Fixed Frequency-DC-DC-100 Watts...**SERIES FD/MD** UL® Wide Input 200-380V DC, Regulated, 17 Standard ***Dual*** and Single Models	D•2095
New! AC-DC Converters... • Power Factor Corrected • Universal Input • Isolated Output • Regulated • DC Output to 200 Watts in One Module	D•2096-97
AC-DC Converters...Universal AC Input Regulated to 365 VDC *Up to 500 Watts* for use with PICO's Hi-Power DC-DC Converters UL®	D•2098-99
Application Notes • Mechanical Configurations	D•2101-06

Series F
Series LF
–40°C to +85°C
Operating Temp.

Series M
Series LM
–55°C to +85°C
Operating Temp.

SURGE	*Meets MIL STD 704*
VIBRATION	*Meets MIL STD 202 Method 204 Cond. D*
HUMIDITY	*Meets MIL STD 202 Method 106*
SHOCK	*Meets MIL STD 202 Method 213 Cond. D*
ALTITUDE	*Meets MIL STD 202 Method 105 Cond. D*
Selected MIL STD 883 Options also Available	
STABILIZATION BAKE	*MIL STD 883 Method 1008 24 Hrs TA=125°C*
BURN IN	*MIL STD 883 Method 1015 160 Hrs at 90°C*
TEMPERATURE CYCLE	*MIL STD 883 Method 1010 Cond. B*



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UL® C UL®

Also See Pages D•2096-2097 for New Series UAC

- *Power Factor Corrected*
- *Universal Input*
- *Isolated Output*
- *Regulated*
- *DC Output to 200 Watts in ONE Module*

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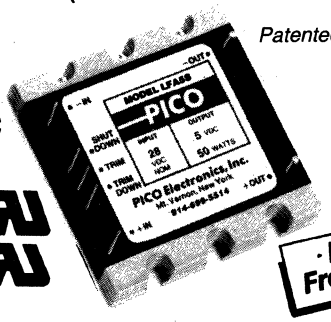
MILITARY SERIES LFA (–40°C to +85°C Operating Temperature) SERIES LMA (–55°C to +85°C Operating Temperature)

Isolated Regulated 75 Watts DC-DC Converters Wide Input Range/18-36 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation



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Dual Isolated Outputs
Special Voltage Combinations Available

‡Parallel Operation
Consult factory to optimize for your application

100 VDC Output Models

Fixed Frequency

Hi Density 75 Watts

The new PICO Series LFA and Series LMA of high power DC-DC Converters, allow a wide input voltage of 18-36 VDC, while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent military requirements.

SERIES LFA/LMA SINGLE • 75 WATTS • INPUT 18–36 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series LFA Single (–40°C to +85°C)		Series LMA Single (–55°C to +85°C)	
				10-50%	50-100%	18-28V	28-36V			‡PICO PART NUMBER	PRICE	PICO PART NUMBER	PRICE
18-36	3.3	30	73	1.5	1.5	1	1	50	2	LFA3.3S	258.00	LMA3.3S	387.00
18-36	5	50	80	1.25	1.25	1	1	50	1.5	LFA5S	258.00	LMA5S	387.00
18-36	5.2	50	80	1.25	1.25	1	1	50	1.5	LFA5.2S	258.00	LMA5.2S	387.00
18-36	9	60	84	1.25	1.25	1	1	50	1	LFA9S	258.00	LMA9S	387.00
18-36	12	60	85	1.25	1.25	1	1	50	0.75	LFA12S	258.00	LMA12S	387.00
18-36	15	65	85	1	1	0.75	0.75	50	0.75	LFA15S	258.00	LMA15S	387.00
18-36	24	75	87	075	0.75	0.5	0.5	50	0.75	LFA24S	258.00	LMA24S	387.00
18-36	28	75	87	0.5	0.5	0.5	0.5	50	0.5	LFA28S	258.00	LMA28S	387.00
18-36	48	75	85	0.5	0.5	0.5	0.5	50	0.5	LFA48S	258.00	LMA48S	387.00
18-36	100	75	85	0.5	0.5	0.5	0.5	100	0.5	LFA100S	258.00	LMA100S	387.00

10% Minimum load required at all times
**Reading taken at nominal 28 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart,
–40°C to +85°C base plate
–55°C to +85°C base plate
Test conditions: 25° C ambient
Isolation Base Input: 1000 VDC
Isolation Input Output: 1000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: –55°C to +105°C

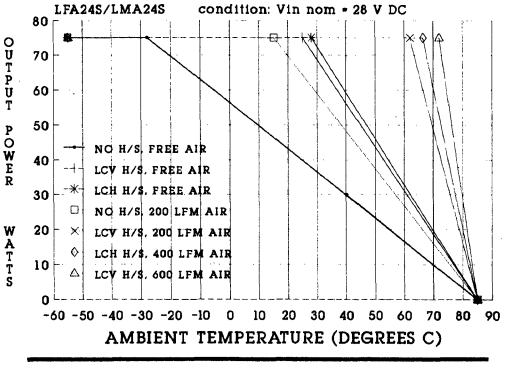
For All Variations Call Factory

SERIES LFA/LMA DUAL • 75 WATTS • INPUT 18–36 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series LFA Dual (–40°C to +85°C)		Series LMA Dual (–55°C to +85°C)	
				10-50%	50-100%	18-28V	28-36V			‡PICO PART NUMBER	PRICE	PICO PART NUMBER	PRICE
18-36	5	50	80	1.25	1.25	1	1	50	1.5	LFA5D	348.00	LMA5D	522.00
18-36	9	60	84	1.25	1.25	1	1	50	1	LFA9D	348.00	LMA9D	522.00
18-36	12	60	85	1.25	1.25	1	1	50	0.75	LFA12D	348.00	LMA12D	522.00
18-36	15	65	85	1	1	0.75	0.75	50	0.75	LFA15D	348.00	LMA15D	522.00
18-36	24	75	87	0.75	0.75	0.5	0.5	50	0.5	LFA24D	348.00	LMA24D	522.00
18-36	28	75	87	0.5	0.5	0.5	0.5	50	0.5	LFA28D	348.00	LMA28D	522.00
18-36	48	75	85	0.5	0.5	0.5	0.5	50	0.5	LFA48D	348.00	LMA48D	522.00

10% Minimum load required at all times
**Reading taken at nominal 28 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #LFA24S/LMA24S using Application Notes
Please consult factory with any questions.



34 Standard Models

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

Series LFA *–40°C to +85°C Operating Temp.*

Series LMA *–55°C to +85°C Operating Temp.*

SURGE	Meets MIL STD 704
VIBRATION	Meets MIL STD 202 Method 204 Cond. D
HUMIDITY	Meets MIL STD 202 Method 106
SHOCK	Meets MIL STD 202 Method 213 Cond. D
ALTITUDE	Meets MIL STD 202 Method 105 Cond. D
Selected MIL STD 883 Options also Available	
STABILIZATION BAKE	MIL STD 883 Method 1008 24 Hrs TA=125°C
BURN IN	MIL STD 883 Method 1015 160 Hrs at 90°C
TEMPERATURE CYCLE	MIL STD 883 Method 1010 Cond. B

Delivery— stock to one week

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MILITARY SERIES LFB (–40°C to +85°C Operating Temperature) SERIES LMB (–55°C to +85°C Operating Temperature)

Dual Isolated Outputs
Special Voltage Combinations Available

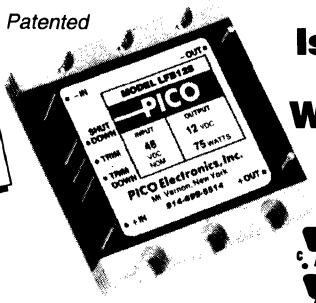
Fixed Frequency

100 VDC Output Models

‡Parallel Operation
Consult factory to optimize for your application

Hi Density 75 Watts

Patented



Isolated Regulated 75 Watts DC-DC Converters Wide Input Range/36-72 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

The new PICO Series LFB and Series LMB of high power DC-DC Converters, allow a wide input voltage of 36-72 VDC, while maintaining a regulated output. They are fully safe-guarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent military requirements.

SERIES LFB/LMB SINGLE • 75 WATTS • INPUT 36–72 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series LFB Single (–40°C to +85°C)		Series LMB Single (–55°C to +85°C)	
				10-50%	50-100%	36-48V	48-72V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
36-72	3.3	30	74	1.5	1.5	0.75	0.75	50	2	LFB3.3S	258.00	LMB3.3S	387.00
36-72	5	50	80	1	1	0.75	0.75	50	1.5	LFB5S	258.00	LMB5S	387.00
36-72	5.2	50	80	1	1	0.75	0.75	50	1.5	LFB5.2S	258.00	LMB5.2S	387.00
36-72	9	65	84	1	1	0.75	0.75	50	1	LFB9S	258.00	LMB9S	387.00
36-72	12	75	84	0.75	0.75	0.5	0.5	50	1	LFB12S	258.00	LMB12S	387.00
36-72	15	75	84	0.75	0.75	0.5	0.5	50	1	LFB15S	258.00	LMB15S	387.00
36-72	24	75	87	0.5	0.5	0.5	0.5	50	0.5	LFB24S	258.00	LMB24S	387.00
36-72	28	75	87	0.5	0.5	0.5	0.5	50	0.5	LFB28S	258.00	LMB28S	387.00
36-72	48	75	85	0.5	0.5	0.5	0.5	50	0.5	LFB48S	258.00	LMB48S	387.00
36-72	100	75	85	0.5	0.5	0.5	0.5	100	0.5	LFB100S	258.00	LMB100S	387.00

10% Minimum load required at all times
**Reading taken at nominal 48 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES LFB/LMB DUAL • 75 WATTS • INPUT 36–72 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series LFB Dual (–40°C to +85°C)		Series LMB Dual (–55°C to +85°C)	
				10-50%	50-100%	36-48V	48-72V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
36-72	5	50	80	1	1	0.75	0.75	50	1.5	LFB5D	348.00	LMB5D	522.00
36-72	9	65	84	1	1	0.75	0.75	50	1	LFB9D	348.00	LMB9D	522.00
36-72	12	75	84	0.75	0.75	0.5	0.5	50	1	LFB12D	348.00	LMB12D	522.00
36-72	15	75	85	0.75	0.75	0.5	0.5	50	1	LFB15D	348.00	LMB15D	522.00
36-72	24	75	87	0.5	0.5	0.5	0.5	50	0.5	LFB24D	348.00	LMB24D	522.00
36-72	28	75	87	0.5	0.5	0.5	0.5	50	0.5	LFB28D	348.00	LMB28D	522.00
36-72	48	75	85	0.5	0.5	0.5	0.5	50	0.5	LFB48D	348.00	LMB48D	522.00

**Reading taken at nominal 48 VDC input 10% Minimum load required at all times
*Using proper thermal management, maximum temp. of +85°C (case)

FEATURES:

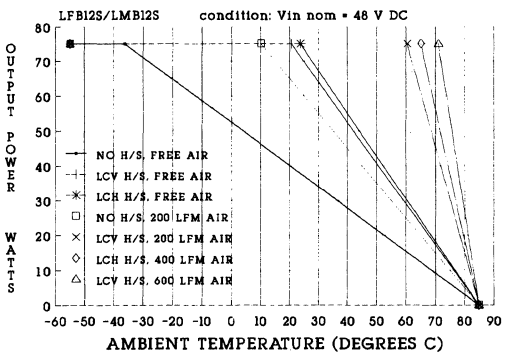
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:

Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart,
–40°C to +85°C base plate
–55°C to +85°C base plate
Test conditions: 25° C ambient
Isolation Base Input: 1000 VDC
Isolation Input Output: 1000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: –55°C to +105°C

For All Variations Call Factory

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #LFB12S/LMB12S using Application Notes Please consult factory with any questions.



Application Notes Page D•2100

Mechanical Configuration Pages D•2101-2106

34 Standard Models

Series LFB *–40°C to +85°C Operating Temp.*

Series LMB *–55°C to +85°C Operating Temp.*

VIBRATION	Meets MIL STD 202 Method 204 Cond. D
HUMIDITY	Meets MIL STD 202 Method 106
SHOCK	Meets MIL STD 202 Method 213 Cond. D
ALTITUDE	Meets MIL STD 202 Method 105 Cond. D
Selected MIL STD 883 Options also Available	
STABILIZATION BAKE	MIL STD 883 Method 1008 24 Hrs TA=125°C
BURN IN	MIL STD 883 Method 1015 160 Hrs at 90°C
TEMPERATURE CYCLE	MIL STD 883 Method 1010 Cond. B

Delivery— stock to one week

For immediate engineering assistance or to place an order–
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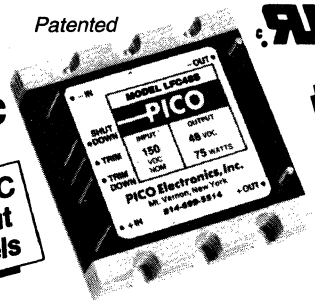
MILITARY SERIES LFC (–40°C to +85°C Operating Temperature) SERIES LMC (–55°C to +85°C Operating Temperature)

Isolated Regulated 75 Watts DC-DC Converters Wide Input Range/100-180 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation



100 VDC Output Models

Dual Isolated Outputs Special Voltage Combinations Available

‡Parallel Operation Consult factory to optimize for your application

Fixed Frequency

Hi Density 75 Watts

The new PICO Series LFC and Series LMC of high power DC-DC Converters, allow a wide input voltage of 100-180 VDC, while maintaining a regulated output. They are fully safe-guarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent military requirements.

SERIES LFC/LMC SINGLE • 75 WATTS • INPUT 100–180 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series LFC Single (–40°C to +85°C)		Series LMC Single (–55°C to +85°C)	
				10-50%	50-100%	100-150V	150-180V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
100-180	3.3	30	74	1.25	1.25	0.75	0.75	50	2	LFC3.3S	258.00	LMC3.3S	387.00
100-180	5	50	81	1.00	1.00	0.75	0.75	50	1.5	LFC5S	258.00	LMC5S	387.00
100-180	5.2	50	81	1.00	1.00	0.75	0.75	50	1.5	LFC5.2S	258.00	LMC5.2S	387.00
100-180	9	65	84	0.75	0.75	0.5	0.5	50	1	LFC9S	258.00	LMC9S	387.00
100-180	12	75	85	0.75	0.75	0.5	0.5	50	1	LFC12S	258.00	LMC12S	387.00
100-180	15	75	86	0.75	0.75	0.5	0.5	50	1	LFC15S	258.00	LMC15S	387.00
100-180	24	75	87	0.5	0.5	0.5	0.5	50	0.5	LFC24S	258.00	LMC24S	387.00
100-180	28	75	87	0.5	0.5	0.3	0.3	50	0.5	LFC28S	258.00	LMC28S	387.00
100-180	48	75	85	0.5	0.5	0.3	0.3	50	0.5	LFC48S	258.00	LMC48S	387.00
100-180	100	75	85	0.5	0.5	0.3	0.3	100	0.5	LFC100S	258.00	LMC100S	387.00

10% Minimum load required at all times
**Reading taken at nominal 150 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES LFC/LMC DUAL • 75 WATTS • INPUT 100–180 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series LFC Dual (–40°C to +85°C)		Series LMC Dual (–55°C to +85°C)	
				10-50%	50-100%	100-150V	150-180V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
100-180	5	50	81	1	1	0.75	0.75	50	1.5	LFC5D	348.00	LMC5D	522.00
100-180	9	65	84	1	1	0.75	0.75	50	1	LFC9D	348.00	LMC9D	522.00
100-180	12	75	85	0.75	0.75	0.5	0.5	50	1	LFC12D	348.00	LMC12D	522.00
100-180	15	75	86	0.75	0.75	0.5	0.5	50	1	LFC15D	348.00	LMC15D	522.00
100-180	24	75	87	0.5	0.5	0.5	0.5	50	0.5	LFC24D	348.00	LMC24D	522.00
100-180	28	75	87	0.5	0.5	0.5	0.5	50	0.5	LFC28D	348.00	LMC28D	522.00
100-180	48	75	85	0.5	0.5	0.5	0.5	50	0.5	LFC48D	348.00	LMC48D	522.00

10% Minimum load required at all times
**Reading taken at nominal 150 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

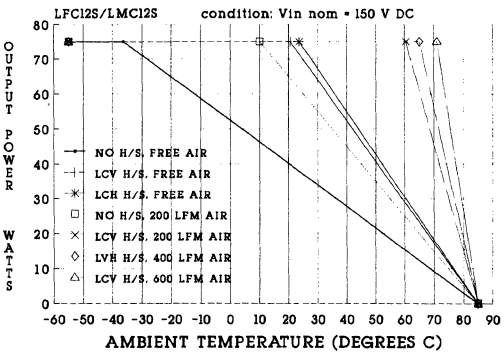
FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max, +85°C
Operating Temp.: See thermal chart,
–40°C to +85°C base plate
–55°C to +85°C base plate
Test conditions: 25° C ambient
Isolation Base Input: 1000 VDC
Isolation Input Output: 1000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: –55°C to +105°C
For All Variations Call Factory

34 Standard Models

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #LFC12S/LMC12S using Application Notes
Please consult factory with any questions.



Series LFC *–40°C to +85°C Operating Temp.*

Series LMC *–55°C to +85°C Operating Temp.*

VIBRATION	Meets MIL STD 202 Method 204 Cond. D
HUMIDITY	Meets MIL STD 202 Method 106
SHOCK	Meets MIL STD 202 Method 213 Cond. D
ALTITUDE	Meets MIL STD 202 Method 105 Cond. D
Selected MIL STD 883 Options also Available	
STABILIZATION BAKE	MIL STD 883 Method 1008 24 Hrs TA=125°C
BURN IN	MIL STD 883 Method 1015 160 Hrs at 90°C
TEMPERATURE CYCLE	MIL STD 883 Method 1010 Cond. B

Delivery— stock to one week

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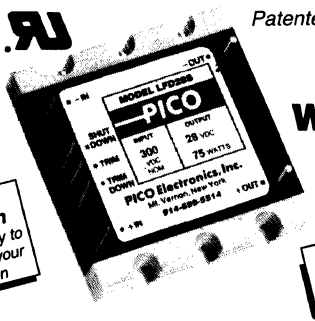
MILITARY SERIES LFD (–40°C to +85°C Operating Temperature) SERIES LMD (–55°C to +85°C Operating Temperature)

Dual Isolated Outputs
Special Voltage Combinations Available

Hi Density 75 Watts

100 VDC Output Models

‡Parallel Operation
Consult factory to optimize for your application



Patented

Isolated Regulated 75 Watts DC-DC Converters Wide Input Range/200-380 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

Fixed Frequency

The new PICO Series LFD and Series LMD of high power DC-DC Converters, allow a wide input voltage of 200-380 VDC, while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent military requirements.

SERIES LFD/LMD SINGLE • 75 WATTS • INPUT 200–380 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series LFD Single (–40°C to +85°C)		Series LMD Single (–55°C to +85°C)	
				10-50%	50-100%	200-300V	300-380V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
200-380	3.3	30	73	1.50	1.50	1.00	1.00	50	2	LFD3.3S	258.00	LMD3.3S	387.00
200-380	5	50	80	1.25	1.25	1.00	1.00	50	1.5	LFD5S	258.00	LMD5S	387.00
200-380	5.2	50	80	1.25	1.25	1.00	1.00	50	1.5	LFD5.2S	258.00	LMD5.2S	387.00
200-380	9	65	84	1.25	1.25	0.75	0.75	50	1	LFD9S	258.00	LMD9S	387.00
200-380	12	75	84	1.00	1.00	0.75	0.75	50	1	LFD12S	258.00	LMD12S	387.00
200-380	15	75	84	1.00	1.00	0.75	0.75	50	1	LFD15S	258.00	LMD15S	387.00
200-380	24	75	85	0.75	0.75	0.5	0.5	50	0.5	LFD24S	258.00	LMD24S	387.00
200-380	28	75	86	0.5	0.5	0.5	0.5	50	0.5	LFD28S	258.00	LMD28S	387.00
200-380	48	75	85	0.5	0.5	0.5	0.5	50	0.5	LFD48S	258.00	LMD48S	387.00
200-380	100	75	85	0.5	0.5	0.5	0.5	100	0.5	LFD100S	258.00	LMD100S	387.00

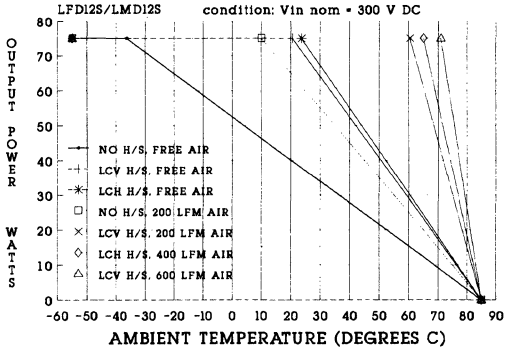
10% Minimum load required at all times
**Reading taken at nominal 300 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES LFD/LMD DUAL • 75 WATTS • INPUT 200–380 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series LFD Dual (–40°C to +85°C)		Series LMD Dual (–55°C to +85°C)	
				10-50%	50-100%	200-300V	300-380V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
200-380	5	50	80	1.25	1.25	1	1	50	1.5	LFD5D	348.00	LMD5D	522.00
200-380	9	65	84	1.25	1.25	0.75	0.75	50	1	LFD9D	348.00	LMD9D	522.00
200-380	12	75	84	1	1	0.75	0.75	50	1	LFD12D	348.00	LMD12D	522.00
200-380	15	75	84	1	1	0.5	0.5	50	1	LFD15D	348.00	LMD15D	522.00
200-380	24	75	85	0.75	0.75	0.5	0.5	50	0.5	LFD24D	348.00	LMD24D	522.00
200-380	28	75	86	0.5	0.5	0.5	0.5	50	0.5	LFD28D	348.00	LMD28D	522.00
200-380	48	75	85	0.5	0.5	0.5	0.5	50	0.5	LFD48D	348.00	LMD48D	522.00

**Reading taken at nominal 300 VDC input 10% Minimum load required at all times
*Using proper thermal management, maximum temp. of +85°C (case)

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #LFD12S/LMD12S using Application Notes Please consult factory with any questions.



FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, –40°C to +85°C base plate –55°C to +85°C base plate
Test conditions: 25° C ambient
Isolation Base Input: 1000 VDC
Isolation Input Output: 1500 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: –55°C to +105°C
For All Variations Call Factory

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

34 Standard Models

Series LFD *–40°C to +85°C Operating Temp.*

Series LMD *–55°C to +85°C Operating Temp.*

SURGE	Meets MIL STD 704
VIBRATION	Meets MIL STD 202 Method 204 Cond. D
HUMIDITY	Meets MIL STD 202 Method 106
SHOCK	Meets MIL STD 202 Method 213 Cond. D
ALTITUDE	Meets MIL STD 202 Method 105 Cond. D
Selected MIL STD 883 Options also Available	
STABILIZATION BAKE	MIL STD 883 Method 1008 24 Hrs TA=125°C
BURN IN	MIL STD 883 Method 1015 160 Hrs at 90°C
TEMPERATURE CYCLE	MIL STD 883 Method 1010 Cond. B

Delivery— stock to one week

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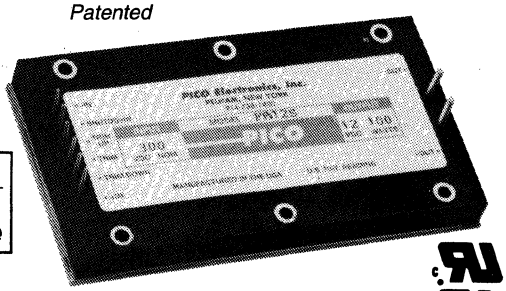
MILITARY SERIES FA (–40°C to +85°C Operating Temperature) SERIES MA (–55°C to +85°C Operating Temperature)

Isolated Regulated 100 Watts DC-DC Converters Wide Input Range/18-36 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

‡Parallel Operation Consult factory to optimize for your application

Dual Isolated Outputs
Special Voltage Combinations Available

Patented



The new PICO Series FA and Series MA of high power DC-DC Converters, allow a wide input voltage of 18-36 VDC, while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent military requirements.

SERIES FA/MA SINGLE • 100 WATTS • INPUT 18–36 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series FA Single (–40°C to +85°C)		Series MA Single (–55°C to +85°C)	
				10-50%	50-100%	18-28V	28-36V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
18-36	3.3	50	74	2.00	2.00	1.50	1.50	50	2.0	FA3.3S	208.00	MA3.3S	312.00
18-36	5	75	76	2.00	2.00	1.50	1.50	50	2.0	FA5S	208.00	MA5S	312.00
18-36	5.2	75	76	2.00	2.00	1.50	1.50	50	2.0	FA5.2S	208.00	MA5.2S	312.00
18-36	9	100	81	1.50	1.50	1.25	1.25	50	1.5	FA9S	208.00	MA9S	312.00
18-36	12	100	83	1.25	1.25	1.00	1.00	50	1.0	FA12S	208.00	MA12S	312.00
18-36	15	100	84	1.00	1.00	0.75	0.75	50	1.0	FA15S	208.00	MA15S	312.00
18-36	24	100	86	0.75	0.75	0.50	0.50	50	1.0	FA24S	208.00	MA24S	312.00
18-36	28	100	86	0.50	0.50	0.50	0.50	50	0.50	FA28S	208.00	MA28S	312.00
18-36	48	100	86	0.50	0.50	0.50	0.50	50	0.50	FA48S	208.00	MA48S	312.00
18-36	100	100	85	0.50	0.50	0.50	0.50	50	0.50	FA100S	208.00	MA100S	312.00

10% Minimum load required at all times
**Reading taken at nominal 28 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart,
–40°C to +85°C base plate
–55°C to +85°C base plate
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: –55°C to +105°C
For All Variations See Factory

SERIES FA/MA DUAL • 100 WATTS • INPUT 18–36 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION *** (%)		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series FA Dual (–40°C to +85°C)		Series MA Dual (–55°C to +85°C)	
				10-50%	50-100%	18-28V	28-36V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
18-36	5	37.5/37.5	76	2.00	2.00	1.50	1.50	50	2.0	FA5D	298.00	MA5D	447.00
18-36	9	50/50	81	1.50	1.50	1.25	1.25	50	1.5	FA9D	298.00	MA9D	447.00
18-36	12	50/50	83	1.25	1.25	1.00	1.00	50	1.0	FA12D	298.00	MA12D	447.00
18-36	15	50/50	84	1.00	1.00	0.75	0.75	50	1.0	FA15D	298.00	MA15D	447.00
18-36	24	50/50	85	0.75	0.75	0.50	0.50	50	1.0	FA24D	298.00	MA24D	447.00
18-36	28	50/50	86	0.50	0.50	0.50	0.50	50	0.5	FA28D	298.00	MA28D	447.00
18-36	48	50/50	86	0.50	0.50	0.50	0.50	50	0.5	FA48D	298.00	MA48D	447.00

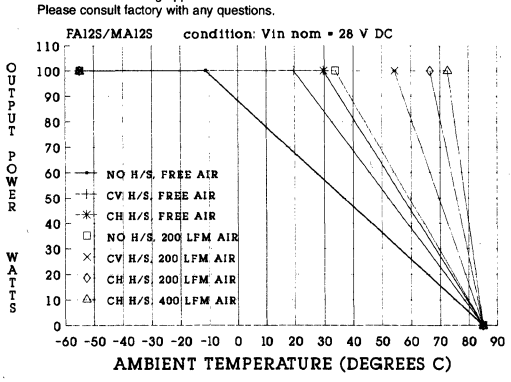
10% Minimum load required at all times
**Reading taken at nominal 28 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)
***Balance Load

34 Standard Models

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

Series FA –40°C to +85°C Operating Temp.	
SURGE	Meets MIL STD 704
VIBRATION	Meets MIL STD 202 Method 204 Cond. D
HUMIDITY	Meets MIL STD 202 Method 106
SHOCK	Meets MIL STD 202 Method 213 Cond. D
ALTITUDE	Meets MIL STD 202 Method 105 Cond. D
Selected MIL STD 883 Options also Available	
STABILIZATION BAKE	MIL STD 883 Method 1008 24 Hrs TA=125°C
BURN IN	MIL STD 883 Method 1015 160 Hrs at 90°C
TEMPERATURE CYCLE	MIL STD 883 Method 1010 Cond. B
Series MA –55°C to +85°C Operating Temp.	

Full thermal analysis can be determined using application notes on Page D•2100
By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #FA12S/MA12S using Application Notes.
Please consult factory with any questions.



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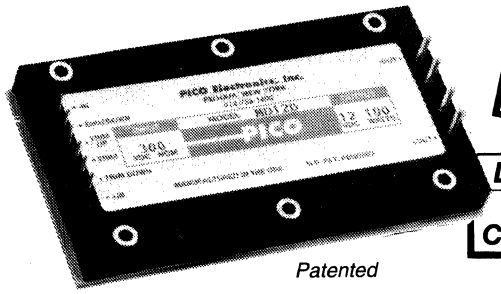
MILITARY SERIES FB (–40°C to +85°C Operating Temperature) SERIES MB (–55°C to +85°C Operating Temperature)



Patented

‡Parallel Operation
Consult factory to optimize for your application

Dual Isolated Outputs
Special Voltage Combinations Available

Isolated Regulated 100 Watts DC-DC Converters Wide Input Range/36–72 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

The new PICO Series FB and Series MB of high power DC-DC Converters, allow a wide input voltage of 38-72 VDC, while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent military requirements.

SERIES FB/MB SINGLE • 100 WATTS • INPUT 36–72 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series FB Single (–40°C to +85°C)		Series MB Single (–55°C to +85°C)	
				10-50%	50-100%	36-48V	48-72V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
36-72	3.3	50	76	1.50	1.50	0.75	0.75	50	2.0	FB3.3S	208.00	MB3.3S	312.00
36-72	5	75	78	1.00	1.00	0.75	0.75	50	1.5	FB5S	208.00	MB5S	312.00
36-72	5.2	75	78	1.00	1.00	0.75	0.75	50	1.5	FB5.2S	208.00	MB5.2S	312.00
36-72	9	100	82	1.00	1.00	0.75	0.75	50	1.0	FB9S	208.00	MB9S	312.00
36-72	12	100	84	0.75	0.75	0.50	0.50	50	1.0	FB12S	208.00	MB12S	312.00
36-72	15	100	85	0.75	0.75	0.50	0.50	50	1.0	FB15S	208.00	MB15S	312.00
36-72	24	100	87	0.50	0.50	0.50	0.50	50	0.5	FB24S	208.00	MB24S	312.00
36-72	28	100	87	0.50	0.50	0.50	0.50	50	0.5	FB28S	208.00	MB28S	312.00
36-72	48	100	88	0.50	0.50	0.50	0.50	50	0.5	FB48S	208.00	MB48S	312.00
36-72	100	100	87	0.50	0.50	0.50	0.50	50	0.5	FB100S	208.00	MB100S	312.00

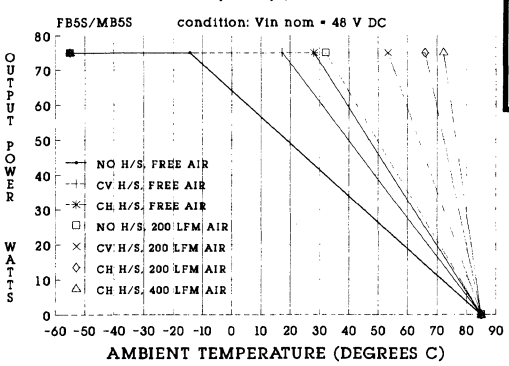
10% Minimum load required at all times
**Reading taken at nominal 48 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES FB/MB DUAL • 100 WATTS • INPUT 36–72 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION *** (%)		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series FB Dual (–40°C to +85°C)		Series MB Dual (–55°C to +85°C)	
				10-50%	50-100%	36-48V	48-72V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
36-72	5	37.5/37.5	78	1.00	1.00	0.75	0.75	50	1.5	FB5D	298.00	MB5D	447.00
36-72	9	50/50	82	1.00	1.00	0.75	0.75	50	1.0	FB9D	298.00	MB9D	447.00
36-72	12	50/50	84	0.75	0.75	0.50	0.50	50	1.0	FB12D	298.00	MB12D	447.00
36-72	15	50/50	85	0.75	0.75	0.50	0.50	50	1.0	FB15D	298.00	MB15D	447.00
36-72	24	50/50	87	0.50	0.50	0.50	0.50	50	0.5	FB24D	298.00	MB24D	447.00
36-72	28	50/50	87	0.50	0.50	0.50	0.50	50	0.5	FB28D	298.00	MB28D	447.00
36-72	48	50/50	88	0.50	0.50	0.50	0.50	50	0.5	FB48D	298.00	MB48D	447.00

10% Minimum load required at all times
**Reading taken at nominal 48 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)
***Balance Load

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #FB5S/MB5S using Application Notes Please consult factory with any questions.



Application Notes Page D•2100

Mechanical Configuration Pages D•2101-2106

34 Standard Models

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, –40°C to +85°C base plate –55°C to +85°C base plate
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: – 55°C to + 105°C
For All Variations See Factory

Series FB –40°C to +85°C Operating Temp.

Series MB –55°C to +85°C Operating Temp.

VIBRATION	Meets MIL STD 202 Method 204 Cond. D
HUMIDITY	Meets MIL STD 202 Method 106
SHOCK	Meets MIL STD 202 Method 213 Cond. D
ALTITUDE	Meets MIL STD 202 Method 105 Cond. D
Selected MIL STD 883 Options also Available	
STABILIZATION BAKE	MIL STD 883 Method 1008 24 Hrs TA=125°C
BURN IN	MIL STD 883 Method 1015 160 Hrs at 90°C
TEMPERATURE CYCLE	MIL STD 883 Method 1010 Cond. B

Delivery— stock to one week

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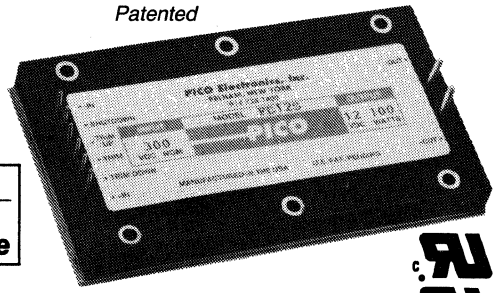
MILITARY SERIES FC (–40°C to +85°C Operating Temperature) SERIES MC (–55°C to +85°C Operating Temperature)

Isolated Regulated 100 Watts DC-DC Converters Wide Input Range/100-180 VDC Fully Regulated Short Circuit Protected ‡Parallel Operation

‡Parallel Operation Consult factory to optimize for your application

Dual Isolated Outputs
Special Voltage Combinations Available

Patented



The new PICO Series FC and Series MC of high power DC-DC Converters, allow a wide input voltage of 100-180 VDC, while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent military requirements.

SERIES FC/MC SINGLE • 100 WATTS • INPUT 100–180 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series FC Single (–40°C to +85°C)		Series MC Single (–55°C to +85°C)	
				10-50%	50-100%	100-150V	150-180V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
100-180	3.3	50	76	1.00	1.00	0.75	0.75	50	2.0	FC3.3S	208.00	MC3.3S	312.00
100-180	5	75	78	1.00	1.00	0.75	0.75	50	1.5	FC5S	208.00	MC5S	312.00
100-180	5.2	75	78	1.00	1.00	0.75	0.75	50	1.5	FC5.2S	208.00	MC5.2S	312.00
100-180	9	100	84	0.75	0.75	0.50	0.50	50	1.0	FC9S	208.00	MC9S	312.00
100-180	12	100	86	0.75	0.75	0.50	0.50	50	1.0	FC12S	208.00	MC12S	312.00
100-180	15	100	87	0.75	0.75	0.50	0.50	50	1.0	FC15S	208.00	MC15S	312.00
100-180	24	100	88	0.50	0.50	0.30	0.30	50	0.5	FC24S	208.00	MC24S	312.00
100-180	28	100	88	0.50	0.50	0.20	0.20	50	0.5	FC28S	208.00	MC28S	312.00
100-180	48	100	88	0.50	0.50	0.20	0.20	50	0.5	FC48S	208.00	MC48S	312.00
100-180	100	100	87	0.50	0.50	0.30	0.30	50	0.5	FC100S	208.00	MC100S	312.00

10% Minimum load required at all times **Reading taken at nominal 150 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart, –40°C to +85°C base plate, –55°C to +85°C base plate
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: –55°C to +105°C
For All Variations See Factory

SERIES FC/MC DUAL • 100 WATTS • INPUT 100–180 VDC

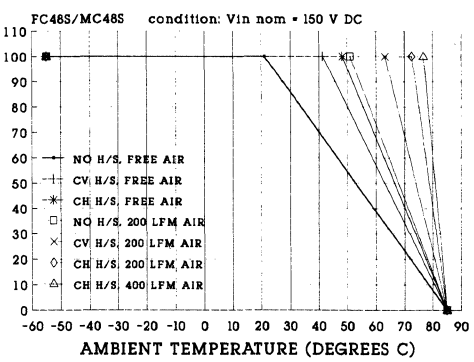
INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION *** (%)		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series FC Dual (–40°C to +85°C)		Series MC Dual (–55°C to +85°C)	
				10-50%	50-100%	100-150V	150-180V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
100-180	5	37.5/37.5	78	1.00	1.00	0.75	0.75	50	1.5	FC5D	298.00	MC5D	447.00
100-180	9	50/50	84	0.75	0.75	0.50	0.50	50	1.0	FC9D	298.00	MC9D	447.00
100-180	12	50/50	86	0.75	0.75	0.50	0.50	50	1.0	FC12D	298.00	MC12D	447.00
100-180	15	50/50	87	0.75	0.75	0.50	0.50	50	1.0	FC15D	298.00	MC15D	447.00
100-180	24	50/50	88	0.50	0.50	0.30	0.30	50	0.5	FC24D	298.00	MC24D	447.00
100-180	28	50/50	88	0.50	0.50	0.20	0.20	50	0.5	FC28D	298.00	MC28D	447.00
100-180	48	50/50	88	0.50	0.50	0.20	0.20	50	0.5	FC48D	298.00	MC48D	447.00

10% Minimum load required at all times **Reading taken at nominal 150 VDC input
*Using proper thermal management, maximum temp. of +85°C (case) ***Balance Load

34 Standard Models

Application Notes Page D•2100
Mechanical Configuration Pages D•2101-2106

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #FC48S/MC48S using Application Notes
Please consult factory with any questions.



Series FC –40°C to +85°C Operating Temp.
Series MC –55°C to +85°C Operating Temp.

VIBRATION	Meets MIL STD 202 Method 204 Cond. D
HUMIDITY	Meets MIL STD 202 Method 106
SHOCK	Meets MIL STD 202 Method 213 Cond. D
ALTITUDE	Meets MIL STD 202 Method 105 Cond. D
Selected MIL STD 883 Options also Available	
STABILIZATION BAKE	MIL STD 883 Method 1008 24 Hrs TA=125°C
BURN IN	MIL STD 883 Method 1015 160 Hrs at 90°C
TEMPERATURE CYCLE	MIL STD 883 Method 1010 Cond. B

Delivery— stock to one week

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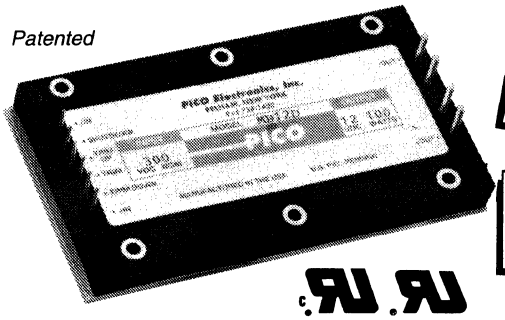
MILITARY SERIES FD (–40°C to +85°C Operating Temperature) SERIES MD (–55°C to +85°C Operating Temperature)

Patented



‡Parallel Operation
Consult factory to optimize for your application

Dual Isolated Outputs
Special Voltage Combinations Available

Isolated Regulated 100 Watts DC-DC Converters
Wide Input Range/200-380 VDC
Fully Regulated
Short Circuit Protected
‡Parallel Operation

The new PICO Series FD and Series MD of high power DC-DC Converters, allow a wide input voltage of 200-380 VDC, while maintaining a regulated output. They are fully safeguarded for over voltage, over temperature and continuous short circuit protection.
The availability of Dual Isolated Outputs, small size, and the capability of parallel operations as standard features should reduce your design and component costs, while the fixed frequency operation helps parallel connections for higher power requirements.
This high density unit is assembled *in the USA* with PICO quality and component selection, allowing it to meet the most stringent military requirements.

SERIES FD/MD SINGLE • 100 WATTS • INPUT 200–380 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series FD Single (–40°C to +85°C)		Series MD Single (–55°C to +85°C)	
				10-50%	50-100%	200-300V	300-380V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
200-380	3.3	50	76	1.50	1.50	1.25	1.25	50	2	FD3.3S	208.00	MD3.3S	312.00
200-380	5	75	78	1.25	1.25	1.00	1.00	50	1.5	FD5S	208.00	MD5S	312.00
200-380	5.2	75	78	1.25	1.25	1.00	1.00	50	1.5	FD5.2S	208.00	MD5.2S	312.00
200-380	9	100	84	1.25	1.25	1.00	1.00	50	1.0	FD9S	208.00	MD9S	312.00
200-380	12	100	85	1.00	1.00	0.75	0.75	50	1.0	FD12S	208.00	MD12S	312.00
200-380	15	100	86	1.00	1.00	0.75	0.75	50	1.0	FD15S	208.00	MD15S	312.00
200-380	24	100	87	075	0.75	0.50	0.50	50	0.5	FD24S	208.00	MD24S	312.00
200-380	28	100	87	0.50	0.50	0.50	0.50	50	0.5	FD28S	208.00	MD28S	312.00
200-380	48	100	88	0.50	0.50	0.20	0.20	50	0.5	FD48S	208.00	MD48S	312.00
200-380	100	100	88	0.50	0.50	0.20	0.20	50	0.5	FD100S	208.00	MD100S	312.00

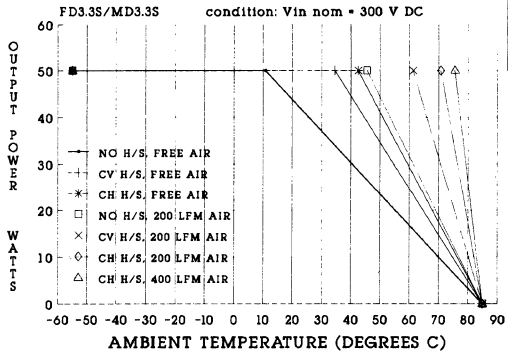
10% Minimum load required at all times
**Reading taken at nominal 300 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)

SERIES FD/MD DUAL • 100 WATTS • INPUT 200–380 VDC

INPUT VOLTAGE RANGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. OUTPUT POWER * (W)	EFF. FULL LOAD TYPICAL ** (%)	MAX. LOAD REGULATION (%)**		MAX. LINE REGULATION AT FULL LOAD (%)		OUTPUT VOLTAGE RIPPLE (FULL LOAD) 1–1MHz BW (MV P-P)	OUTPUT VOLTAGE TOLERANCE ** (±%)	Series FD Dual (–40°C to +85°C)		Series MD Dual (–55°C to +85°C)	
				10-50%	50-100%	200-300V	300-380V			‡PICO PART NUMBER	PRICE	‡PICO PART NUMBER	PRICE
200-380	5	37.5/37.5	78	1.25	1.25	1.00	1.00	50	1.5	FD5D	298.00	MD5D	447.00
200-380	9	50/50	84	1.25	1.25	1.00	1.00	50	1.0	FD9D	298.00	MD9D	447.00
200-380	12	50/50	85	1.00	1.00	0.75	0.75	50	1.0	FD12D	298.00	MD12D	447.00
200-380	15	50/50	86	1.00	1.00	0.75	0.75	50	1.0	FD15D	298.00	MD15D	447.00
200-380	24	50/50	87	0.75	0.75	0.50	0.50	50	0.5	FD24D	298.00	MD24D	447.00
200-380	28	50/50	87	0.50	0.50	0.50	0.50	50	0.5	FD28D	298.00	MD28D	447.00
200-380	48	50/50	88	0.50	0.50	0.50	0.50	50	0.5	FD48D	298.00	MD48D	447.00

10% Minimum load required at all times
**Reading taken at nominal 300 VDC input
*Using proper thermal management, maximum temp. of +85°C (case)
***Balance Load

Full thermal analysis can be determined using application notes on page D•2100. By using the efficiency and thermal resistance of your desired unit to the formula you can complete your evaluation. The curves below were generated for Part #FD3.3S/MD3.3S using Application Notes Please consult factory with any questions.



Application Notes Page D•2100

Mechanical Configuration Pages D•2101-2106

FEATURES:
- Dual isolated outputs
- Short circuit protection
- Thermal, over temp. shutdown
- Line regulation
- Load regulation
- No external components required
- Hi density, hi efficiency design
- Remote shutdown
- Trim capabilities
- Fixed frequency-100 Khtz

TYPICAL CHARACTERISTICS:
Frequency: 100 Khtz
Base plate: Max. +85°C
Operating Temp.: See thermal chart,
–40°C to +85°C base plate
–55°C to +85°C base plate
Test conditions: 25° C ambient
Isolation Base Input: 2000 VDC
Isolation Input Output: 2000 VDC
Isolation Output to Base: 1000 VDC
Storage Temp.: –55°C to +105°C
For All Variations See Factory

34 Standard Models

Series FD
–40°C to +85°C Operating Temp.

Series MD
–55°C to +85°C Operating Temp.

SURGE	Meets MIL STD 704
VIBRATION	Meets MIL STD 202 Method 204 Cond. D
HUMIDITY	Meets MIL STD 202 Method 106
SHOCK	Meets MIL STD 202 Method 213 Cond. D
ALTITUDE	Meets MIL STD 202 Method 105 Cond. D
Selected MIL STD 883 Options also Available	
STABILIZATION BAKE	MIL STD 883 Method 1008 24 Hrs TA=125°C
BURN IN	MIL STD 883 Method 1015 160 Hrs at 90°C
TEMPERATURE CYCLE	MIL STD 883 Method 1010 Cond. B

Delivery— stock to one week

For immediate engineering assistance or to place an order–
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PICO's NEW UAC SERIES

- Universal Input Voltage 85 to 265 VAC
- Isolated Output
- Power Factor Corrected, 0.99%*
- Space Saving Design, One Module Replaces Two
- Special Output Voltages Available
- Regulated Output Voltage
- Made in the USA, Fully Encapsulated

TYPICAL FEATURES/ ELECTRICAL CHARACTERISTICS:

AC Line Input Voltage: 85 to 265 VAC, 47-440 Hz

Output Power: 100 to 200 Watts, See Chart

Output Voltage Ripple: 75-200 mV, See Chart

Inrush Current Typical:
120 VAC Input: 20-40 AMPS
240 VAC Input: 15-20 AMPS

Operating Temperature: 0 to 85 degrees centigrade, case temperature
See Application Notes for proper thermal considerations.

Isolation:
From Input to DC Output: 2,000 VDC
From Input or DC Output to Case: 2,000 VDC
From AC Input to Auxiliary 380 VDC Output: Non-Isolated
From Auxiliary 380 VDC Output to DC Output 2,000 VDC
From Auxiliary 380 VDC Output to Case: 2,000 VDC

Capacitor Requirement: External at Auxiliary 380 VDC Pins: 220 µf, 450 Volt Electrolytic

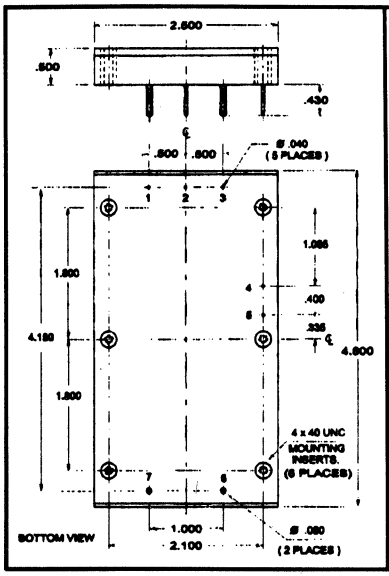
***MUST BE INSTALLED*

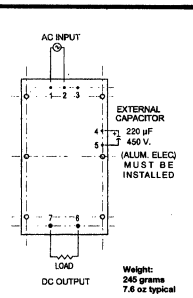
Short Circuit Protection:
Continuous

Series UAC Single Output
Input Voltage 85–265 (47–440 Hz)

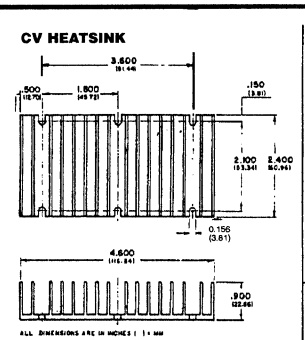
PICO PART NUMBER	OUTPUT VOLTAGE VDC	MAX. LOAD CURRENT (A)	MAX. OUTPUT POWER (watts)	EFF.* FULL LOAD %	OUTPUT RIPPLE FULL LOAD 1-1 MHz BW mv p*p	OUT VOLT TOLERANCE ±%*	V LD. REG. 10%-100% LOAD ±%†	LINE REGULATION (±%†)	Price
UAC5S	5	20	100	76	100	1.0	1.5	0.2	495.00
UAC9S	9	11.1	100	78	75	1.0	1.5	0.2	495.00
UAC12S	12	12.5	150	80	75	0.5	1.5	0.2	495.00
UAC15S	15	10	150	80	75	0.5	1.5	0.2	495.00
UAC24S	24	8.33	200	81	100	0.5	1	0.2	495.00
UAC28S	28	7.14	200	82	100	0.5	1	0.2	495.00
UAC48S	48	4.17	200	84	200	0.5	1	0.2	495.00

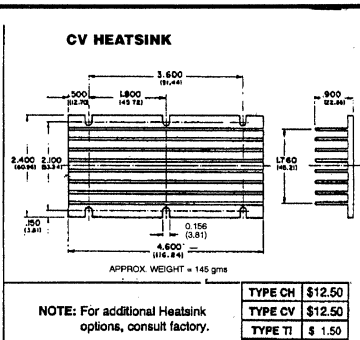
*Capacitor Required: 220µF, 450 V Aliminum Electrolytic Capacitors





PIN No.	FUNTION
1	AC IN
2	AC IN
3	N/C
4	+ 380 V BUS
5	- V BUS
6	- V OUT
7	+ V OUT





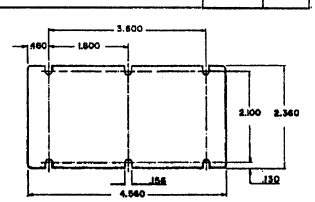
NOTE: For additional Heatsink options, consult factory.

TYPE CH	$12.50
TYPE CV	$12.50
TYPE TI	$ 1.50

PART TI = THERMAL INTERFACE

Alloy Aluminum Substrate

Thermal Conductivity, (BTU-in/hr ft² °F ___1530
Coefficient of Thermal Expansion
(25-100°C, 10^{-6} in-in/°F) _____13.1
Hardness, Brinnell B _____ 23
Endurance Limit, psi _____5000
Standard Thickness (inches) _____ .002



Internet:http://www.picoelectronics.com • E-Mail:HLSC73A@prodigy.com • Call Toll free: 800-228-9747 • Fax: 914-738-8225

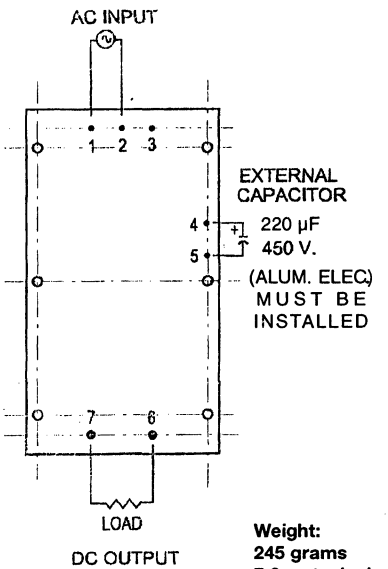
PICO's NEW UAC SERIES

- Universal Input Voltage 85 to 265 VAC
- Isolated Output
- Power Factor Corrected, 0.99%*
- Space Saving Design, One Module Replaces Two
- Special Output Voltages Available
- Regulated Output Voltage
- Made in the USA, Fully Encapsulated

THERMAL CONSIDERATIONS:

	UAC Series		
	Baseplate	Heatsink CV	Heatsink CH
Free Air	5.1	3.5	3.0
200 LFM	2.8	1.8	1.0
400 LFM	1.8	1.1	0.7
600 LFM	1.4	0.8	0.55
800 LFM	1.2	0.65	0.45
1000 LFM	1.0	0.55	0.40

PIN No.	FUNTION
1	AC IN
2	AC IN
3	N/C
4	+ 380 V BUS
5	- V BUS
6	- V OUT
7	+ V OUT



Weight:
245 grams
7.6 oz typical

Typical Examples:

EXAMPLE 1:

A UAC24S module has an efficiency of 80%. What is the maximum ambient temperature if 100 Watts of power is needed.

A) In free air.

From Table 1: T_{rca} = 5.1

Using Relation (2)

$$\Delta T = 5.1\ (100)\left[\frac{1}{0.80} - 1\right] = 127.5°C$$

$$Ta = 85 - 127.5 = -42.5°C$$

B) In free air with heatsink (CV).

T_{rca} = 3.5

$$\Delta T = 3.5\ (100)\left[\frac{1}{0.80} - 1\right] = 87.5°C$$

$$Ta = 85 - 87.5 = -2.5°C$$

C) With 400 LFM of air flow.

T_{rca} = 1.8

$$\Delta T = 1.8\ (100)\left[\frac{1}{0.80} - 1\right] = 45°C$$

$$Ta = 85 - 45 = 40°C$$

EXAMPLE 2:

What would be the maximum output power for a UAC24S module at an ambient temperature of 50°C with an efficiency of 80%.

A) If the module is used in free air.

From Table 1: T_{rca} = 5.1

Using Relation (2)

$$85 - 50 = 5.1\ P_{out}\left[\frac{1}{0.80} - 1\right]$$

$$P_{out} = \frac{35}{5.1\ [0.25]} = 27.5 \text{ Watts}$$

B) If the module is used in an area with forced air at 200 LFM with no heatsink.

T_{rca} = 2.8

$$P_{out} = \frac{35}{2.8\ [0.25]} = 50 \text{ Watts}$$

C) If the module with heatsink (CV) is used in free air.

T_{rca} = 3.5

$$P_{out} = \frac{35}{3.5\ [0.25]} = 40 \text{ Watts}$$

EXAMPLE 3:

At a maximum ambient temperature of 50°C and an efficiency of 80%, how could a UAC24S module be used if 200 Watts of output power is required.

Using Relation (2), we first find the maximum thermal resistance from case to air.

$$\Delta T = T_{rca}\ (200)\left[\frac{1}{0.80} - 1\right]$$

$$85 - 50 = T_{rca}\ (50)$$

$$T_{rca} = 0.7$$

A) If no heatsink is used.
From Table 1, more than 1,000 LFM of airflow is required.

B) If a (CV) heatsink is used.
700 LFM of airflow is required.

C) If a (CH) heatsink is used.
400 LFM of airflow is required.

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Delivery— stock to one week

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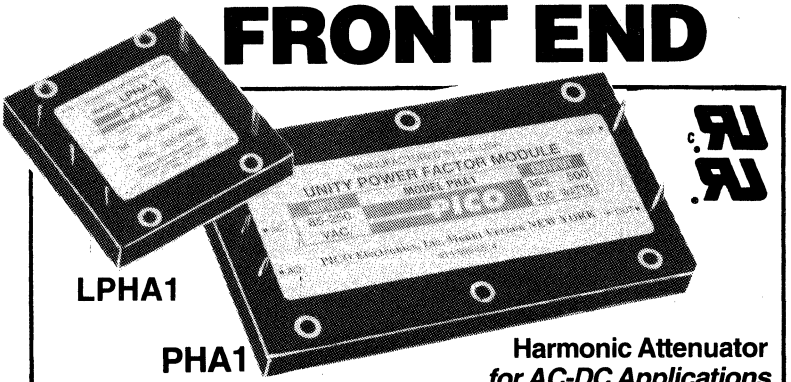
PICO LPHA1 250 Watts PHA-1 500 Watts AC-DC Converters

Universal AC Input Regulated to 365 VDC Output or use with PICO's Hi-Power Models for 3.3 to 100 VDC Outputs Single or Dual

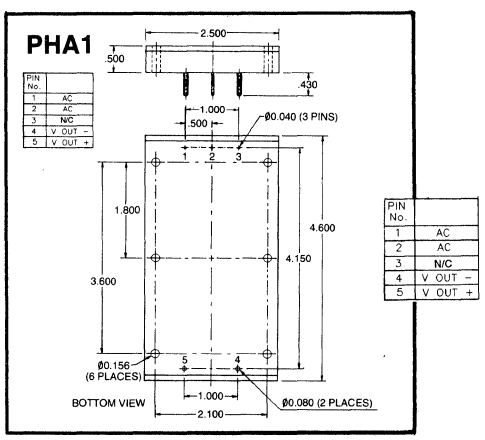
Regulated 365 VDC Output

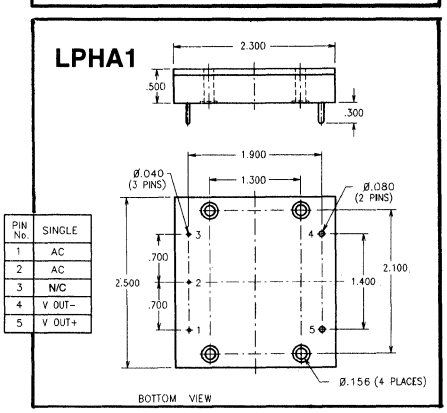
new UNITY POWER FACTOR FRONT END



Harmonic Attenuator *for AC-DC Applications*

PICO's LPHA1/PHA1 is the perfect match for universal AC inputs to your worldwide DC applications. Used with PICO's LPD, PD and HPD Series of DC-DC Converters you can obtain a variety of DC outputs from ***3.3 VDC to 100 VDC in single and dual outputs.*** ***Many Laser and Motor Applications are able to use the LPHA1/PHA1 directly because of its' unique 365 Volt regulated output.*** Regardless of use PICO always optimizes ***Size, Reliability and Cost.***





- ***Universal Input Voltage (85 to 250 VAC)***
- ***Power Factor: 0.99****
- ***Efficiency 90% or better***
- ***PHA1: Up to 500 Watts*****
  LPHA1: Up to 250 Watts**
- ***Regulated Output (365 VDC)***
- ***PHA1: Only $199/ LPHA1: Only $179***

***Derate from 110 VAC to 85 VAC at the rate of 1.2% per volt.*
**50-100% of Full Load*

ELECTRICAL CHARACTERISTICS:
Regulated 365V DC Output–can be used directly for many Motor, Laser and Direct Drive Applications.
AC Line Input: 85–250 VAC/47–440 Hz
Output Power: **PHA1** Up to 500 Watts derate from 110 VAC to 85 VAC at the rate of 1.2% per volt.
LPHA1 Up to 250 Watts derate from 110 VAC to 85 VAC at the rate of 1.2% per volt
Output Voltage Tolerance at F.L.: ±2%
Output Ripple: **PHA1** 10V P-P, Full Load, with 470 UF capacitor
LPHA1 10V P-P, Full Load with 250 UF capacitor
Operating Temperature: 0°C to +85°C
Inrush Current Typical: 25–40A at 120 VAC
15–20A at 240 VAC
Output Capacitor: **PHA1** 470 UF Min., External
LPHA1 250 UF Min., External
Isolation: Input to Output: None
Input/Output to Baseplate: 2500V rms
Load Regulation: (FL-10%) ±3%
Thermal Shutdown: 90–100°C Baseplate
Short Circuit Protection: **PHA1** Requires 10 AMP Fast-Blow Fuse in input
LPH1 Requires 5 AMP Fast-Blow Fuse in input.
See connection diagram on page **D•2099**
Weight: **PHA1** 7.2 ounces (231 grams) typical
LPHA1 3.5 ounces (112 grams) typical

Networking: Can be used with PICO's LPD-PD-HPD Series to provide from 3.3 VDC to 100 VDC in single and dual outputs. Consult factory for network designs implementing all of PICO's over 1000 Power Converters to give you capabilities from 2.0 VDC to 5,000 VDC

PICO's UNITY POWER FACTOR Front End

Application Notes: Please refer to Application Notes on pages ***D•2100*** Typical examples are noted below.

Thermal Considerations:

TABLE 1:

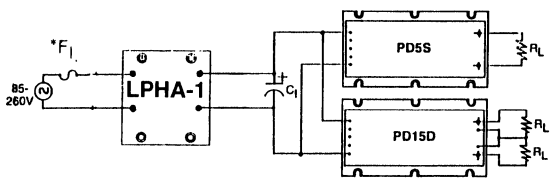
	PHA1 Series		
	Baseplate	Heatsink CV	Heatsink CH
Free Air	5.1	3.5	3.0
200 LFM	2.8	1.8	1.0
400 LFM	1.8	1.1	0.7
600 LFM	1.4	0.8	0.55
800 LFM	1.2	0.65	0.45
1000 LFM	1.0	0.55	0.40

	LPHA-1 Series		
	Baseplate	Heatsink LCV	Heatsink LCH
Free Air	7.9	4.2	4.0
200 LFM	4.9	1.6	1.6
400 LFM	2.5	1.3	1.3
600 LFM	2.2	0.9	0.9
800 LFM	1.5	0.7	0.7
1000 LFM	1.2	0.6	0.6

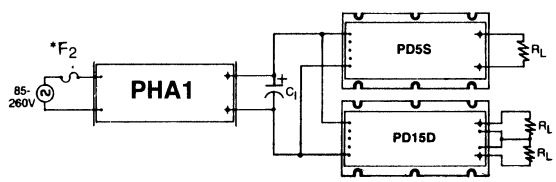
TABLE 1: = Thermal resistance of case to air.

Connections Diagram:

Note: Consult factory for C_I capacitance and voltage ratings.



*F_1 NOTE: 4 AMP FAST-BLOW FUSE REQUIRED AS NOTED ABOVE.



*F_2 NOTE: 10 AMP FAST-BLOW FUSE REQUIRED AS NOTED ABOVE.

Typical Examples:

EXAMPLE 1:

A PHA1 module has an efficiency of 92%. What is the maximum ambient temperature if 200 Watts of power is needed.

A) In free air.

From Table 1: T_{rca} = 5.1

Using Relation (2)

$$\Delta T = 5.1\ (200)\left[\frac{1}{0.92} - 1\right] = 88.7°C$$

$$Ta = 85 - 88.7 = 3.7°C$$

B) In free air with heatsink (CV).

T_{rca} = 3.5

$$\Delta T = 2.5\ (200)\left[\frac{1}{0.92} - 1\right] = 60.9°C$$

$$Ta = 85 - 60.9 = 24.1°C$$

C) With 400 LFM of air flow.

T_{rca} = 1.8

$$\Delta T = 1.8\ (200)\left[\frac{1}{0.92} - 1\right] = -31.3°C$$

$$Ta = 85 - 31.3 = 53.7°C$$

EXAMPLE 2:

What would be the maximum output power for a LPHA-1 module at an ambient temperature of 50°C with an efficiency of 92%.

A) If the module is used in free air.

From Table 1: T_{rca} = 7.9

Using Relation (2)

$$85 - 50 = 7.9\ P_{out}\left[\frac{1}{0.92} - 1\right]$$

$$P_{out} = \frac{35}{7.9\ [0.087]} = 51 \text{ Watts}$$

B) If the module is used in an area with forced air at 200 LFM with no heatsink.

T_{rca} = 4.9

$$P_{out} = \frac{35}{4.9\ [0.087]} = 82 \text{ Watts}$$

C) If the module with heatsink (CV) is used if free air.

T_{rca} = 4.2

$$P_{out} = \frac{35}{4.2\ [0.087]} = 96 \text{ Watts}$$

EXAMPLE 3:

At a maximum ambient temperature of 50°C and an efficiency of 90%, how could a PHA1 module be used if 400 Watts of output power is required.

Using Relation (2), we first find the maximum thermal resistance from case to air.

$$\Delta T = T_{rca}(400)\left[\frac{1}{0.9} - 1\right]$$

$$85 - 50 = T_{rca}\ (44.4)$$

$$T_{rca} = 0.79$$

A) If no heatsink is used.
From Table 1, more than 1,000 LFM of airflow is required.

B) If a (CV) heatsink is used.
600 LFM of airflow is required.

C) If a (CH) heatsink is used.
400 LFM of airflow is required.

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APPLICATION NOTES

THERMAL CONSIDERATIONS (LP/P/HP/LF/LM/F/M Series)

To use these PICO Series at full power one has to get rid of dissipated losses in the modules. Although the high efficiency of these units minimizes the heat loss; The exposed area, depending on the ambient temperature, may not be enough to keep the case temperature at an acceptable value if natural convection is used. The additional heat may be removed by a heat sink, forced air, or both. Internal losses produce heat which is moved toward the case and must be removed. Depending on the thickness and the material used, there is always a temperature gradient from inside to the case which may be calculated by:

[1] $T_{ric} = \frac{T_i - T_c}{Q}$ where,

Tric = Thermal Resistance from inside to case
Ti = Inside Termperature in Degrees C
Tc = Case Temperature in Degrees C
Q = Dissipated Power in the module in watts

The specification given in the data sheet of these units are such that at 85°C case the T_i; (inside temperature of components) is acceptable for proper operation. The user of these modules then has the task to keep the case temperature at or below 85°C. The temperature rise of the case depends on how efficiently the heat is removed; If the process is very efficient the thermal resistance is low and the case to ambient temperature gradient is low. The thermal resistance from the case to the air is given by:

$$T_{rca} = \frac{T_c - T_a}{Q} \quad \text{and}$$

$$Q = P_{in} - P_{out} = P_{out}\left(\frac{1}{\eta} - 1\right)$$

[2] $T_c - T_a = \Delta T = T_{rca}\ P_{out}\left(\frac{1}{\eta} - 1\right)$ where,

T_{rca} = Thermal Resistance of case to air
P_{out} = Output Power in watts
η = Efficiency
T_c = Case temperature in Degrees C
T_a = Ambient Temperature in Degrees C

The following tables show the thermal resistance in free air as well as with forced cooling with or without heat sinks.

Table I: Thermal resistance case to air (°C/W)

	Series LP/LF/LM			Series P			Series HP/F/M		
	Baseplate	Heatsink LCV	Heatsink LCH	Baseplate	Heatsink CV	Heatsink CH	Baseplate	Heatsink CV	Heatsink CH
Free Air	7.9	4.2	4.0	4.7	3.2	2.7	5.1	3.5	3.0
200 LFM	4.9	1.6	1.6	2.5	1.5	0.9	2.8	1.8	1.0
400 LFM	2.5	1.3	1.3	1.6	1.0	0.6	1.8	1.1	0.7
600 LFM	2.2	0.9	0.9	1.3	0.7	0.5	1.4	0.8	0.55
800 LFM	1.5	0.7	0.7	1.1	0.6	0.4	1.2	0.65	0.45
1000 LFM	1.2	0.6	0.6	0.9	0.5	0.36	1.0	0.55	0.40

NOTE: The values in Table I include the thermal resistance from heatsink to baseplate. Provided a proper contact exists between the plate and the sink.

TYPICAL EXAMPLES

Example 1: What would be the maximum output power for a LP Series unit at an ambient temperature of 50°C with an efficiency of 85%

A) If the module is used in free air?

From Table I: $T_{rca} = 7.9$

Using Relation (2)

$$85 - 50 = 7.9\ P_{out}\left[\frac{1}{0.85} - 1\right]$$

$$P_{out} = \frac{35}{7.9\ [0.176]} = 25\ \text{WATTS}$$

B) If the module is used in an area with forced air at 200 LFM with no heatsink?

$T_{rca} = 4.9$

$$P_{out} = \frac{35}{4.9\ [0.176]} = 40\ \text{WATTS}$$

C) If the module with heatsink (LCV) is used in free air?

$T_{rca} = 4.2$

$$P_{out} = \frac{35}{4.2\ [0.176]} = 47\ \text{WATTS}$$

Example 2: A P Series module has an efficiency of 87%. What is the maximum ambient temperature if 100 watts of power is needed?

A) In free air?

From Table I: $T_{rca} = 4.7$

Using Relation (2)

$$\Delta T = 4.7\ (100)\left[\frac{1}{0.87} - 1\right] = 70°C$$

$Ta = 85 - 70 = 15°C$

B) In free air with heatsink (CV)?

$T_{rca} = 3.2$

$$\Delta T = 3.2\ (100)\left[\frac{1}{0.87} - 1\right] = 48°C$$

$Ta = 85 - 48 = 37°C$

C) Forced air with 400 LFM?

$T_{rca} = 1.6$

$$\Delta T = 1.6\ (100)\left[\frac{1}{0.87} - 1\right] = 24°C$$

$Ta = 85 - 24 = 61°C$

Example 3: At a maximum ambient temperature of 50°C and an efficiency of 87%, how could a Series HP unit be used if 150 watts of output power is required?

Using relation (2), we should first find the thermal resistance from case to air.

$$\Delta T = T_{rca}\ (150)\left[\frac{1}{0.87} - 1\right]$$

$85 - 50 = T_{rca}\ (22.41)$

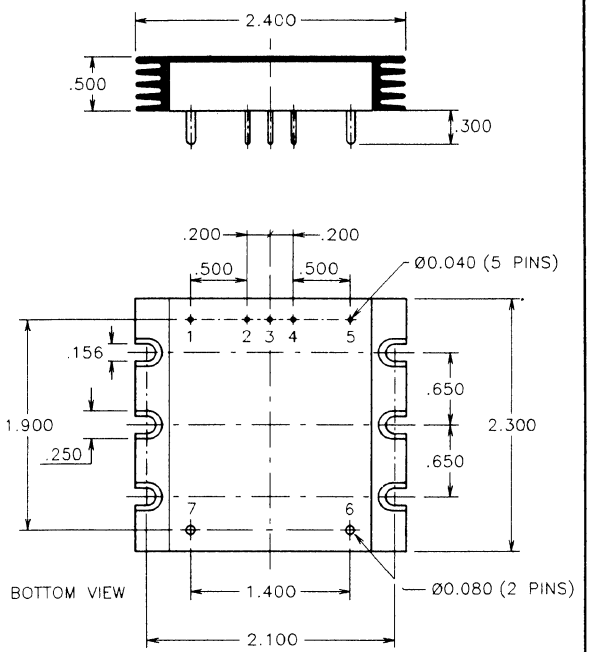
$T_{rca} = 1.56$ max.

A) If no heatsink is used?
From Table I, 600 LFM of airflow is required.

B) If a CV heatsink is used?
300 LFM of airflow is required

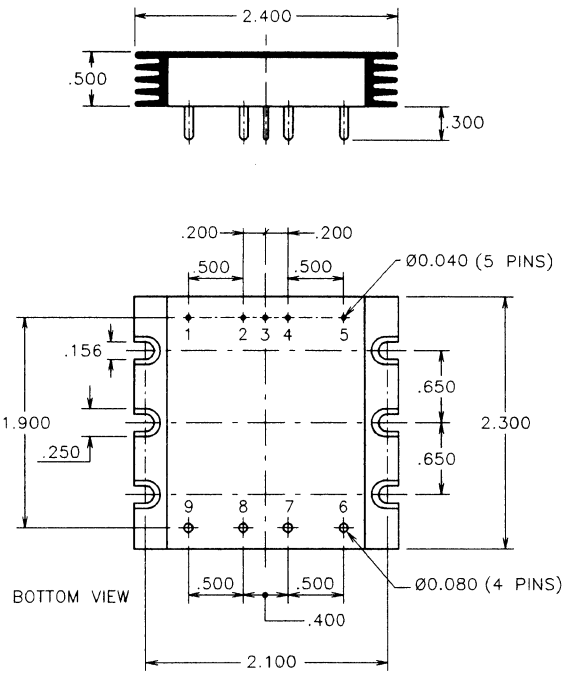
C) If a CH heatsink is used?
150 LFM of airflow is required

SERIES LP/LF/LM SINGLE



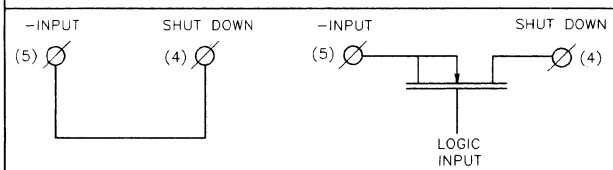
PIN No.	SINGLE
1	+INPUT
2	TRIM DOWN
3	TRIM
4	SHUT DOWN
5	−INPUT
6	−OUTPUT
7	+OUTPUT

SERIES LP/LF/LM DUAL



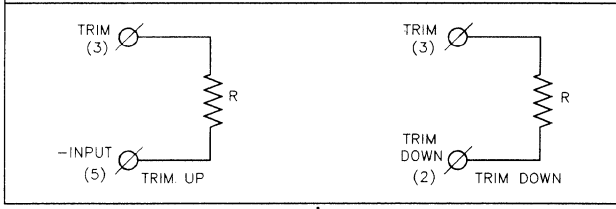
PIN No.	DUAL
1	+INPUT
2	TRIM DOWN
3	TRIM
4	SHUT DOWN
5	−INPUT
6	−OUTPUT 1
7	+OUTPUT 1
8	−OUTPUT 2
9	+OUTPUT 2

REMOTE SHUTDOWN



FOR TOTAL SHUTDOWN, THE VOLTAGE AT PIN 4 MUST BE REDUCED TO 0.15 VOLTS OR LOWER.

EXTERNAL OUTPUT TRIMING ± 5% MAX.



* TYPICAL RESISTANCE RANGE FOR TRIM UP AND TRIM DOWN

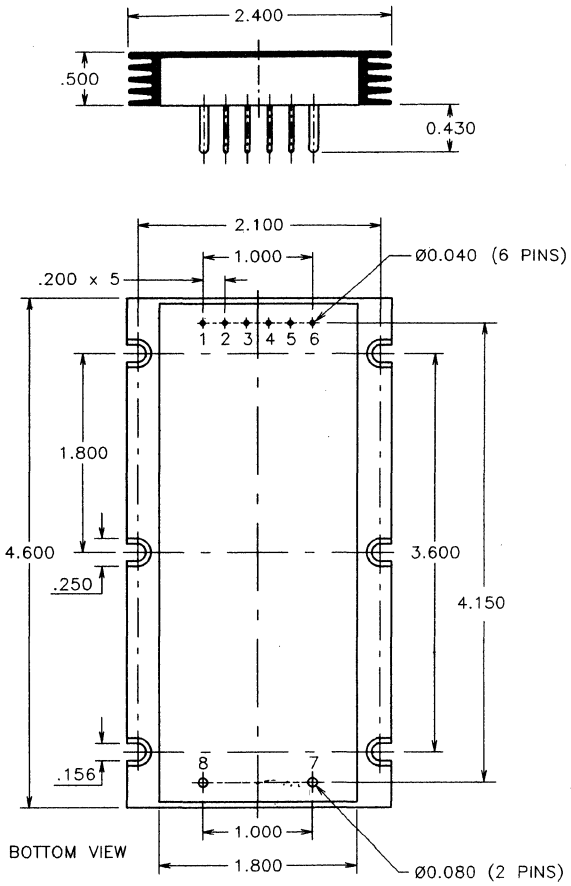
RESISTANCE / TRIM %	1	2	3	5
TRIM UP	300K	150K	50K	20K
TRIM DOWN	1M	500K	250K	100K

* THESE ARE TYPICAL RESISTANCE VALUES, AS EACH INDIVIDUAL UNIT WILL VARY SLIGHTLY.
USE OF TRIM POT TO DETERMINE RESISTANCE VALUE IS RECOMMENDED.
USE 1/2 WATT MINIMUM POWER RATING RESISTOR.

Single: Typical Weight 110 grams

Dual: Typical Weight 135 grams

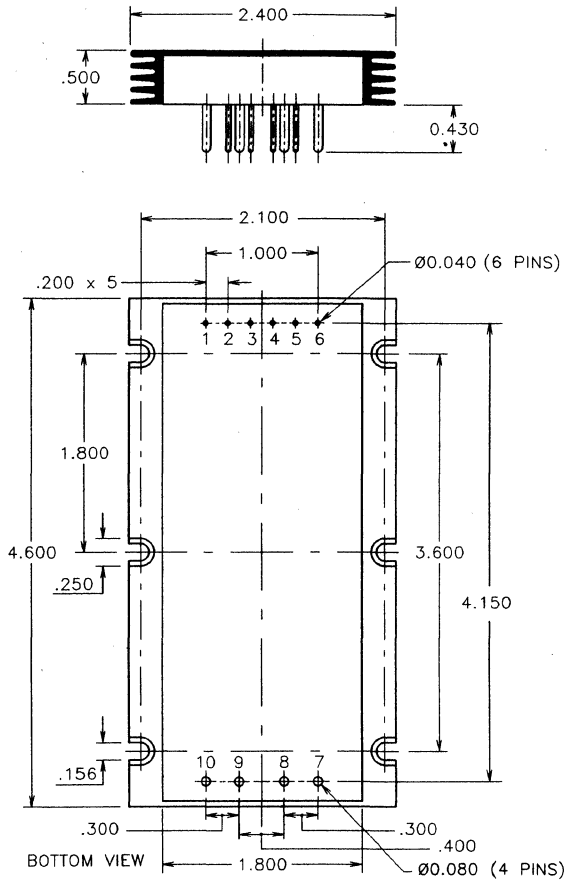
SERIES P SINGLE



PIN No.	SINGLE
1	+INPUT
2	TRIM DOWN
3	TRIM
4	TRIM UP
5	SHUT DOWN
6	−INPUT
7	−OUTPUT
8	+OUTPUT

Single: Typical Weight 210 grams

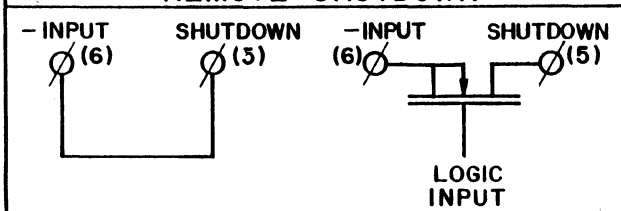
SERIES P DUAL



PIN No.	DUAL
1	+INPUT
2	TRIM DOWN
3	TRIM
4	TRIM UP
5	SHUT DOWN
6	−INPUT
7	−OUTPUT(1)
8	+OUTPUT(1)
9	−OUTPUT(2)
10	+OUTPUT(2)

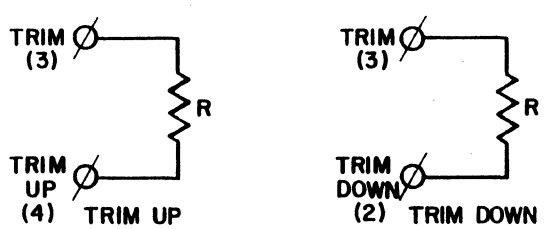
Dual: Typical Weight 235 grams

REMOTE SHUTDOWN



FOR TOTAL SHUTDOWN, THE VOLTAGE AT PIN 5 MUST BE REDUCED TO 0.15 VOLTS OR LOWER.

EXTERNAL OUTPUT TRIMING ± 5%MAX.

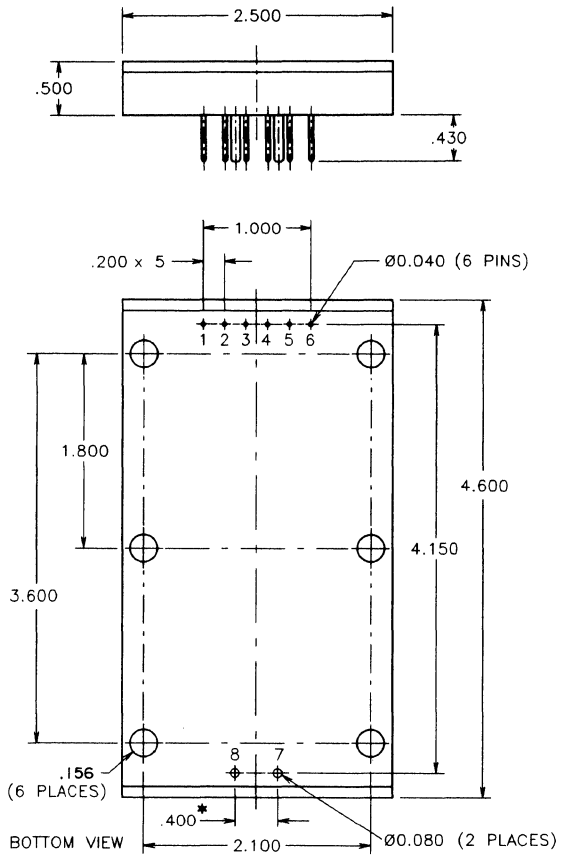


* TYPICAL RESISTANCE RANGE FOR TRIM UP AND TRIM DOWN

RESISTANCE / TRIM	% 1	2	3	5
TRIM UP	300K	150K	50K	20K
TRIM DOWN	1M	500K	250K	100K

* THESE ARE TYPICAL RESISTANCE VALUES, AS EACH INDIVIDUAL UNIT WILL VARY SLIGHTLY.
USE OF TRIM POT TO DETERMINE RESISTANCE VALUE IS RECOMMENDED.
USE 1/2 WATT MINIMUM POWER RATING RESISTOR.

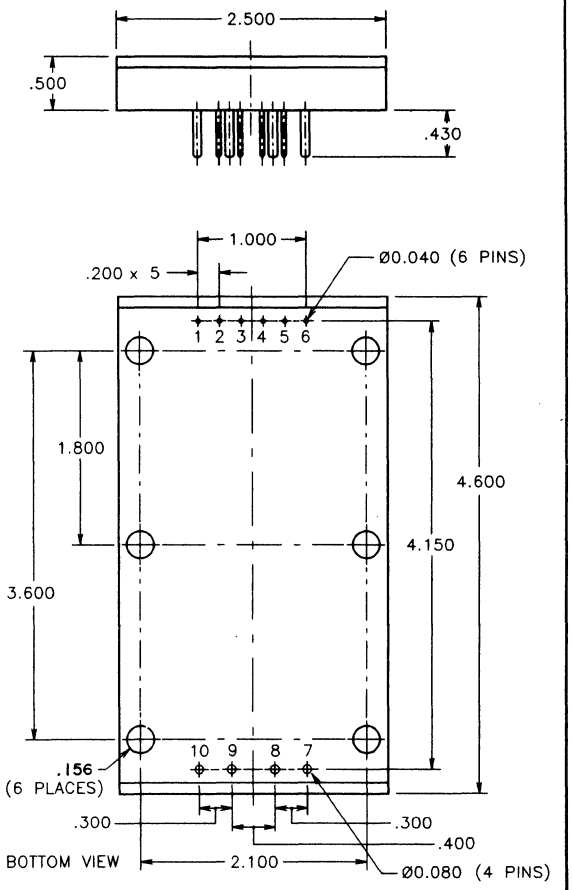
SERIES F/M / HP SINGLE



PIN No.	SINGLE
1	+INPUT
2	TRIM DOWN
3	TRIM
4	TRIM UP
5	SHUT DOWN
6	−INPUT
7	−OUTPUT
8	+OUTPUT

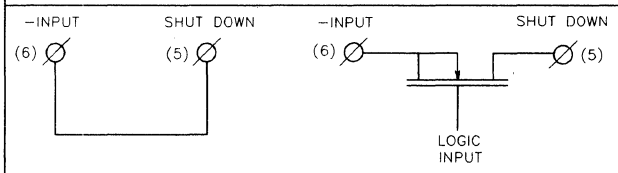
***For 100VDC OUT 1.00"**

SERIES F/M / HP DUAL



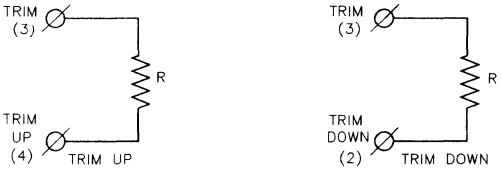
PIN No.	DUAL
1	+INPUT
2	TRIM DOWN
3	TRIM
4	TRIM UP
5	SHUT DOWN
6	−INPUT
7	−OUTPUT (1)
8	+OUTPUT (1)
9	−OUTPUT (2)
10	+OUTPUT (2)

REMOTE SHUTDOWN



FOR TOTAL SHUTDOWN, THE VOLTAGE AT PIN 5 MUST BE REDUCED TO 0.15 VOLTS OR LOWER.

EXTERNAL OUTPUT TRIMING ± 5% MAX



* TYPICAL RESISTANCE RANGE FOR TRIM UP AND TRIM DOWN

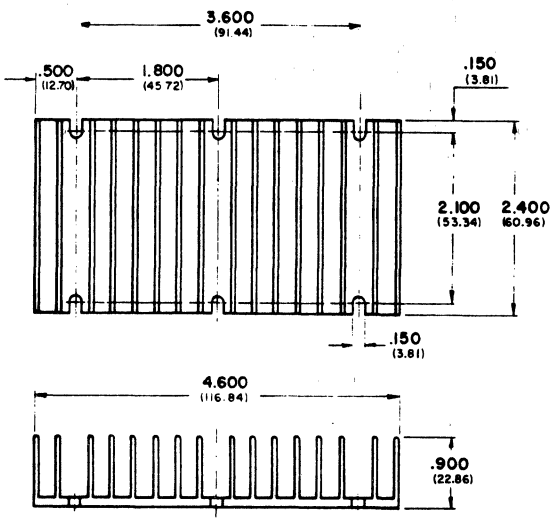
RESISTANCE / TRIM	% 1	2	3	5
TRIM UP	300K	150K	50K	20K
TRIM DOWN	1M	500K	250K	100K

* THESE ARE TYPICAL RESISTANCE VALUES, AS EACH INDIVIDUAL UNIT WILL VARY SLIGHTLY. USE OF TRIM POT TO DETERMINE RESISTANCE VALUE IS RECOMMENDED. USE 1/2 WATT MINIMUM POWER RATING RESISTOR.

Single: Typical Weight 210 grams

Dual: Typical Weight 235 grams

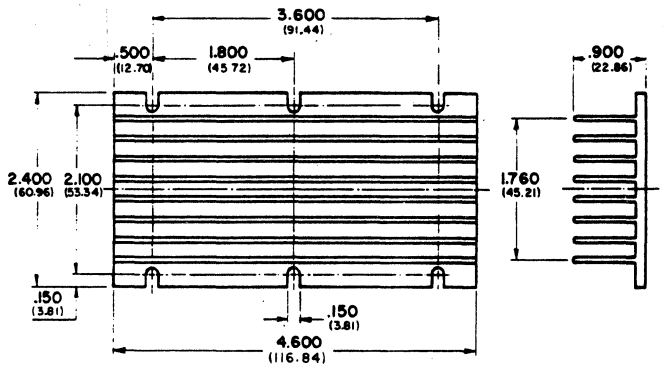
CH HEATSINK



ALL DIMENSIONS ARE IN INCHES ( ) = MM

Approximate Weight 145 grams

CV HEATSINK



Approximate Weight 145 grams

NOTE: For additional Heatsink options, consult factory.

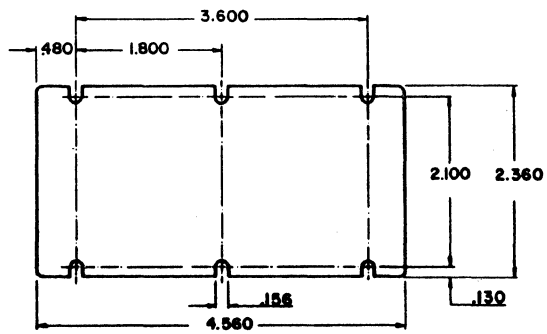
TYPE CH	$12.50
TYPE CV	$12.50
TYPE TI	$ 1.50

PART TI = THERMAL INTERFACE

Alloy Aluminum Substrate

Thermal Conductivity, (BTU-in/hr ft² °F __1530
Coefficient of Thermal Expansion
(25-100°C, 10^{-6} in-in/°F) _____13.1
Hardness, Brinnell B _____ 23
Endurance Limit, psi _____5000
Standard Thickness (inches) _____ .002

Approximate Weight 1.10 grams



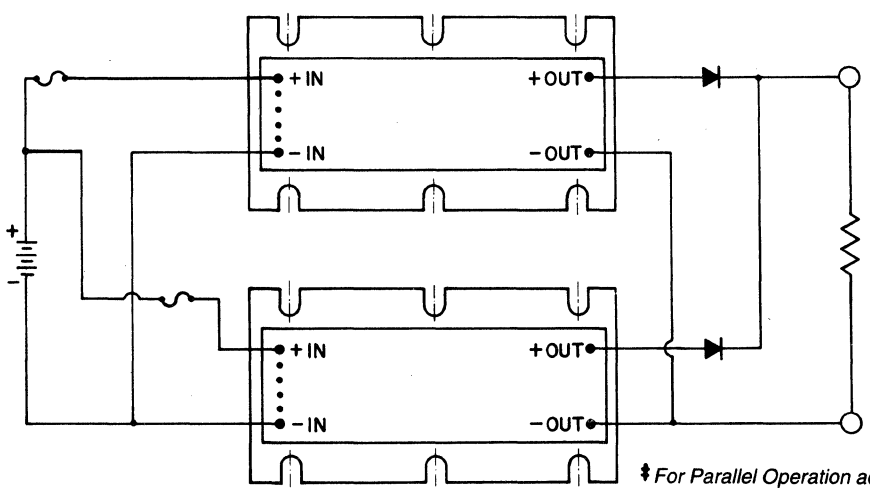
‡PARALLEL OPERATION

Special care must be exercised when operating these units in parallel, since these modules deliver comparatively high currents (especially the low voltage outputs of 3.3, 5.0, 5.2, and 12 volts.)

For parallel operation, the corresponding pins of the units must be connected together. The paths of these connections should be as direct as possible. The path to the load also should have the lowest possible resistance; otherwise unacceptable losses and load regulation will occur.

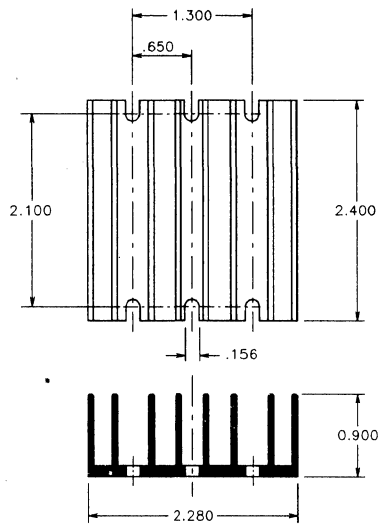
For instance, a 1 milli-ohm resistance and a 100 ampere load will cause 10 watts of line losses as well as additional load regulation.

If the parallel configuration is for redundant operation, schottky diodes should be used at the output of each module as shown in figure **.



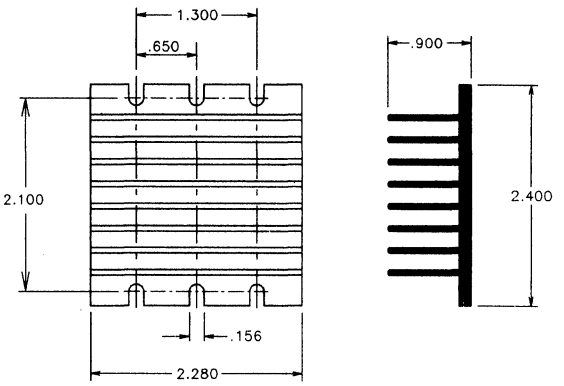
‡ *For Parallel Operation add Suffix P to Part #. Example: PA5SP, PB5SP, PC5SP, PD5SP.*

LCH HEATSINK



Approximate Weight 70 grams

LCV HEATSINK



Approximate Weight 70 grams

NOTE: For additional Heatsink options, consult factory.

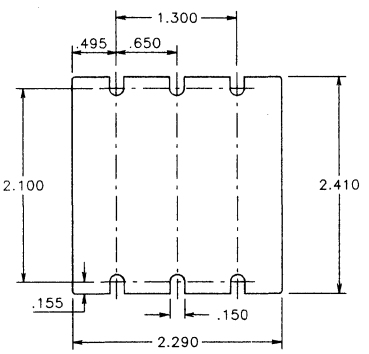
TYPE LCH	$6.25
TYPE LCV	$6.25
TYPE LTI	$1.50

PART TI = THERMAL INTERFACE

Alloy Aluminum Substrate

Thermal Conductivity, (BTU-in/hr ft² °F	1530
Coefficient of Thermal Expansion (25-100°C, 10^{-6} in-in/°F)	13.1
Hardness, Brinnell B	23
Endurance Limit, psi	5000
Standard Thickness (inches)	.002

NOTE: STANDARD THICKNESS = .002



Approximate Weight 0.600 grams

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Note: All dimensions are inches

PICO SM and SAT Series

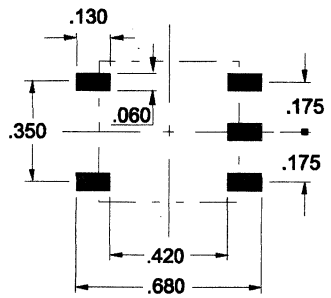

Fig. 1

PICO SMV Series

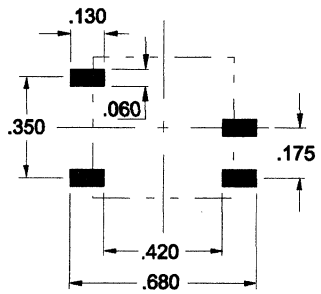

Fig. 2

PICO SDT Series

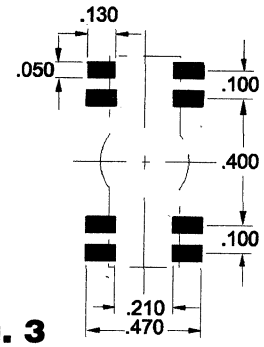

Fig. 3

PICO SB and SOR Series

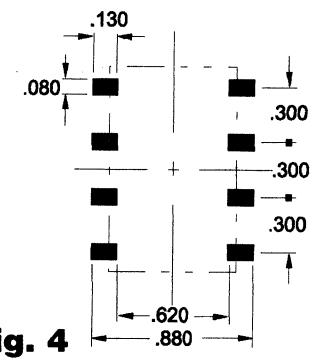

Fig. 4

PICO SC Series

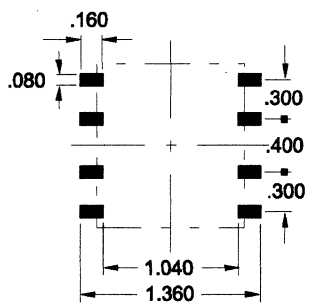

Fig. 5

PICO SE Series

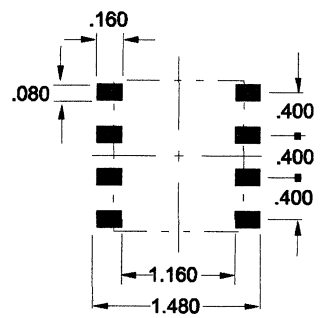

Fig. 6

PICO SFR Series

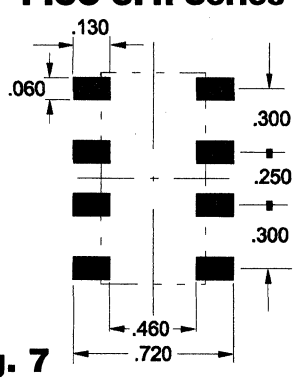

Fig. 7

PICO XSGR Series

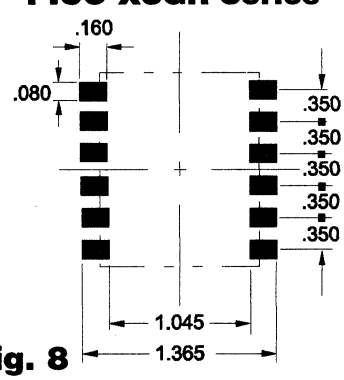

Fig. 8

PICO SIR Series

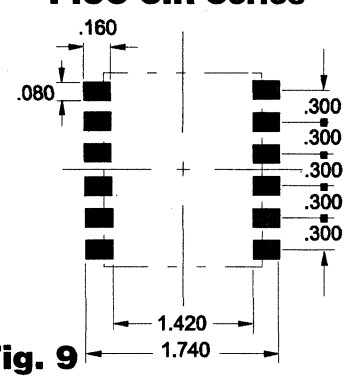

Fig. 9

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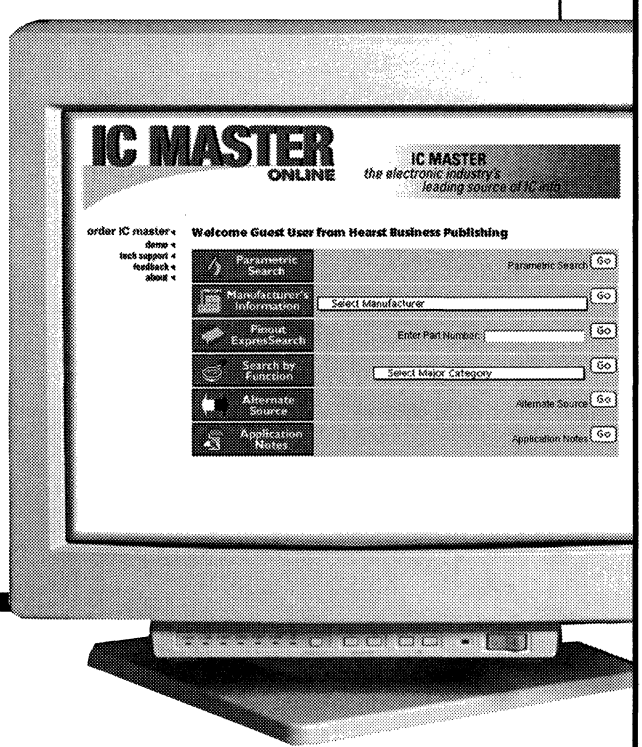

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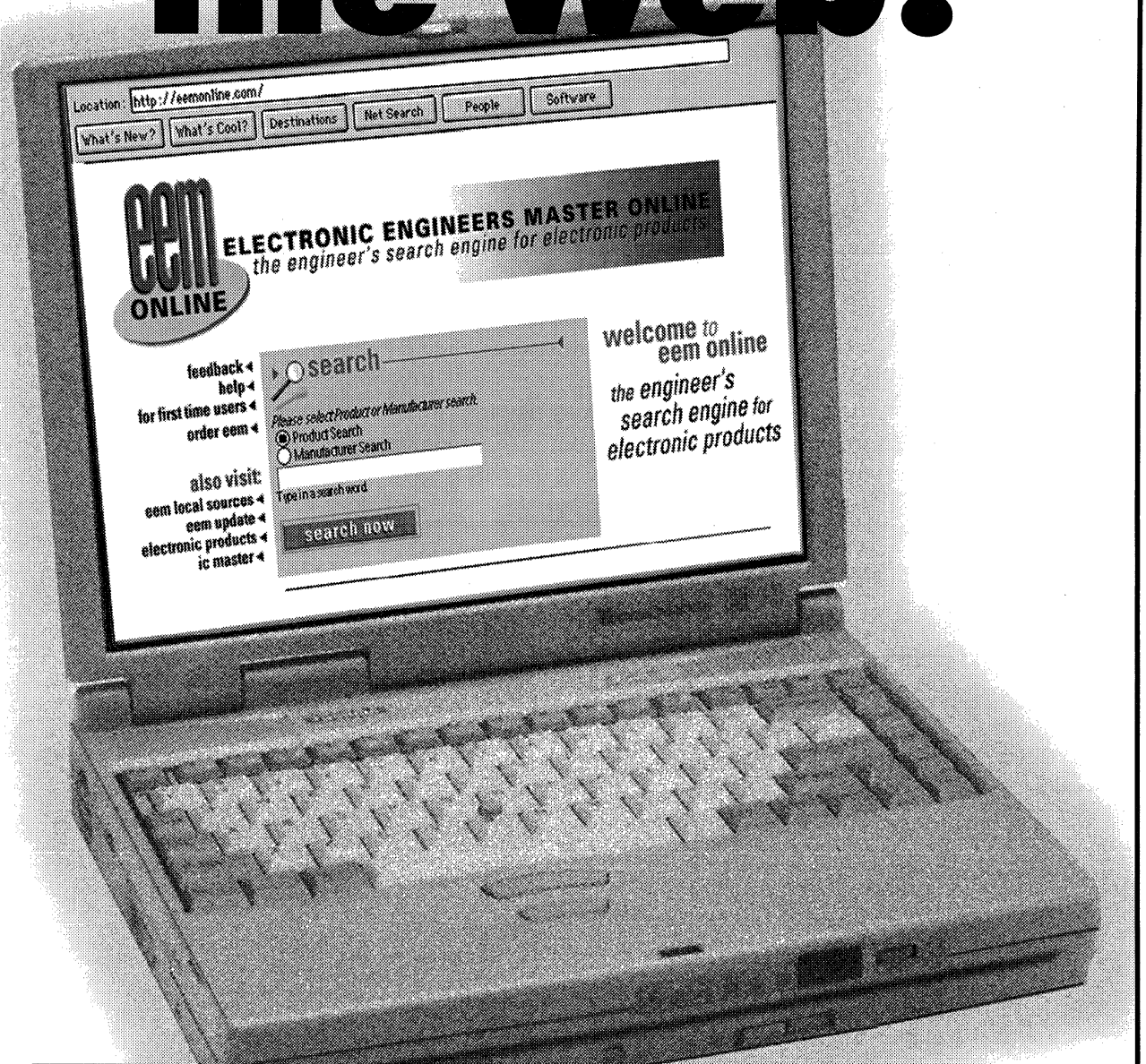

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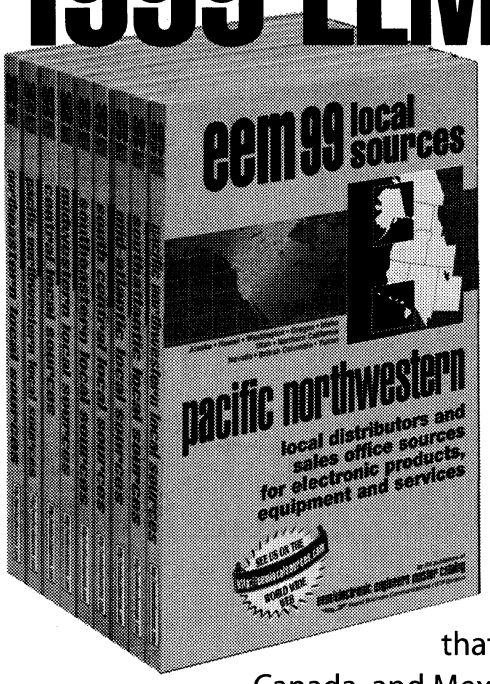

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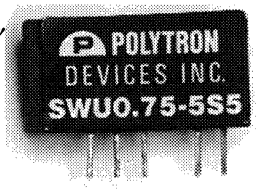
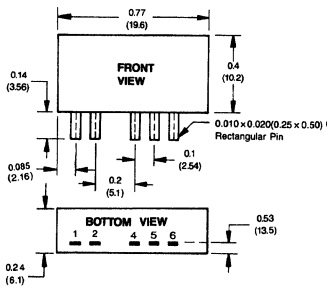
SWU SERIES

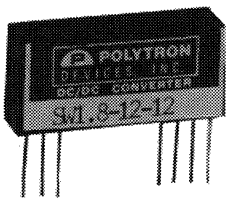


FEATURES:

- Miniature Single-Inline Package (SIP)
- Input Voltage:
  4.5 to 5.5 Vdc
  10.8 to 13.2 Vdc
  13.5 to 16.5 Vdc
  21.6 to 26.4 Vdc
- High Efficiency
- 500 Vdc Input/Output Isolation (750 VDC Optional
- Single & Dual Output
- Voltages: 5, 12, 15, ±5, ±12, ±15

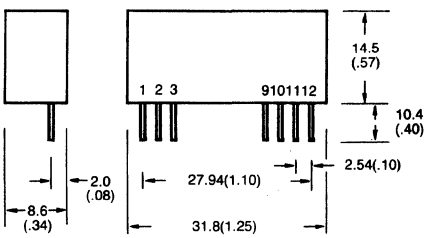


1-2 WATTS-SIP (1.25″ x 0.57″ x 0.34″)
SW1.8 SERIES



FEATURES:

- Miniature Single-Inline Package (SIP)
- Input Voltage: 5, 12, 24 (±10%)
- Output Voltage: 5, 9, 12, 15 ±12, ±15 Vdc
- Tight Regulation
- 500 Vdc Input/Output Isolation
- Single & Dual Output
- Voltages: 5, 9, 12, 15, ±5, ±12, ±15



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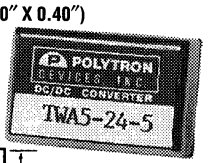
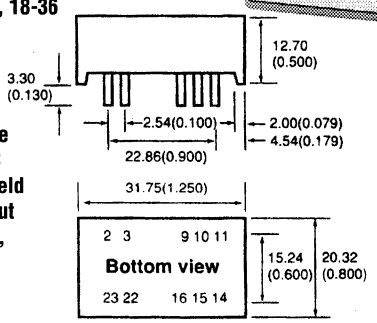
5 WATTS-TWA5 SERIES
24 PIN DIP PACKAGE (1.25″ X 0.80″ X 0.40″)
WIDE INPUT RANGE (2:1)

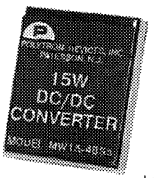


FEATURES:

- 5 Watts In D.I.L. package
- Input Voltage: 9-18, 18-36 36-72 Vdc
- Efficiency: 80%
- Isolated Outputs
- Regulated Outputs
- Low Profile Package
- No derating to 70°C
- Five-Sided EMI Shield
- Single & Dual Output Voltages: 5, 12, 15, ±5, ±12, ±15 Vdc

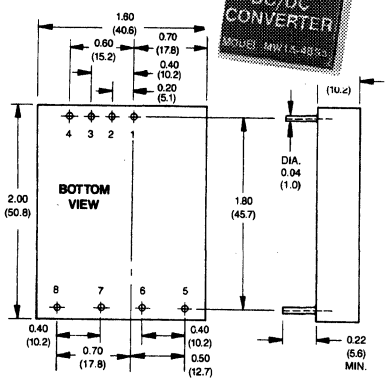


15 WATTS-MWB15 SERIES
(1.6″ X 2.0″ X 0.40″)
WIDE INPUT RANGE (4:1)



FEATURES:

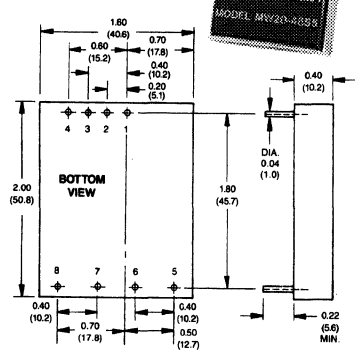
- Input Voltage Range: 9-36 Vdc, 20-72 Vdc
- Low Profile Package (1.6″ x 2.0″ x 0.45″)
- High Efficiency
- Short Circuit Protection
- Over Voltage Protection
- Six-sided Continuous Metal Shielding
- Epoxy Encapsulated
- Single and Dual Output Voltages: 5, 12, 15, ±5, ±12, ±15 Vdc



20 WATTS-MWA20 SERIES
MINIATURE (2.0″ X 1.6″ X 0.40″)
WIDE INPUT RANGE (2:1)

FEATURES:

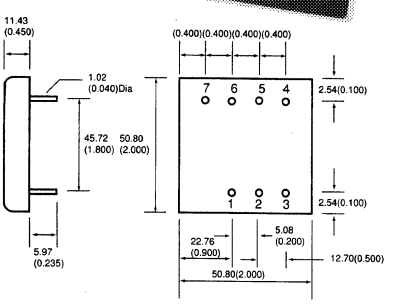
- Input Voltage: 9-18, 18-36, 36-72 Vdc
- Low Profile Package (2″ x 1.6″ x 0.45″)
- High Efficiency
- Short Circuit Protection
- Over Voltage Protection
- Six-Sided Continuous Metal Shielding
- Epoxy Encapsulated
- Single and Dual Output Voltage: 5, 12, 15, ±5, ±12, ±15 Vdc



25 WATTS-KW25 SERIES
(2.0″ X 2.0″ X 0.45″)
2:1 INPUT VOLTAGE RANGE
(9-18 VDC, 18-36 VDC, 36-72 VDC)

FEATURES:

- Input Voltage: 9-18, 18-36, 36-72 Vdc
- Low Profile Package (2.0″ x 2.0″ x 0.45″)
- High Efficiency (88%)
- Short Circuit Protection
- Over Voltage Protection
- Single, Dual & Triple Output Voltages: 5, 12, 15, ±5, ±12, ±15, +5/±12 Vdc



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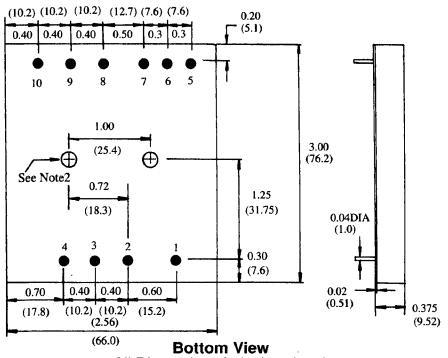
MORE NEW PRODUCTS!

DC/DC CONVERTERS-continued

40 WATT (2.56″ x 3.0″ x .375″)
MWA40 SERIES
FEATURES:

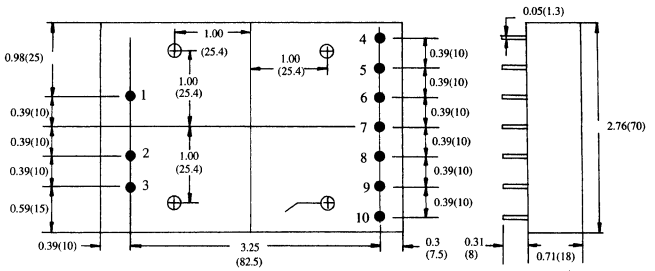
- Input Voltage: 9-18 Vdc, 18-36 Vdc, 36-72 Vdc
- Six Sided Shield
- High Efficiency (85%)
- Isolation Voltage: 1500 Vdc
- Single, Dual & Triple Outputs
- Output Voltage: 3.3 Vdc, 5 Vdc, 12 Vdc, 15 Vdc, ±5 Vdc, ±12 Vdc, ±15 Vdc, 3.3/5.0 Vdc, 5/±12 Vdc, 5/±15 Vdc



Bottom View
All Dimensions in inches (mm)

60 WATT (3.94″ x 2.76″ x 0.71″)
MWA60 SERIES
FEATURES:

- Input Voltage: 9-18 Vdc, 18-36 Vdc, 36-72 Vdc
- Six Sided Shield
- High Efficiency (85%)
- Isolation Voltage: 1500 Vdc
- Single & Dual Outputs
- Output Voltage: 3.3 Vdc, 5 Vdc, 12 Vdc, 15 Vdc, ±5 Vdc, ±12 Vdc, ±15 Vdc, 3.3/5.0 Vdc



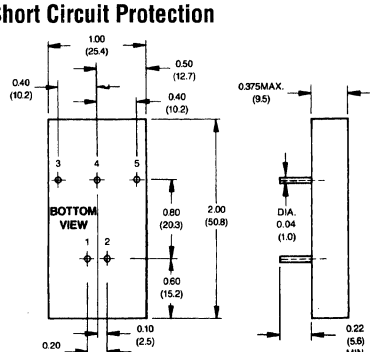
Bottom View
All Dimensions in inches (mm)

REGULATED DC/DC CONVERTERS
LWA5 SERIES
1″ X 2″ X 0.4″
2:1 & 4:1 WIDE INPUT VOLTAGE RANGE 5W

CONTACT FACTORY FOR NEW CATALOG

FEATURES:

- Wide Input Voltage Range
- Low Profile Package (1″ x 2″ x 0.4″)
- Input Output Isolation: 500 Vdc
- Efficiency up to 83% @ FL
- Short Circuit Protection
- Over Voltage Protection
- Six-Sided Continuous Metal shielding
- Epoxy Encapsulated
- Single and Dual Output Voltage
- Isolation Voltage: 1500 Vdc



Pin Connections		
PIN	SINGLE OUTPUT	DUAL OUTPUT
1	+ VIN	+ VIN
2	-VIN	-VIN
3	+VOUT	+VOUT
4	NO PIN	COMMON
5	-VOUT	V-OUT

	INPUT VOLTAGE (Vdc)*	OUTPUT VOLTAGE (Vdc)	OUTPUT CURRENT (mA)	% EFF.	MODEL NUMBER	CASE	PRICE 1-9 QTY
SINGLE OUTPUT	9-18	5	1000	77	LWA5-12S5	P	$49.00
		12	470	80	LWA5-12S12	P	$49.00
		15	400	79	LWA5-12S15	P	$49.00
	18-36 *9-36	5	1000	79	LWA5-24S5	P	$49.00
		12	470	82	LWA5-24S12	P	$49.00
		15	400	82	LWA5-24S15	P	$49.00
	36-72 *18-72	5	1000	80	LWA5-48S5	P	$49.00
		12	470	84	LWA5-48S12	P	$49.00
		15	400	84	LWA5-48S15	P	$49.00
DUAL OUTPUT	9-18	±12	±230	79	LWA5-12-12	P	$54.00
		±15	±190	79	LWA5-12-15	P	$54.00
	18-36 *9-36	±12	±230	80	LWA5-24-12	P	$54.00
		±15	±190	80	LWA5-24-15	P	$54.00
	36-72 *18-12	±12	±230	82	LWA5-48-12	P	$54.00
		±15	±190	82	LWA5-48-15	P	$54.00

* Use LWB prefix in place of LWA for 4:1 input range (9-36, 18-72)

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REGULATED DC/DC CONVERTERS

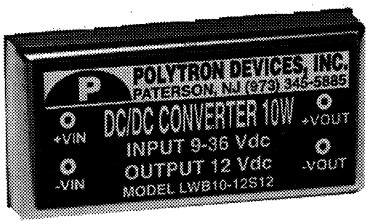
LWA10 SERIES

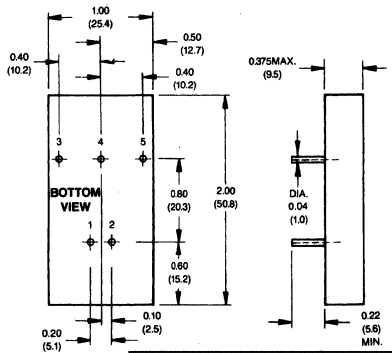
1″ X 2″ X 0.4″
2:1 & 4:1 WIDE INPUT RANGE 10W

CONTACT FACTORY FOR NEW CATALOG

FEATURES:

- Wide Input Voltage Range (2:1 & 4:1)
- Low Profile Package (1″ x 2″ x 0.4″)
- Input/Output Isolation: 1500 Vdc
- Efficiency up to 82% @ FL
- Short Circuit Protection
- Over Voltage Protection
- Six-Sided Continuous Metal shielding
- Epoxy Encapsulated
- Single and Dual Output Voltage





Pin Connections		
PIN	SINGLE OUTPUT	DUAL OUTPUT
1	+ VIN	+ VIN
2	-VIN	-VIN
3	+VOUT	+VOUT
4	NO PIN	COMMON
5	-VOUT	V-OUT

	INPUT VOLTAGE (Vdc)	OUTPUT VOLTAGE (Vdc)	OUTPUT CURRENT (mA)	% EFF.	MODEL NUMBER QTY	PRICE 1-9
SINGLE OUTPUT	9-18	5	2000	79	LWA10-12S5	$59.00
		12	830	80	LWA10-12S12	$59.00
		15	670	83	LWA10-12S15	$59.00
	18-36	5	2000	81	LWA10-24S5	$59.00
		12	830	84	LWA10-24S12	$59.00
	*9-36	15	670	84	LWA10-24S15	$59.00
	36-72	5	2000	82	LWA10-48S5	$59.00
		12	830	86	LWA10-48S12	$59.00
	*18-72	15	670	86	LWA10-48S15	$59.00
DUAL OUTPUT	9-18	±12	±416	84	LWA10-12-12	$63.00
		±15	±333	84	LWA10-12-15	$63.00
	18-36	±12	±416	81	LWA10-24-12	$63.00
	*9-36	±15	±333	81	LWA10-24-15	$63.00
	36-72	±12	±416	82	LWA10-48-12	$63.00
	*18-72	±15	±333	82	LWA10-48-15	$63.00

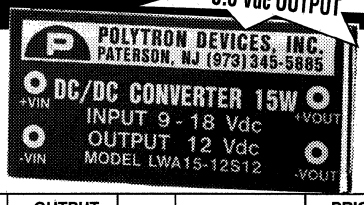
*Use LWB Prefix in place of LWA for 4:1 input range (9-36, 18-72)

REGULATED DC/DC CONVERTERS

LWA15 SERIES

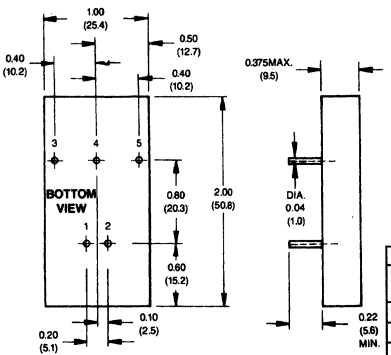
1″ X 2″ X 0.4″
2:1 & 4:1 WIDE INPUT RANGE 15W

NEW! 3.3 Vdc OUTPUT



FEATURES:

- Wide Input Voltage Range (2:1 & 4:1)
- Low Profile Package (1″ x 2″ x 0.4″)
- Input/Output Isolation- 500 Vdc
- Efficiency up to 86% @ FL
- Short Circuit Protection
- Over Voltage Protection
- Six-Sided Continuous Metal shielding
- Epoxy Encapsulated
- Single and Dual Output Voltage



Pin Connections		
PIN	SINGLE OUTPUT	DUAL OUTPUT
1	+ VIN	+ VIN
2	-VIN	-VIN
3	+VOUT	+VOUT
4	NO PIN	COMMON
5	-VOUT	V-OUT

2:1 INPUT RANGE

	INPUT VOLTAGE (Vdc)*	OUTPUT VOLTAGE (Vdc)	OUTPUT CURRENT (mA)	% EFF.	MODEL NUMBER	PRICE 1-9 QTY
SINGLE OUTPUT	9-18	3.3	4000	84	LWA15-12S33	$79.00
		5	3000	79	LWA15-12S5	$79.00
		12	1250	80	LWA15-12S12	$79.00
		15	1000	80	LWA15-12S15	$79.00
	18-36	3.3	4000	85	LWA15-24S33	$79.00
		5	3000	79	LWA15-24S5	$79.00
	*9-36	12	1250	80	LWA15-24S12	$79.00
		15	1000	79	LWA15-24S15	$79.00
	36-72	3.3	4000	85	LWA15-48S33	$79.00
		5	3000	79	LWA15-48S5	$79.00
	*18-72	12	1250	80	LWA15-48S12	$79.00
		15	1000	80	LWA15-48S15	$79.00
DUAL OUTPUT	9-18	±12	±625	80	LWA15-12-12	$85.00
		±15	±500	80	LWA15-12-15	$85.00
	18-36	±12	±625	80	LWA15-24-12	$85.00
	*9-36	±15	±500	80	LWA15-24-15	$85.00
	36-72	±12	±625	80	LWA15-48-12	$85.00
	*18-72	±15	±500	80	LWA15-48-15	$85.00

*Use LWB Prefix in place of LWA for 4:1 input range (9-36, 18-72)

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REGULATED DC/DC CONVERTERS

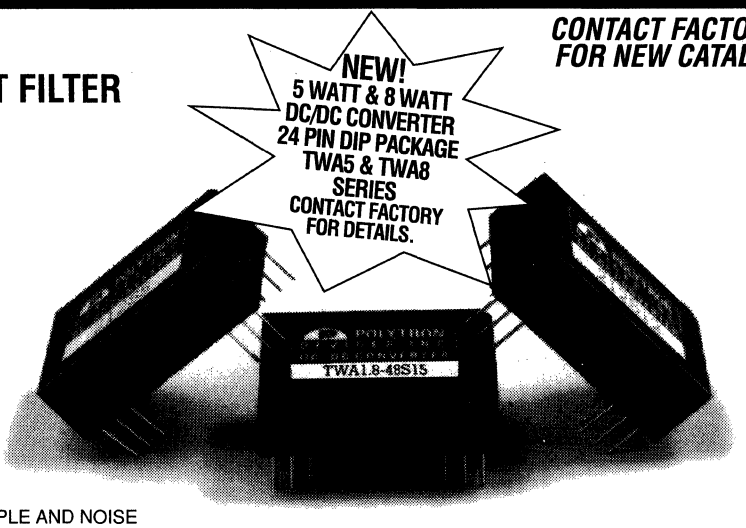
TW SERIES
TWA SERIES
TWB SERIES
1.8W-3W

24 PIN DIP PACKAGE INPUT VOLTAGE RANGE ±5%, 2:1 & 4:1

FEATURES:

- HIGH PERFORMANCE TT INPUT FILTER
- SINGLE AND DUAL OUTPUTS
- HIGHLY REGULATED ISOLATED OUTPUTS
- 100% BURN IN
- HIGH EFFICIENCY
- HIGH RELIABILITY
- NO EXTERNAL COMPONENTS

CONTACT FACTORY FOR NEW CATALOG



SPECIFICATIONS:

- OUTPUT VOLTAGE STABILITY 0.02%/°C Max.
- OUTPUT VOLTAGE ACCURACY 5%
- REGULATION Line: ±0.5% Max. Load: ±1% Max.
- RIPPLE AND NOISE 50 MVP-P Max.
- INPUT-OUTPUT ISOLATION 500 Vdc Min. 2000 Vdc (Optional)
- OPERATING TEMPERATURE -25°C to +71°C
- STORAGE TEMPERATURE -40°C to +100°C

SINGLE OUTPUT

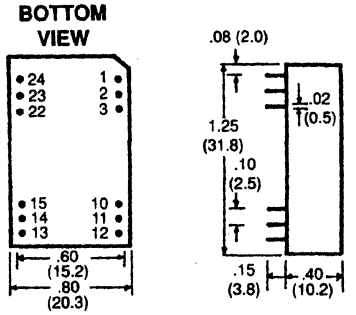
INPUT ①,② VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER	PRICE 1-9 QTY
5 (4.76-5.25) ①	5	360	TW1.8-5S5	23.00
	5	600	TW3-5S5	29.00
	9	250	TW1.8-5S9	23.00
	9	334	TW3-5S9	29.00
	12	150	TW1.85S12	23.00
	12	250	TW3-5S12	29.00
	15	120	TW1.85S15	23.00
②	15	200	TW3-5S15	29.00
12 (11.40-12.60) ①	5	360	TW1.8-12S5	23.00
	5	600	TW3-12S5	29.00
	9	250	TW1.8-12S9	23.00
	9	334	TW3-12S9	29.00
	12	150	TW1.8-12S12	23.00
	12	250	TW3012S12	29.00
	15	120	TW1.8-12S15	23.00
②	15	200	TW3-12S15	29.00
24 (22.80-25.30) ①	5	360	TW18-24S5	23.00
	5	600	TW3-24S5	29.00
	9	250	TW1.8-24S9	23.00
	9	334	TW3-24S9	29.00
	12	150	TW1.8-24S12	23.00
	12	250	TW3-24S12	29.00
	15	120	TW1.8-24S15	23.00
②	15	200	TW3-24S15	29.00
48 (45.60-50.40) ①	5	360	TW1.8-48S5	23.00
	5	600	TW3-48S5	29.00
	9	250	TW1.8-48S9	23.00
	9	334	TW3-48S9	29.00
	12	150	TW1.8-48S12	23.00
	12	250	TW3-48S12	29.00
	15	120	TW1.8-48S15	23.00
②	15	200	TW3-48S15	29.00

DUAL OUTPUT

INPUT ①,② VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER	PRICE 1-9 QTY
5 (4.75-5.25)	±5	±180	TW1.88-5.5	29.00
	±5	±300	TW3-5-5	34.00
	±9	±100	TW1.85-9	29.00
	±9	±167	TW3-5-9	34.00
	±12	±75	TW1.8-5.12	29.00
	±12	±125	TW3-5-12	34.00
①	±15	±60	TW1.8-5-15	29.00
②	±15	±100	TW3-5-15	34.00
12 (11.40-12.60)	±5	±180	TW1.8-12-5	29.00
	±5	±300	TW3-12-5	34.00
	±12	±75	TW1.8-12-12	29.00
	±12	±125	TW3-12-12	34.00
①	±15	±60	TW1.8-12-15	29.00
②	±15	±100	TW3-12-15	34.00
24 (22.80-2520)	±5	±180	TW1.8-24-5	29.00
	±5	±300	TW3-24-5	34.00
	±12	±75	TW1.8-24-12	29.00
	±12	±125	TW3-24-12	34.00
①	±15	±60	TW1.8-24-15	29.00
②	±15	±100	TW3-24-15	34.00
48 (45.60-50.40)	±5	±180	TW1.8-48-5	29.00
	±5	±300	TW3-48-5	34.00
	±12	±75	TW1.8-48-12	29.00
	±12	±125	TW3-48-12	34.00
①	±15	±60	TW1.8-48-15	29.00
②	±15	±100	TW3-48-15	34.00

① For 2:1 input range (9-18, 18-36, 36-72) use prefix TWA in place of TW in model number.

② For 4:1 input range (9-36, 18-72 Vdc) use prefix TWB in place of TWA in model number, Consult factory for prices and detailed specifications.



Pin Connections		
PIN	SINGLE OUTPUT	DUAL OUTPUT
1	+ V INPUT	+V INPUT
2	N.C.	- V OUTPUT
3	N.C.	COMMON
10	- V OUTPUT	COMMON
11	+ V OUTPUT	+V OUTPUT
12	- V INPUT	- V INPUT
13	- V INPUT	- V INPUT
14	+ V OUTPUT	+V OUTPUT
15	- V OUTPUT	COMMON
22	N.C.	COMMON
23	N.C.	- V OUTPUT
24	+ V INPUT	+V INPUT

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REGULATED DC/DC CONVERTERS

2:1/4:1 INPUT VOLTAGE RANGE 5W TO 25W

3.3Vdc TO 48Vdc OUTPUT

FEATURES:

CONTACT FACTORY FOR NEW CATALOG

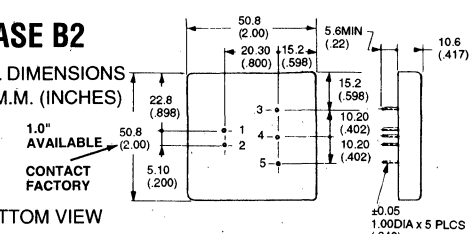
- Input/Output Isolation
- Efficiency up to 86% @ FL
- Switching Frequency — 100KHz Min.
- Short Circuit Protection
- Six Sided Shielding
- Compact Size
- Single, Dual, Triple Outputs
- Epoxy Encapsulated

SPECIFICATIONS:

Typical @ 25°C Under Full Load and Nominal Input Voltage Unless Otherwise Specified.

- INPUT*
  - Voltage Range
  - 12Vdc Input 9-18Vdc
  - 9-36Vdc
  - 24Vdc Input 18-36Vdc
  - 18-72Vdc *
  - 48Vdc Input 36-72Vdc
- OUTPUT
  - Voltage Accuracy .....±1%
  - Line Regulation .....±0.1%
  - Load Regulation .....±0.5%
  - Ripple & Noise (20MHz BW).....50mV P-P Max
  - Transient Response.....<250 usec
  - Protection .....over current protection
  - short circuit protection
- GENERAL
  - Efficiency .....Up to 86% @ FL
  - Isolation Voltage.....500 Vdc Min.
  - .....(Up to 3000 Vdc Min. Optional)
  - Isolation Resistance .....100 Mohms
  - Switching Frequency .....100KHz Min.
- ENVIRONMENTAL
  - Operating Temperature Range .....-25°C to +71°C
  - Storage Temperature Range .....-50°C to +105°C
  - Temperature Coefficient.....0.02% / °C Max.
  - Cooling.....Free air convection
  - EMI/RFI .....Five-sided shield
  - Six-sided shield (optional)

CASE B2



PIN CONNECTIONS		
PIN NO.	PIN FUNCTION	
	SINGLE	DUAL
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	N.C.	Common
5	- Output	- Output

5/10W DC/DC Converter

	INPUT* VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER	CASE	PRICE 1-9 QTY
SINGLE OUTPUT	12 Vdc (9-18) (9-36)*	3.3 Vdc	3000 mA	YW10-12S03	B2	99.00
		5 Vdc	1000 mA	KW5-12S5	B2	$65.00
		12 Vdc	417 mA	KW5-12S12	B2	$65.00
		15 Vdc	334 mA	KW5-12S15	B2	$65.00
	24 Vdc (18-36) (18-72)*	3.3 Vdc	3000 mA	YW10-24S03	B2	$99.00
		5 Vdc	1000 mA	KW5-24S5	B2	$65.00
		12 Vdc	417 mA	KW5-24S12	B2	$65.00
		15 Vdc	334 mA	KW5-24S15	B2	$65.00
	48 Vdc (36-72)	3.3 Vdc	3000 mA	YW10-48S03	B2	$99.00
		5 Vdc	1000 mA	KW5-48S5	B2	$65.00
		12 Vdc	417 mA	KW5-48S12	B2	$65.00
		15 Vdc	334 mA	KW5-48S15	B2	$65.00
DUAL OUTPUT	12 Vdc (9-18) (9-36)*	±5 Vdc	±500 mA	KW5-12-5	B2	$69.00
		±12 Vdc	±210 mA	KW5-12-12	B2	$69.00
		±15 Vdc	±170 mA	KW5-12-15	B2	$69.00
	24 Vdc (18-36) (18-72)*	±5 Vdc	±500 mA	KW5-24-5	B2	$69.00
		±12 Vdc	±210 mA	KW5-24-12	B2	$69.00
		±15 Vdc	±170 mA	KW5-24-15	B2	$69.00
	48 Vdc (36-72)	±5 Vdc	±500 mA	KW5-48-5	B2	$69.00
		±12 Vdc	±210 mA	KW5-48-12	B2	$69.00
		±15 Vdc	±170 mA	KW5-48-15	B2	$69.00

15W DC/DC Converter

	INPUT* VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER	CASE	PRICE 1-9 QTY
SINGLE OUTPUT	12 Vdc (9-18) (9-36)*	5 Vdc	3000 mA	KW15-12S5	B2	$89.00
		12 Vdc	1250 mA	KW15-12S12	B2	$89.00
		15 Vdc	1000 mA	KW15-12S15	B2	$89.00
		24 Vdc	625 mA	KW15-12S24	B2	$89.00
	24 Vdc (18-36) (18-72)*	5 Vdc	3000 mA	KW15-24S5	B2	$89.00
		12 Vdc	1250 mA	KW15-24S12	B2	$89.00
		15 Vdc	1000 mA	KW15-24S15	B2	$89.00
		24 Vdc	625 mA	KW15-24S24	B2	$89.00
	48 Vdc (36-72)	5 Vdc	3000 mA	KW15-48S5	B2	$89.00
		12 Vdc	1250 mA	KW15-48S12	B2	$89.00
		15 Vdc	1000 mA	KW15-48S15	B2	$89.00
		24 Vdc	625 mA	KW15-48S24	B2	$89.00
DUAL OUTPUT	12 Vdc (9-18) (9-36)*	±5 Vdc	±1500 mA	KW15-12-5	B2	$98.00
		±12 Vdc	±625 mA	KW15-12-12	B2	$98.00
		±15 Vdc	±500 mA	KW15-12-15	B2	$98.00
		±24 Vdc	±313 mA	KW15-12-24	B2	$98.00
	24 Vdc (18-36) (18-72)*	±5 Vdc	±1500 mA	KW15-24-5	B2	$98.00
		±12 Vdc	±625 mA	KW15-24-12	B2	$98.00
		±15 Vdc	±500 mA	KW15-24-15	B2	$98.00
		±24 Vdc	±313 mA	KW15-24-24	B2	$98.00
	48 Vdc (36-72)	±5 Vdc	±1500 mA	KW15-48-5	B2	$98.00
		±12 Vdc	±625 mA	KW15-48-12	B2	$98.00
		±15 Vdc	±500 mA	KW15-48-15	B2	$98.00
		±24 Vdc	±313 mA	KW15-48-24	B2	$98.00

25W DC/DC Converter

	INPUT* VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER	CASE	PRICE 1-9 QTY
SINGLE OUTPUT	12 Vdc (9-18)	5 Vdc	5000 mA	KW25-12S5	J	$ 99.00
		12 Vdc	2100 mA	KW25-12S12	J	$ 99.00
		15 Vdc	1700 mA	KW25-12S15	J	$ 99.00
	24 Vdc (18-36)	5 Vdc	5000 mA	KW25-24S5	J	$ 99.00
		12 Vdc	2100 mA	KW25-24S12	J	$ 99.00
		15 Vdc	1700 mA	KW25-24S15	J	$ 99.00
	48 Vdc (36-72)	5 Vdc	5000 mA	KW25-48S5	J	$ 99.00
		12 Vdc	2100 mA	KW25-48S12	J	$ 99.00
		15 Vdc	1700 mA	KW25-48S15	J	$ 99.00
DUAL OUTPUT	12 Vdc (9-18)	±5 Vdc	±2500 mA	KW25-12-5	J	$109.00
		±12 Vdc	±1250 mA	KW30-12-12	J	$112.00
		±15 Vdc	±1000 mA	KW30-12-15	J	$112.00
	24 Vdc (18-36)	±5 Vdc	±2500 mA	KW25-24-5	J	$109.00
		±12 Vdc	±1250 mA	KW30-24-12	J	$112.00
		±15 Vdc	±1000 mA	KW30-24-15	J	$112.00
	48 Vdc (36-72)	±5 Vdc	±2500 mA	KW25-48-5	J	$109.00
		±12 Vdc	±1250 mA	KW30-48-12	J	$112.00
		±15 Vdc	±1000 mA	KW30-48-15	J	$112.00
TRIPLE OUTPUT	12 Vdc (9-18)	5/±12 Vdc	4000/±250 mA	KW25-12S5-12	J	$120.00
		5/±15 Vdc	3500/±300 mA	KW25-12S5-15	J	$120.00
		12/+5/-5 Vdc	300/+4000/-300 mA	KW25-12S12-5	J	$120.00
	24 Vdc (18-36)	5/±12 Vdc	4000/±250 mA	KW25-24S5-12	J	$120.00
		5/±15 Vdc	3500/±300 mA	KW25-24S5-15	J	$120.00
		12/+5/-5 Vdc	300/+4000/-300 mA	KW25-24S12-5	J	$120.00
	48 Vdc (36-72)	5/±12 Vdc	4000/±250 mA	KW25-48S5-12	J	$120.00
		5/±15 Vdc	3500/±300 mA	KW25-48S5-15	J	$120.00
		12/+5/-5 Vdc	300/+4000/-300 mA	KW25-48S12-5	J	$120.00

***FOR 4:1 INPUT RANGE (9-36Vdc, 18-72Vdc) USE PREFIX "Y" IN PLACE OF PREFIX "KW" IN THE MODEL NUMBER**

(NOT AVAILABLE FOR 3.3Vdc UNITS)

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REGULATED DC/DC CONVERTERS

2:1 INPUT VOLTAGE RANGE 40W TO 60W

CONTACT FACTORY FOR NEW CATALOG

40W DC/DC Converter

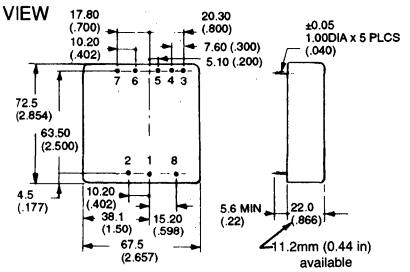
	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER	CASE	PRICE 1-9 QTY
SINGLE OUTPUT	12 Vdc (9-18)	5 Vdc	8000 mA	KW40-12S5	K	$104.00
		12 Vdc	3400 mA	KW40-12S12	K	$104.00
		15 Vdc	2700 mA	KW40-12S15	K	$104.00
	24 Vdc (18-36)	5 Vdc	8000 mA	KW40-24S5	K	$104.00
		12 Vdc	3400 mA	KW40-24S12	K	$104.00
		15 Vdc	2700 mA	KW40-24S15	K	$104.00
	48 Vdc (36-72)	5 Vdc	8000 mA	KW40-48S5	K	$112.00
		12 Vdc	3400 mA	KW40-48S12	K	$112.00
		15 Vdc	2700 mA	KW40-48S15	K	$112.00
DUAL OUTPUT	12 Vdc (9-18)	±5 Vdc	±4000 mA	KW40-12-5	K	$112.00
		±12 Vdc	±1670 mA	KW40-12-12	K	$112.00
		±15 Vdc	±1340 mA	KW40-12-15	K	$112.00
	24 Vdc (18-36)	±5 Vdc	±4000 mA	KW40-24-5	K	$112.00
		±12 Vdc	±1670 mA	KW40-24-12	K	$112.00
		±15 Vdc	±1340 mA	KW40-24-15	K	$112.00
	48 Vdc (36-72)	±5 Vdc	±4000 mA	KW40-48-5	K	$112.00
		±12 Vdc	±1670 mA	KW40-48-12	K	$112.00
		±15 Vdc	±1340 mA	KW40-48-15	K	$112.00
TRIPLE OUTPUT	12 Vdc (9-18)	5/±12 Vdc	7000/±300 mA	KW40-12S5-12	K	$118.00
		5/±15 Vdc	6200/±300 mA	KW40-12S5-15	K	$118.00
		+5/-5/+12 Vdc	7000/300/300 mA	KW40-12S12-5	K	$118.00
	24 Vdc (18-36)	5/±12 Vdc	7000/±300 mA	KW40-24S5-12	K	$118.00
		5/±15 Vdc	6200/±300 mA	KW40-24S5-15	K	$118.00
		+5/-5/+12 Vdc	7000/300/300 mA	KW40-24S12-5	K	$118.00
	48 Vdc (36-72)	5/±12 Vdc	7000/±300 mA	KW40-48S5-12	K	$118.00
		5/±15 Vdc	6200/±300 mA	KW40-48S5-15	K	$118.00
		+5/-5/+12 Vdc	7000/300/300 mA	KW40-48S12-5	K	$118.00

60W DC/DC Converter

	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER	CASE	PRICE 1-9 QTY
SINGLE OUTPUT	12 Vdc (9-18)	5 Vdc	12000 mA	KW60-12S5	N	$159.00
		12 Vdc	5000 mA	KW60-12S12	N	$159.00
		15 Vdc	4000 mA	KW60-12S15	N	$159.00
	24 Vdc (18-36)	5 Vdc	12000 mA	KW60-24S5	N	$159.00
		12 Vdc	5000 mA	KW60-24S12	N	$159.00
		15 Vdc	4000 mA	KW60-24S15	N	$159.00
	48 Vdc (36-72)	5 Vdc	12000 mA	KW60-48S5	N	$159.00
		12 Vdc	5000 mA	KW60-48S12	N	$159.00
		15 Vdc	4000 mA	KW60-48S15	N	$159.00
DUAL OUTPUT	12 Vdc (9-18)	±5 Vdc	±6000 mA	KW60-12-5	N	$169.00
		±12 Vdc	±2500 mA	KW60-12-12	N	$169.00
		±15 Vdc	±2000 mA	KW60-12-15	N	$169.00
	24 Vdc (18-36)	±5 Vdc	±6000 mA	KW60-24-5	N	$169.00
		±12 Vdc	±2500 mA	KW60-24-12	N	$169.00
		±15 Vdc	±2000 mA	KW60-24-15	N	$169.00
	48 Vdc (36-72)	±5 Vdc	±6000 mA	KW60-48-5	N	$169.00
		±12 Vdc	±2500 mA	KW60-48-12	N	$169.00
		±15 Vdc	±2000 mA	KW60-48-15	N	$169.00
TRIPLE OUTPUT	12 Vdc (9-18)	5/+12/-12 Vdc	6000/2000/500 mA	KW60-12S5-12	N	$189.00
		+5/+15/-15 Vdc	6000/1500/500 mA	KW60-12S5-15	N	$189.00
		±5/12 Vdc	± 5500/500 mA	KW60-12S12-5	N	$189.00
	24 Vdc (18-36)	5/+12/-12 Vdc	6000/2000/500 mA	KW60-24S5-12	N	$189.00
		+5/+15/-15 Vdc	6000/1500/500 mA	KW60-24S5-15	N	$189.00
		±5/12 Vdc	± 5500/500 mA	KW60-24S12-5	N	$189.00
	48 Vdc (36-72)	5/+12/-12 Vdc	6000/2000/500 mA	KW60-48S5-12	N	$189.00
		+5/+15/-15 Vdc	6000/1500/500 mA	KW60-48S5-15	N	$189.00
		±5/12 Vdc	± 5500/500 mA	KW60-48S12-5	N	$189.00

CASE J ALL DIMENSIONS IN M.M. (INCHES)

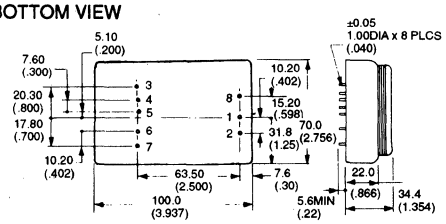
BOTTOM VIEW



PIN NO.	PIN CONNECTIONS PIN FUNCTION SINGLE	DUAL	TRIPLE
1	+ Input	+ Input	+ Input
2	- Input	- Input	- Input
3	+ Sense/Trim Down	- Output V2	+ Output V2
4	Output Trim	Com2	Com2
5	- Sense/Trim Up	NC	- Output V3
6	+ Output	+ Output V1	+ Output V1
7	- Output	Com 1	Com 1
8	Remote On/Off	Remote On/Off	Remote On/Off

CASE K ALL DIMENSIONS IN M.M. (INCHES) HEAT SINK IS OPTIONAL

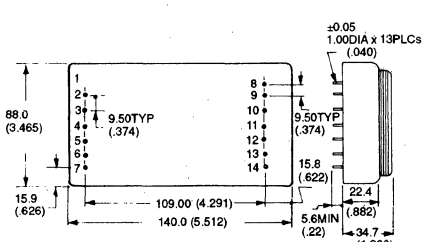
BOTTOM VIEW



PIN NO.	PIN CONNECTIONS PIN FUNCTION SINGLE	DUAL	TRIPLE
1	+ Input	+ Input	+ Input
2	- Input	- Input	- Input
3	+ Sense/Trim Down	- Output V2	+ Output V2
4	Output Trim	Com2	Com2
5	- Sense/Trim Up	NC	- Output V3
6	+ Output	+ Output V1	+ Output V1
7	- Output	Com 1	Com 1
8	Remote On/Off	Remote On/Off	Remote On/Off

CASE N ALL DIMENSIONS IN M.M. (INCHES) HEAT SINK IS OPTIONAL

BOTTOM VIEW



PIN NO.	PIN CONNECTIONS PIN FUNCTION SINGLE	DUAL	TRIPLE
1	No Pin	No Pin	No Pin
2	- Input	- Input	- Input
3	- Input	- Input	- Input
4	+ Input	+ Input	+ Input
5	+ Input	+ Input	+ Input
6	Remote On/Off	Remote On/Off	Remote On/Off
7	Case	Case	Case
8	- Output	On	- Sense
9	- Output	Common	Com 1
10	+ Output	+ Output	+ Output V1
11	+ Output	+ Output	+ Sense
12	- Sense	Common	+ Output V2
13	Trim	- Output	Com2
14	+ Sense	- Output	- Output V3

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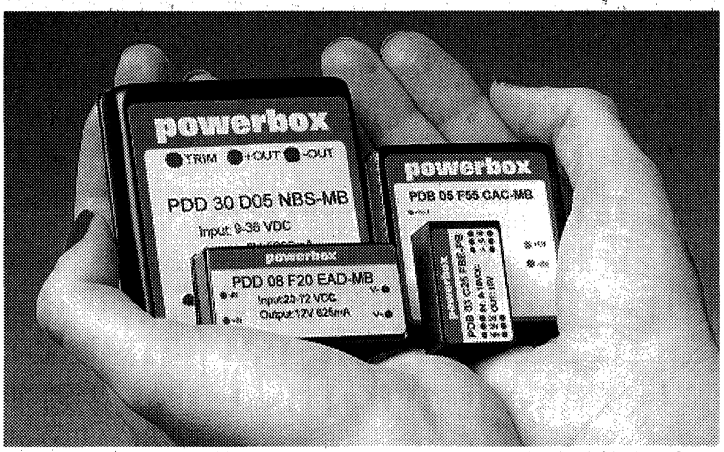
DC/DC CONVERTERS



The Powerbox range of DC/DC converters includes encapsulated, externals(desktop & wall mount), open frame, enclosed, and eurostandard. All in wide variety of inputs and ranges.

Product Selection

Encapsulated/Modular
- Input Voltage: nominal 5, 12, 24, 48 and 300 VDC
- Input Range: ±10%, 2:1, 3:1, 4:1
- Output Voltage: *Single:* 3.3, 5, 12, 15, 24, 48 and 300 VDC
  Multiple: various, including: ±5, ±12, ±15; 5&±12, 5&±15
- Output Power: various from 0.5 to 250W
- Isolation: 500VDC typical. 1,000VDC, 1,500- 4,000 VAC options

External/Desktop
- Input Voltage: nominal 12, 24, and 48VDC
- Input Range: typically 2:1 (9 - 18, 18 - 36 & 36 - 72
- Output Voltage: *Single:* 5, 12, 15, 18, 24, and 48 VDC
  Multiple: various including: ±5, ±12, ±15; 5&±12, 5&±15
- Output Power: various from 5W to 110W
- Isolation: 500VDC typical.
- I/O connection: typically wire but can be about anything

Open Frame/Enclosed
- Input Voltage: nominal 5, 12, 24, 48 and 300 VDC
- Input Range: typically 2:1 (9 - 18, 18 - 36 & 36 - 72
- Output Voltage: *Single:* 3.3, 5, 12, 15, 24, 48 and 300 VDC
  Multiple: various including: ±5, ±12, ±15; 5&±12, 5&±15
  Powerflex: nearly any output from 2.1 to 48VDC on any of 1 - 4 outputs from 50 - 250W
- Output Power: various from 10W to 250W
- Isolation: 500VDC typical. 1,500 & 4,000 VAC options

Plug-In/Cassette (including VME and Compact PCI)
- Input Voltage: nominal 12, 24, 48 110 and 300 VDC
- Input Range: ±10%, 2:1, some 3:1.
- Output Voltage: *Single:* various from: 2.1, some 300 VDC
  Multiple: ±5, ±12, ±15, ±24; 5&±12, 5&±15 and quads
- Output Power: various from 30W to 2,500W
- Isolation: 500VDC typical. 1,500 VAC options

FEATURES
- Excellent price/performance ratio
- US, Canada & World-Wide approvals
- High reliability
- 1 year warranty
- Various package options

APPLICATIONS
- Telecommunications
- Medical Instruments (many have IEC601 & UL2601 approvals)
- Computer & Peripherals
- Industrial products
- Robotics

SERVICES & SUPPORT
- Standard Off-The-Shelf Products
- Modified Standard Products
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DC/DC CONVERTERS

1-30 WATTS

FEATURES

- SMD ASSEMBLY
- STAKED PINS
- FR4 PCB
- SHIELDED CASES
- ISO 9000
- 100% BURN-IN
- VACUUM ENCAPSULATED CONSTRUCTION
- UL1950 CSA 22.2#950
- TUV (EN60950)
- CE MARKED TO LVD

V OUT	I OUT	V IN RANGE	MODEL NUMBER	WATTS	CASE SIZE-INCH (W X L X H)	CASE SIZE-MM (W X L X H)	FEATURES*
3.3	2A	9.0-18.0	DFC10E12S3.3	6.6	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
3.3	2A	18.0-36.0	DFC10E24S3.3	6.6	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
3.3	2A	36.0-72.0	DFC10E48S3.3	6.6	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
3.3	3.5A	4.5-6.0	DSN17N5S3.3	11.5	2.00 X 0.75 X 0.50	50.8 X 19.1 X 12.7	B,C
3.3	4A	9.0-18.0	DFA20E12S3.3	13.2	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D
3.3	4A	18.0-36.0	DFA20E24S3.3	13.2	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D
3.3	4A	36.0-72.0	DFA20E48S3.3	13.2	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D
5	0.15A	4.5-5.5	DSP1N5S5	0.75	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
5	1A	9.0-27.0	DFA6U12S5	5.0	1.08 X 2.12 X 0.48	27.4 X 53.9 X 12.2	A
5	1A	20.0-60.0	DFA6U48S5	5.0	1.08 X 2.12 X 0.48	27.4 X 53.9 X 12.2	A
5	1.2A	3.5-16.0	DFC6U5S5	6.0	1.00 X 2.00 X 0.45	25.4 X 50.8 X 11.4	A
5	2A	3.5-16.0	DGP12U5S5	10.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	A,C,D
5	2A	9.0-18.0	DFC10E12S5	10.0	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
5	2A	18.0-36.0	DFC10E24S5	10.0	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
5	2A	36.0-72.0	DFC10E48S5	10.0	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
5	3A	20.0-60.0	DFC15U48S5	15.0	1.62 X 2.02 X 0.55	41.5 X 51.3 X 14.0	B,C,D
5	3.5A	6.5-15.5	DSN17N12S5	17.5	2.00 X 0.75 X 0.50	50.8 X 19.1 X 12.7	B,C
5	4A	9.0-18.0	DFA20E12S5	20.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
5	4A	18.0-36.0	DFA20E24S5	20.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
5	4A	36.0-72.0	DFA20E48S5	20.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
5	5A	36.0-72.0	DGP30E48S5	25.0	1.62 X 2.02 X 0.55	41.2 X 51.3 X 14.0	B,C,D,E
5.2	1.2A	3.5-16.0	DFC6U5S5.2	6.2	1.00 X 2.00 X 0.45	25.4 X 50.8 X 11.4	A
7	0.14A	4.5-5.5	DSP1N5S7	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
12	0.08A	4.5-5.5	DSP1N5S12	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
12	0.5A	3.5-16.0	DFC6U5S12	6.0	1.00 X 2.00 X 0.45	25.4 X 50.8 X 11.4	A
12	0.5A	9.0-27.0	DFA6U12S12	6.0	1.08 X 2.12 X 0.48	27.4 X 53.9 X 12.2	A
12	0.5A	20.0-60.0	DFA6U48S12	6.0	1.08 X 2.12 X 0.48	27.4 X 53.9 X 12.2	A
12	0.9A	9.0-18.0	DFC10E12S12	10.8	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
12	0.9A	18.0-36.0	DFC10E24S12	10.8	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
12	0.9A	36.0-72.0	DFC10E48S12	10.8	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
12	1A	3.5-16.0	DGP12U5S12	12.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	A,C,D
12	1.25A	20.0-60.0	DFC15U48S12	15.0	1.62 X 2.02 X 0.55	41.5 X 51.3 X 14.0	B,C,D
12	1.7A	9.0-18.0	DFA20E12S12	20.4	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
12	1.7A	18.0-36.0	DFA20E24S12	20.4	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
12	1.7A	36.0-72.0	DFA20E48S12	20.4	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
12	2.5A	36.0-72.0	DGP30E48S12	30.0	1.62 X 2.02 X 0.55	41.2 X 51.3 X 14.0	B,C,D,E
14	0.07A	4.5-5.5	DSP1N5S14	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
15	0.065A	4.5-5.5	DSP1N5S15	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
15	0.4A	3.5-16.0	DFC6U5S15	6.0	1.00 X 2.00 X 0.45	25.4 X 50.8 X 11.4	A
15	0.4A	9.0-27.0	DFA6U12S15	6.0	1.08 X 2.12 X 0.48	27.4 X 53.9 X 12.2	B
15	0.4A	20.0-60.0	DFA6U48S15	6.0	1.08 X 2.12 X 0.48	27.4 X 53.9 X 12.2	B
15	0.7A	9.0-18.0	DFC10E12S15	10.5	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
15	0.7A	18.0-36.0	DFC10E24S15	10.5	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
15	0.7A	36.0-72.0	DFC10E48S15	10.5	1.02 X 2.02 X 0.41	25.9 X 51.3 X 10.7	B
15	0.8A	3.5-16.0	DGP12U5S15	12.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	A,C,D
15	1A	20.0-60.0	DFC15U48S15	15.0	1.62 X 2.02 X 0.55	41.5 X 51.3 X 14.0	B,C,D
15	1.4A	9.0-18.0	DFA20E12S15	21.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
15	1.4A	18.0-36.0	DFA20E24S15	21.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
15	1.4A	36.0-72.0	DFA20E48S15	21.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
15	2A	36.0-72.0	DGP30E48S15	30.0	1.62 X 2.02 X 0.55	41.2 X 51.3 X 14.0	B,C,D,E
17	0.06A	4.5-5.5	DSP1N5S17	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A

* **Features: A)** Short term current limit (<30 seconds) **B)** Continuous current limit **C)** Remote ON/OFF **D)** Output trim function ±10% **E)** Thermal Shutdown

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DC/DC CONVERTERS

1-30 WATTS

DUAL OUTPUT

V OUT	I OUT	V IN RANGE	MODEL NUMBER	WATTS	CASE SIZE-INCH (W X L X H)	CASE SIZE-MM (W X L X H)	FEATURES*
±5	±0.075A	4.5-5.5	DSP1N5D5	0.75	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
±5	±0.8A	18.0-72.0	DFC10U48D5	8.0	1.02 X 2.02 X 0.42	25.9 X 51.3 X 10.7	A
±5	±0.85A	9.0-36.0	DFC10U24D5	8.5	1.02 X 2.02 X 0.42	25.9 X 51.3 X 10.7	A
±5	±1.0A	3.5-16.0	DGP12U5D5	10.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	A,C,D
±5	±1.7A	9.0-18.0	DFA20E12D5	17.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
±5	±1.7A	18.0-36.0	DFA20E24D5	17.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
±5	±1.7A	36.0-72.0	DFA20E48D5	17.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
±7	±0.07A	4.5-5.5	DSP1N5D7	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
±12	±0.04A	4.5-5.5	DSP1N5D12	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
±12	±0.4A	9.0-36.0	DFC10U24D12	9.6	1.02 X 2.02 X 0.42	25.9 X 51.3 X 10.7	A
±12	±0.415A	18.0-72.0	DFC10U48D12	10.0	1.02 X 2.02 X 0.42	25.9 X 51.3X 10.7	A
±12	±0.5A	3.5-16.0	DGP12U5D12	12.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	A,C,D
±12	±0.625A	20.0-72.0	DFC15U48D12	15.0	1.62 X 2.02 X 0.55	41.2 X 51.3 X 14.0	B,C,D,E
±12	±0.85A	9.0-18.0	DFA20E12D12	20.4	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
±12	±0.85A	18.0-36.0	DFA20E24D12	20.4	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
±12	±0.85A	36.0-72.0	DFA20E48D12	20.4	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
±14	±0.035A	4.5-5.5	DSP1N5D14	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
±15	±0.33A	4.5-5.5	DSP1N5D15	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A
±15	±0.32A	9.0-36.0	DFC10U24D15	9.6	1.02 X 2.02 X 0.42	25.9 X 51.3 X 10.7	A
±15	±0.33A	18.0-72.0	DFC10U48D15	9.9	1.02 X 2.02 X 0.42	25.9 X 51.3 X 10.7	A
±15	±0.4A	3.5-16.0	DGP12U5D15	12.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 0.45	A,C,D
±15	±0.5A	20.0-72.0	DFC15U48D15	15.0	1.62 X 2.02 X 0.55	41.2 X 51.3 X 14.0	B,C,D,E
±15	±0.7A	9.0-18.0	DFA20E12D15	21.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 1..4	B,C,D,E
±15	±0.7A	18.0-36.0	DFA20E24D15	21.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 1..4	B,C,D,E
±15	±0.7A	36.0-72.0	DFA20E48D15	21.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C,D,E
±17	±0.03A	4.5-5.5	DSP1N5D17	1.0	0.77 X 0.40 X 0.27	19.6 X 10.2 X 6.9	A

TRIPLE OUTPUT

5±12	2.5A,. ±0.310A	9.0-18.0	DGP20E12T5/12	20.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C
5±12	2.5A, ±0.310A	18.0-36.0	DGP20E24T5/12	20.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C
5±12	2.5A, ±0.310A	36.0-72.0	DGP20E48T5/12	20.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C
5±15	2.5A, ±0.250A	9.0-18.0	DGP20E12T5/15	20.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C
5±15	2.5A, ±0.250A	18.0-36.0	DGP20E24T5/15	20.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C
5±15	2.5A, ±0.250A	36.0-72.0	DGP20E48T5/15	20.0	2.02 X 2.02 X 0.45	51.3 X 51.3 X 11.4	B,C

* **Features: A)** Short term current limit (<30 seconds) **B)** Continuous current limit **C)** Remote ON/OFF **D)** Output trim function ±10% **E)** Thermal Shutdown

GENERAL SPECIFICATIONS

DC/DC SERIES	OUTPUT NOISE**	LOAD REG(%)	LINE REG(%)	CROSS REG(%)	% MAX EFFICIENCY	ISOLATION VOLTAGE	TEMPERATURE RANGE (CASE)
SINGLE OUTPUT							
DSP1	70 mV	+8,-5	±1.2	N/A	75	700V	-40°C to ±85°C
DFA6	50 mV	±0.4	±0.8	N/A	83	700V	-40°C to ±85°C
DFC6	75 mV	±0.7	±0.2	N/A	77	700V	-40°C to ±85°C
DFC10	60 mV	±0.4	±1.0	N/A	83	700V/1544V†	-40°C to ±85°C
DGP12	50 mV	±0.7	±0.2	N/A	82	700V	-40°C to ±85°C
DFC15	75 mV	±0.75	±0.2	N/A	83	700V	-40°C to ±85°C
DSN17	60 mV	±2.5	±1.0	N/A	88	N/A	-40°C to ±85°C
DFA20	75 mV	±0.6	±1.0	N/A	83	700V/1544V†	-40°C to ±85°C
DGP30	75 mV	±1.0	±1.0	N/A	86	1544V†	-40°C to ±90°C
DUAL OUTPUT							
DSP1	70 mV	±5.0	±1.0	±6.0	70	700V	-40°C to ±85°C
DFC10	10 mV	±1.0	±0.75	±3.0	79	700V	-40°C to ±85°C
DGP12	120 mV	±0.7	±0.2	±2.5	78	700V	-40°C to ±85°C
DFC15	70 mV	±0.4	±0.2	±3.0	82	1544V	-40°C to ±100°C
DFA20	50 mV	±0.7	±0.8	±2.5	85	700V/1544†	-40°C to ±85°C
TRIPLE OUTPUT							
DGP20	50 mV	±2.0	±1.5	±5.0	84	700V/1544†	-40°C to ±90°C

** Measured 1" from converter across a 1µF tantalum capacitor and bandwidth limited to 20MHz † 1544V isolation for DC/DC converters with 48V inputs

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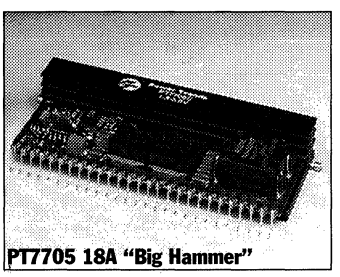
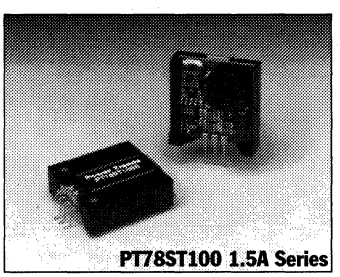
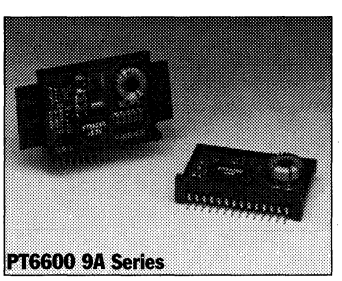
Product Selector Guide

Input Voltage	Output Voltage	1A	1.5A	2A	3A	6-10A	15-20A	30A+
WIDE INPUT RANGE PRODUCTS								
V_O+4V to 38V	3.3 to 15	PT5100						
	3.3 to 12	PT6100		PT6210	PT6300			
	3.3 to 15		PT78ST100					
7V to 25V	-5 to -15	PT78NR100						
V_O+4V to 28V	3.3 to 6.5			PT78HT200				
	12			PT78ST200				
20V to 60V	3.3 to 15					PT3300		
V_O-4V to -30V	-5 to -15		PT79SR100					
5V BUS PRODUCTS								
5V	1.2 to 3.3				PT6400			
	1.2 to 3.3				PT6420			
	-2 to -5.2				PT6900			
	1.5 to 3.6					PT6500		
	1.5 to 3.6					PT6600		
	1.3 to 3.5					PT7600	PT7705	PT7705+ PT7749
	1.3 to 3.5							PT7770 64A w/PT7746
	8 to 15	PT5040						
	-3.3 to -15	PT5020						
	±12, ±15	PT5060						
12V BUS PRODUCTS								
12V	1.5 to 6.5					PT6620		
	1.3 to 3.5						PT7721	PT7721+ PT7748
	4.5 to 7.6						PT7722	PT7722+ PT7748
24V BUS PRODUCTS								
24V	3.3 to 5	PT4205*						
	5 to 15				PT31/4100*			
	2.5 to 12					PT6650		
	2.5 to 5.6						PT7751	PT7751+ PT7747
	6.6 to 12.8						PT7756	PT7756+ PT7747
48V BUS PRODUCTS			* Products with isolated outputs					
48V	2 to 12	PT4200*						
	±5,±12, +5/3.3	PT4300*						
	3.3 to 15				PT31/4100*			


PT7705 18A "Big Hammer"


PT78ST100 1.5A Series


PT6600 9A Series

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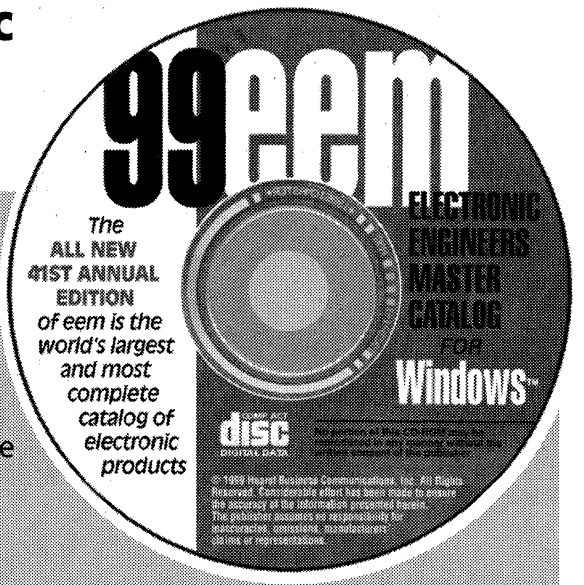

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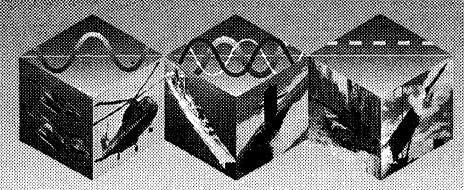

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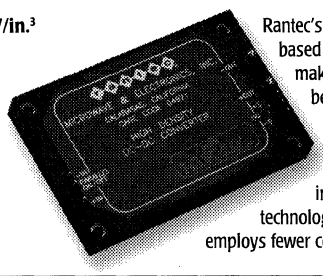

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INPUT	Single Output (250W max.)								Triple Output (185W max.)		
	2.1V@60A	3.3V@50A	5V@40A	8V@30A	12V@20A	15V@16A	24V@10A	28V@9A	5V@35A;±12V@3A	5V@35A;±15V@3A	12V@10A;12V@3A; 5V@3A
28 VDC	HDM-2S-2-01	HDM-2S-3-01	HDM-21	HDM-2S-8-01	HDM-22	HDM-23	HDM-24	HDM-25	HDM-22T	HDM-23T	
48 VDC	HDM-4S-2-01	HDM-4S-3-01	HDM-41	HDM-4S-8-01	HDM-42	HDM-43	HDM-44	HDM-45	HDM-42T	HDM-43T	
300 VDC	HDM-3S-2-01	HDM-3S-3-01	HDM-301	HDM-3S-8-01	HDM-302	HDM-303	HDM-304	HDM-305	HDM-302T	HDM-303T	HDM-3T-12-01

INPUT POWER	28VDC	48 VDC	300 VDC	UNITS	Comments
Voltage Nominal	24	48	300	VDC	
Voltage Min	20	36	220	VDC	
Voltage Max	32	72	400	VDC	
Brownout	18	32	180	VDC	OUTPUT NON-COMPLIANT
OverVoltage Max	60	100	425	VDC	
No Load Power (single-output)	1.5	2.5	2.5	watts	
No Load Power (triple-output)	7.5	7.5	7.5	watts	
EMI	MIL-STD-704D, MIL-STD-1275 (with battery support)				
In rush charge	2.6E-04	2.6E-04	4.5E-05	Coulombs	
Turn on time	2.5	2.5	250	mSec.	
INPUT CONTROL					
Turn on time, logic	1	1	2	mSec.	See HDMA-106*
Logic disabled power in	0.35	1	1	watts	See HDMA-106*
Logic disabled current	1	1	1	mA	See HDMA-106*

FREQUENCY SYNCH	NOMINAL	MAXIMUM	MINIMUM	COMMENTS
Frequency	370 KHz	400 KHz	330 KHz	See HDMA-102*
Width	50 ns	200 ns	10 ns	
Aplitude	1 V	2.5 V	.5 V	

OUTPUT VOLTAGE	Min	Typ	Max	Units	Comments
Set Point		0.50	01.0	± %	No Load
Set Point - Aux		0.50	01.0	± %	10A Main, no Load Aux
Trim Adjust - Main		10		± %	See HDMA-104*
Ripple		1	3	% p-p	
Ripple - Aux		0.25	0.50	% p-p	See HDMA-100*
OUTPUT REGULATION					
Line & Load		0.05	0.50	%	See HDMA-105*
Load - Aux		0.20	0.50	%	
Line - Aux		0.01	0.10	%	Load Change 20-80%
Dyn Load - Main			5.00	%	Load Change 20-80%
Dyn Load - Aux			1.00	%	Load Change 20-80%
Dyn Load Recovery			50	uSec.	Singles Only
Dyn Load Recovery			250	uSec.	Triple Main & Aux
Temp Coeff			0.02	%/° C	
Temp Coeff-Aux			0.06	%/° C	
OUTPUT GENERAL					
Operating Frequency		370		KHz	
OUTPUT PROTECTION					
Overvoltage		120		%	Single and Mains
Current Limit		115		%	
Current Share		5		±%	
Auto Temp Shutdown	100	105	110	° C	

Construction
- **Fully encapsulated**

Cooling
- **Conductively cooled baseplate, +95°C max.**

Operating Temperature
- **-40°C to +95°C, combined baseplate and ambient**

Storage Temperature
- **-55°C to +125°C**

Humidity
- **MIL-STD-810C, Method 507.1, Proc. IV**

Altitude
- **up to 70,000 ft.**

Shock
- **MIL-S-910C, Grade A, Type A, Class 1 High impact shock**

Vibration
MIL-E-5400, Curve IVa, 5 to 2kHz

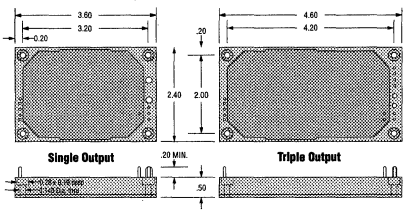
Salt Spray
- **MIL-STD-810C, Method 509, Proc. 1**

MTBF
- **1,300,000 hours @ 55°C baseplate (demonstrated, ground benign)**

I/O Connection
- **Wave solderable or inserted into mated sockets, see HDMA-108***
- **For complete specifications, see HDMA 108***

Weight
- **Single Output: 8 oz.; Triple Output: 10 oz.**

POWER RATING				EFFICIENCY (TYPICAL)					
	VDC	AMPS	MAX. WATTS	LOW	50W	100W	150W	200W	MAX
Single Output	3.3 / 5.0	50/40	165/200	75%	81%	83%	82%	81%	
	12.0 / 15.0	20/16	240	75%	83%	87%	87%	85%	84%
	24.0 / 28.0	10/9	240	75%	78%	84%	85%	84%	83%
Triple Output	VDC MAIN	VDC AUX1/AUX2	MAX. WATTS	LOW	50W	100W	150W	200W	MAX
	5	-12@3A/+12@3A	185	70%	73%	76%	74%	73%	73%



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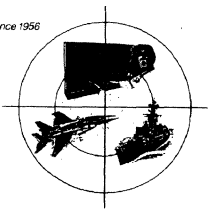
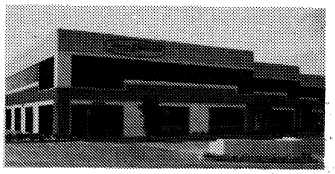


Why Choose Arnold Magnetics?

Company Profile



Founded over 40 years ago, Arnold Magnetics Corporation has grown to a respected position in today's Defense, Aerospace, Scientific, Geophysical, Process Control, Transportation, and Nuclear Industries. Beginning in 1955 by producing transformers and magnetic amplifiers, we quickly expanded into power supplies and converters. Arnold Magnetics soon became known for four basic characteristics:

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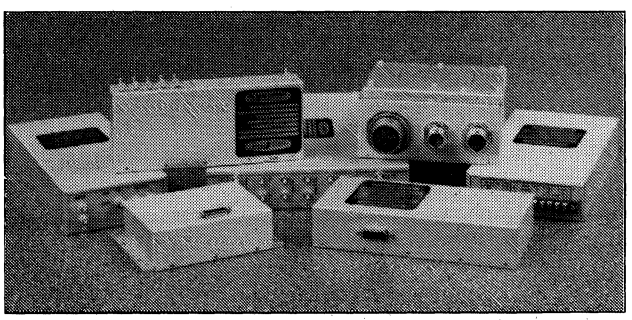
- **High Reliability**
- **Modular**
- **Off the Shelf**

In the early 1960's Arnold Magnetics introduced our first full rated AC to DC Power Supplies and DC to DC Converters. Anticipating future technological demands, the first modular power supplies were released in the late 1970's.

Continuously improving and expanding on this concept, we have become a respected modular power conversion company. More recently, Front End power conditioners, Rack Mount, Industrial products, and Custom Power conversion products have been added.

This flexible modular approach allows us to take advantage of various off-the-shelf modules. With over 40 years of power supply expertise, we can produce power conversion products for our customers and keep costs and lead times to a minimum.

The Solution is Within Reach whether your application is for standard "COTS", modular or custom product, we have the solution. Our Applications Engineers are ready to assist you with your power conversion needs!



Save Space... Miniaturized Packages

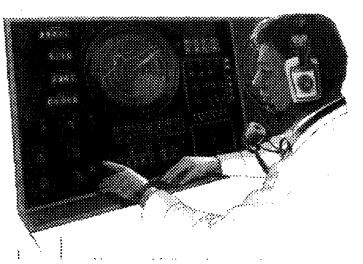
Arnold's complete AC-DC and DC-DC Multi Output Systems are 50% to 75% smaller than previous generation power supplies. Our miniaturized packages provide more power in less space.

Save Time... Quick Deliveries

Arnold's unique design concept allows you to choose inputs and outputs from predesigned standard modules. You configure your own "custom" multi-output power supply system and get delivery in weeks... even with non-standard voltage combinations.

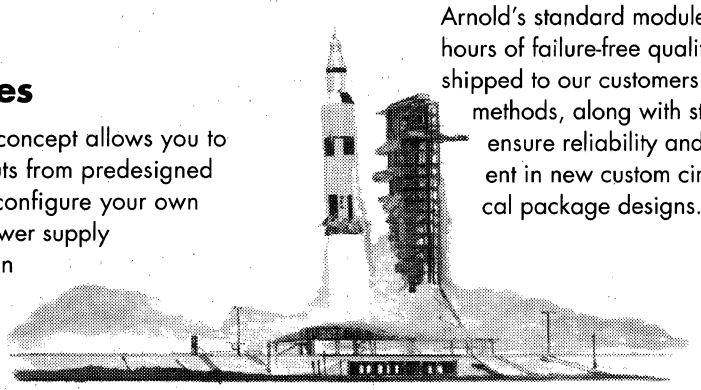
Save Money... Lower Program Costs

With Arnold, there is no additional charge for unique output voltage combinations. Non-recurring engineering and qualification expenses of custom designs are avoided. In addition, our standard modules provide lower cost for production quantities.



Reduce Risk... High Reliability Designs

Arnold's standard modules are proven thru thousands of hours of failure-free qualification before ever being shipped to our customers. NAVMAT derating and testing methods, along with standardized modular designs, ensure reliability and reduce the risk of failure inherent in new custom circuits or thermal and mechanical package designs.



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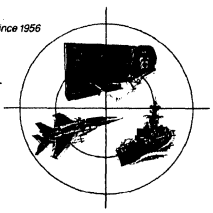
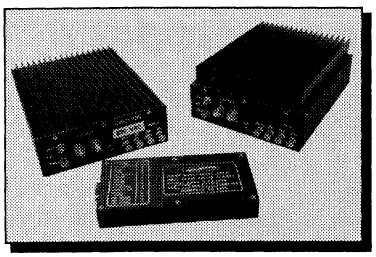
ARNOLD MAGNETICS

The Solution is Within Reach



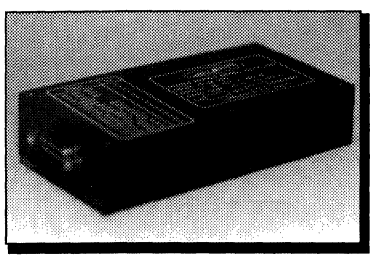
V Series-DC to DC Modular COTS Power Supplies



- **Low profile**
- **Wide range of Inputs**
- **Built from Standard "COTS" modules**
- **Flexible packaging**

The V Series power supplies feature a COTS modular design for easy configuration, proven performance and fast delivery. Low profile design allows for lighter, denser packaging in a variety of case styles. Options are available without NRE. The V series has a wide choice of input ranges, output voltages, power levels and number of outputs. Customize your power supply with standard options and special circuitry as well.

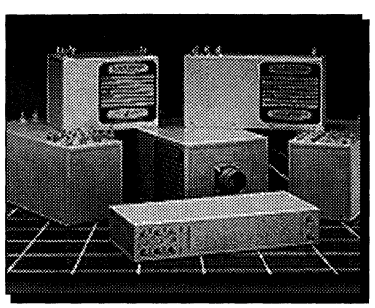
LPH Series-High Density Low Profile DC to DC Converter Series



- **0.98" Low Profile**
- **N+1 Current Sharing**
- **Wide Range of Inputs**
- **Transient Protection and Isolation**

This low profile, high density, single or dual output DC to DC converter is designed for applications where compact size, high reliability and harsh environments are encountered. Being connectorized, the unit is simple to install, mount and connect. Additional options include Thermal Shutdown and EMI filtering. Next generation packaging and manufacturing techniques provide the reliability, performance and cost effectiveness necessary in today's COTS products.

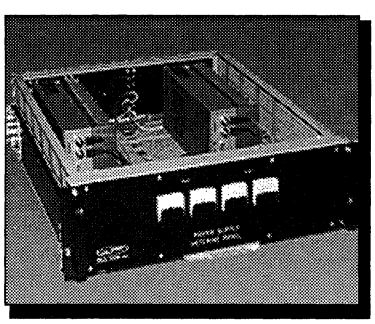
EL 2000 Series-Modular AC to DC and DC to DC Power Supplies



- **Standard High Density Modular Design**
- **1-10 Outputs-** Voltages from 2 to 300 VDC up to 100 amps
- **Wide Variety of Options:** EMI, Wide Temperature Operation, MIL-STD Environments, Transient Protection, Power Factor Correction
- **High Reliability:** Configured to meet the needs of Severe Environment Industrial and Military markets

The EL Series Product line uses a high density, sub-modular building block approach. This allows our customers to configure a unique solution to their power needs without costly NRE! Option modules further expand the capabilities. Units are fully assembled and tested enabling us to provide complete power solutions. These units are qualified to many MIL-SPECS such as Shock, Vibration, Temperature, Humidity and Salt Fog. Used in Military Programs, Commercial Avionics, Transportation, Nuclear controls and other applications requiring high performance and reliability.

RL Series-Rack And Panel Mount Power Supplies



- **Standard 19" EIA:** Rack or Panel mount versions
- **AC or DC inputs:** Fuse or breaker protection available
- **Multiple Outputs:** 1 to 10 outputs up to 2000 watts
- **Panel Meters:** Optional meters, rack slides, and test points enhance system monitoring

The RL Series product line offers rack and panel mount solutions for a wide variety of applications. Using standard power supplies, a rack mount power supply is assembled to meet specific requirements. All configuration, wiring and testing is done at our factory saving you time and money. Configurations are available to customized requirements, complete with a myriad of accessories and off-the-shelf sub modules. Applications range from high grade industrial to severe military environments.

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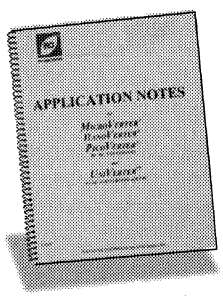

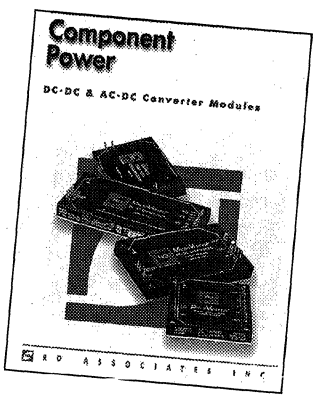

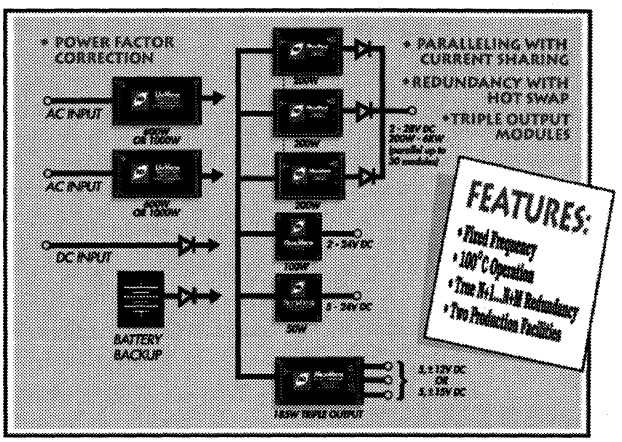

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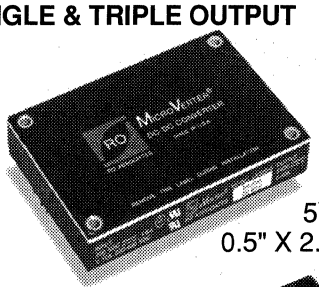
- **View Module Specifications**
- **View Applications Notes**
- **Order Free Evaluation Modules & Mounting Boards**

185-250 WATTS
28/48/300V INPUT
MICROVERTER® Series

SINGLE & TRIPLE OUTPUT



SINGLE
5V @ 40A
0.5" X 2.4" X 3.6"

TRIPLE
5V @ 35A, ±12 or ±15V @ 3A
0.5" X 2.4" X 4.6"

- Miniature Size
- High Density - up to 58 watts/in.³
- Constant Frequency Operation
- Parallelable with Current Sharing
- Fault Tolerant - True n+1...n+m Redundancy

MODEL SELECTION CHART

Model Number				
Input Voltage			Output	Output
28VDC	48VDC	300VDC	Voltage	Current
Single Output Models:				
μV28-2	μV48-2	μV300-2	2.1V	60A
μV28-3	μV48-3	μV300-3	3.3V	50A
μV28-5	μV48-5	μV300-5	5V	40A
μV28-8	μV48-8	μV300-8	8V	30A
μV28-12	μV48-12	μV300-12	12V	20A
μV28-15	μV48-15	μV300-15	15V	16A
μV28-24	μV48-24	μV300-24	24V	10A
μV28-28	μV48-28	μV300-28	28V	9A
Triple Output Models:				
μV28-T512	μV48-T512	μV300-T512	5V	35A
			12V	3A
			12V	3A
μV28-T515	μV48-T515	μV300-T515	5V	35A
			15V	3A
			15V	3A

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AC-DC/DC-DC CONVERTERS

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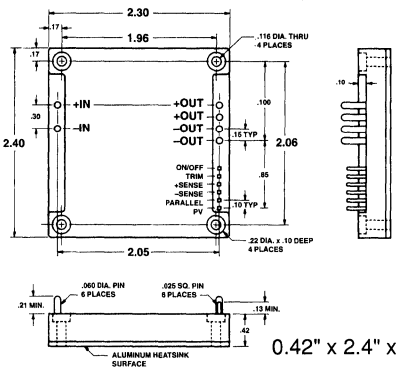
Ultra High Density ■

nANO VERTER™
picoVerter®
UNI VERTER™

RO ASSOCIATES

60-120 WATTS
48 & 300VDC INPUT
nANO VERTER® Series

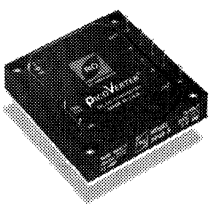
See Selection Chart Below



0.42" x 2.4" x 2.3"

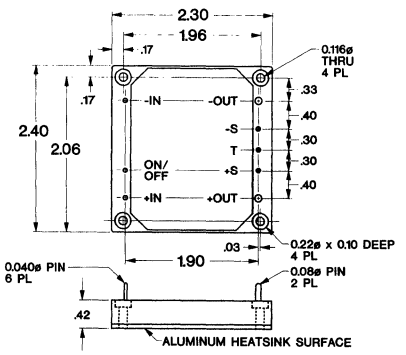
FEATURES

- Miniature Size-Low Profile .42"
- High Density - up to 52 watts/in.³
- Constant Frequency Operation
- Parallelable with Current Sharing
- Fault Tolerant - True n+1...n+m Redundancy
- Secondary Referencing for Controls
- Extremely Low Thermal Resistance
- Hot Plug-in Capability
- Ruggedized
- Non-shutdown OVP
- Logic On/Off



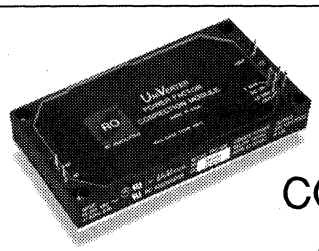
50-60 WATTS
48 & 300VDC INPUT
pICO VERTER® Series

See Selection Chart Below

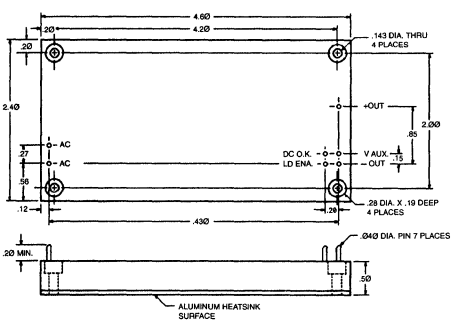


FEATURES

- Miniature Size-Low Profile .42"
- High Efficiency
- Low Cost
- Industry Standard Pin-out
- Low Thermal Resistance
- 100°C Baseplate Rating
- Constant Frequency Operation
- Input Voltage: 36VDC min. 72VDC max.
- Non-shutdown OVP
- Logic On/Off



UNI VERTER™
POWER FACTOR CORRECTION MODULE
AC-DC CONVERTER



FEATURES

- ***600/1000 Watts PFC 600/1000***
- 380 VDC Output
- Universal Input (PFC 600)
- Unity Power Factor
- High Efficiency
- 100°C Baseplate rating
- Active Inrush Limiting and Short Circuit Protection
- Very Low Harmonic Distortion
- Power Fail Warning Via DC OK Signal
- Load Enable Signal to Control MicroVerter® DC-DC Converter

MODEL SELECTION CHART – *nANO VERTER®, pICO VERTER® & UNI VERTER™ MODELS*

Input 48VDC	Input 300VDC	Output Voltage	Output Current	Input 48VDC	Input 300VDC	Output Voltage	Output Current
nV48-2	nV300-2	2.1V	30A	pV48-3	pV300-3	3.3V	12.5A
nV48-3	nV300-3	3.3V	25A	pV48-5	pV300-5	5V	10A
nV48-5	nV300-5	5V	20A	pV48-12	pV300-12	12V	5A
nV48-12	nV300-12	12V	10A	pV48-15	pV300-15	15V	4A
nV48-15	nV300-15	15V	8A	pV48-24	pV300-24	24V	2.5A
nV48-24	nV300-24	24V	5A	PFC-600	85-265VAC	380V	600W
				PFC-1000	170-265VAC	380V	1000W

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SCHAEFER

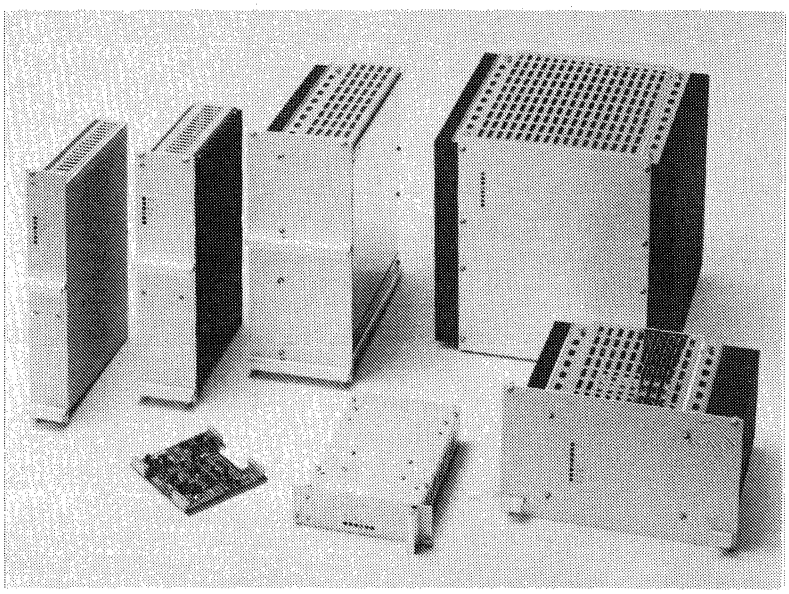
● DC(AC)/DC converters ● DC(AC)/AC inverters ● Switchmode battery chargers

● Single- & 3-phase thyristor-controlled battery chargers and power supplies

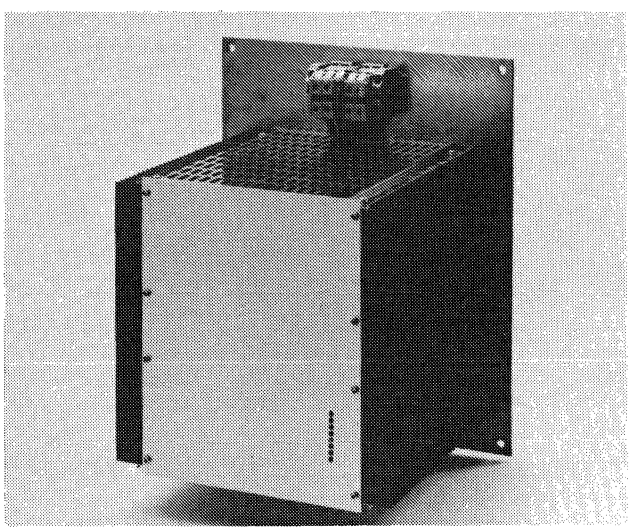
● Converters with battery back-up ● Switchmode Step-up converters

ELECTRICAL

- DC input ranges from 10-18V DC up to 450-900V DC
- AC input ranges of 110V AC/220V AC/400V AC (single & three-phase), 50-400Hz
- Hundreds of output combinations:
  - 50W -- 10kW (switchmode converters)
  - 300W -- 10kW (switchmode battery chargers)
  - 600VA -- 12kVA (switchmode inverters)
  - 100W -- 300kW (thyristor-controlled battery chargers & power supplies)



MECHANICAL



- VME/Eurorack format
- Modules for 19" racks, 6U & 3U; 160 and 220 mm deep
- Wallmount plate versions available (option 'w')
- Cabinet installed modules available -- 300 mm (h) x 380 mm(w) x 210 mm (d) up to 2000 mm (h) x 1200 mm (w) x 600 mm (d)
- Conformal coating & increased mechanical strength options available for severe environments

APPLICATIONS

- Railroad & transit communication systems & controls
- Telecommunications equipment
- Industrial/Process Control Systems
- Power Stations
- Emergency Shutdown Systems

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TODD
POWER SUPPLIES

TODD PRODUCTS CORP. ACQUIRES ORYX POWER PRODUCTS CORPORATION

Todd Products Corp., a leading privately owned designer and manufacturer of OEM switching power supplies, has acquired Oryx Power Products Corporation.

"This acquisition further accelerates the double-digit growth Todd Products Corp. has achieved over the last three fiscal years," said Kathy Todd, Company President and CEO. "It broadens our product line, enhances its mix, and provides additional resources for sales, engineering and manufacturing. This will strategically strengthen our competitive position in the global power supply market."

As a result of this acquisition, Todd has the capability for high-volume manufacturing offshore, in addition to the manufacturing done at its ISO 9001 certified headquarters facility in Brentwood, New York.

Founded in 1968, Todd's product line of AC/DC switching power supplies includes over 260 standard models between 150 and 1500 watts in addition to a virtually unlimited number of modified standard and custom power solutions, plus unlimited value-added services. The acquisition of Oryx Power Products Corp. expands the Todd product line so that the company is positioned to provide one of the industry's most complete lines of AC/DC switching power supplies from 30 to 1500 watts, and DC/DC converters from 1 to 500 watts. These power supplies are used in a wide variety of original equipment manufacturer's (OEM) applications. Market segments include telecommunications, computers, medical, bus systems, and control instrumentation/test systems, and more.

For more information see EEM Catalog pages D-1825 to D-1846 and D-2127 to D-2130 or contact Todd Products Corp., 50 Emjay Boulevard, Brentwood, NY 11717 USA. TEL: 1800 223-TODD or 516 231-3366; FAX: 516 231-3473; EMAIL: info@toddpower.com; WEB: http://www.toddpower.com.

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TODD POWER SUPPLIES

Low Power Series

Model	Max. Output Power (Watts)	Main Output Volts DC Nominal	Main Output Amps Min./Max.	2nd Output Volts DC Nominal	2nd Output Amps Min./Max.	3rd Output Volts DC Nominal	3rd Output Amps Min./Max.	4th Output Volts DC Nominal	4th Output Amps Min./ Max.	Size (inches) LxWxH
ZPS-30-5	30	5	0.5/6	-	-	-	-	-	-	5x3x1.35
ZPS-30-5C	30	5	0.5/6	-	-	-	-	-	-	5.4x3.4x1.85
ZPS-30-12	30	12	0.2/2.5 PK3	-	-	-	-	-	-	5x3x1.35
ZPS-30-12C	30	12	0.2/2.5 PK3	-	-	-	-	-	-	5.4x3.4x1.85
ZPS-30-15-1	30	15	0.2/2	-	-	-	-	-	-	5x3x1.35
ZPS-30-15-1C	30	15	0.2/2	-	-	-	-	-	-	5.4x3.4x1.85
ZPS-30	30	5	0.1/3 PK4	+12	0.1/2 PK3	-12	0/.7	-	-	5x3x1.35
ZPS-30C	30	5	0.1/3 PK4	+12	0.1/2 PK3	-12	0/.7	-	-	5.4x3.4x1.85
ZPS-30-1	30	5	0.1/3 PK4	+12	0.1/2 PK3	-5	0/.1 PK.2	-	-	5x3x1.35
ZPS-30-1C	30	5	0.1/3 PK4	+12	0.1/2 PK3	-5	0/.1 PK.2	-	-	5.4x3.4x1.85
ZPS-30-15	30	5	0.1/3 PK4	+15	0.1/1.5 PK2	-15	0/.7	-	-	5x3x1.35
ZPS-30-15C	30	5	0.1/3 PK4	+15	0.1/1.5 PK2	-15	0/.7	-	-	5.4x3.4x1.85
ZPS-45-5	45	5	0.5/9	-	-	-	-	-	-	5x3x1.35
ZPS-45-5C	45	5	0.5/9	-	-	-	-	-	-	5.4x3.4x1.85
ZPS-45-12	45	12	0.2/4 PK5	-	-	-	-	-	-	5x3x1.35
ZPS-45-12C	45	12	0.2/4 PK5	-	-	-	-	-	-	5.4x3.4x1.85
ZPS-45-15-1	45	15	0.2/3	-	-	-	-	-	-	5x3x1.35
ZPS-45-15-1C	45	15	0.2/3	-	-	-	-	-	-	5.4x3.4x1.85
ZPS-45*	45	5	0.1/5 PK7	+12	0.1/2 PK3	-12	0/.7	-	-	5x3x1.35
ZPS-45C	45	5	0.1/5 PK7	+12	0.1/2 PK3	-12	0/.7	-	-	5.4x3.4x1.85
ZPS-45-1	45	5	0.1/5 PK7	+12	0.1/2 PK3	-5	0/.1 PK2	-	-	5x3x1.35
ZPS-45-1C	45	5	0.1/5 PK7	+12	0.1/2 PK3	-12	0/.1 PK2	-	-	5.4x3.4x1.85
ZPS-45-15	45	5	0.1/5 PK7	+15	0.1/1.5 PK2	-15	0/.7	-	-	5x3x1.35
ZPS-45-15C	45	5	0.1/5 PK7	+15	0.1/1.5 PK2	-15	0/.7	-	-	5.4x3.4x1.85
ZPS-60**	60	5	1/5 PK10	+12	0.3/2.2 PK6	-12	0/.3 PK1.5	-	-	5x3x1.58

*BS6301 **Available in open frame only. Other models available upon request. Please call for details. Note: Models ending in "C" are enclosed units. All others are open frame units.

Low Power Features

- Universal input.
- Single output and triple output versions.
- Safety cover (models ending in "C").
- Board level construction.
- 500,000 hours MTBF.
- 100% cycled burn-in.
- One year warranty.
- Compact 3" x 5" design

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Prototype Models
Manufacturing
Technical Support

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800 827-8720

All specifications are subject to change without notice.

In 1998, Todd acquired Oryx Power Products Corporation. Todd offers a complete line of OEM power supplies including AC/DC from 30 to 1500 watts and DC/DC from 1 to 500 watts. These power solutions *appear on EEM Catalog pages D-1825 to D-1846 and D-2127 to D-2130.*

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TODD POWER SUPPLIES

DC to DC Converters
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Model	Description	Input Voltage	Output Voltage	Maximum Output Current	Maximum Output Power
PSI 200	High Density DC/DC Power Modules Isolated, Single Output	24, 48 or 300 VDC	3.3 to 48V	30A	200 Watts
PSI 003	DC/DC Power Modules for Ethernet Isolated, Single Output	12V	9V	0-.35A	3 Watts
PSI 006	High Density DC/DC Power Modules Isolated, Dual Output	36-72V	+5/-5V	1.2A total	6 Watts
PSI 008	High Density DC/DC Power Modules Isolated, Dual Output	12V	+/-12V	.35A	8.4 Watts
PSJ 008	High Density DC/DC Power Modules Isolated, Quadruple Output	125-280V	+5/-5/-24/-67V	0.85/.20/.04/.05A	8.6 Watts
PSI 012	High Density DC/DC Power Modules Isolated, Single Output	36-72V	3.3V-24.0V	2.0A	12 Watts
PSI 016	High Density DC/DC Power Modules Isolated, Dual Output	42-56V	+/-65V to +/-130V	0.06A Cont./0.12A PK	16 Watts
PSX 004	High Density DC/DC Power Modules Non-Isolated, Dual Output	42-56V	+5.0V/-5.0V	.5A/.05A	4 Watts
PSD 012	High Density DC/DC Power Modules for Computers Non-Isolated, Dual Output	(Vo +3V) to 32V	+5.0V to +15.0V	2.0A	12 Watts
PSD 018	High Density DC/DC Power Modules for Computers Non-Isolated, Single Output	6-16V	+5.0V to +3.3V +5.0V to +12.0V	2.0A/1.5A 3.0A/.25A	18 Watts
PSD 030	High Density DC/DC Power Modules Non-Isolated, Single Output	18-28V	5V	6.0A	30 Watts
PSV 006	DC/DC Power Modules Non-Isolated, Single Output	8-28V	-12V or -5V	1A	6 Watts
PSD 033	High Density DC/DC Power Modules Non-Isolated, Single Output	5V	3.3V	10A	33 Watts
PSY 016	High Density DC/DC Power Modules Isolated, Dual Regulated Current	42-56V	±65 to ±130V	60mA	16 Watts

In 1998, Todd acquired Oryx Power Products Corporation.
Todd offers a complete line of OEM power supplies including AC/DC from 30 to 1500 watts and DC/DC from 1 to 500 watts.
These power solutions *appear on EEM Catalog pages D-1825 to D-1846 and D-2127 to D-2130.*

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email:info@toddpower.com http://www.toddpower.com

TODD POWER SUPPLIES

Adjustable Models

Model	Max. Output Power (Watts)	Main Output Volts DC Nominal	Main Output Amps Min./Max.	2nd Output Volts DC Nominal	2nd Output Amps Min./Max.	3rd Output Volts DC Nominal	3rd Output Amps Min./Max.	4th Output Volts DC Nominal	4th Output Amps Min./ Max.	Size (inches) LxWxH
ZPS-150A*	150	4.75/5.25	2.0/20.0	11.5-25.2	0.3/3.0PK4.5	9.5-15.8	0.3/4.0PK5	4.75/12.6	0.2/2.0	11x5x2.5
ZPS-175A*	175	4.75/5.25	2.5/25.0	11.5-25.2	.35/3.5PK5.25	9.5-15.8	.35/4.5PK5.5	4.75/12.6	0.2/2.0	11x5x2.5
ZPS-200A*	200	4.75/5.25	3.0/30.0	11.5-25.2	0.4/4.0PK6	9.5-15.8	0.4/5.0PK6	4.75/12.6	0.2/2.0	11x5x2.5
ZPS-250A*	250	4.75/5.25	3.5/35.0	11.5-25.2	0.4/4.0PK6	4.75-15.8	0.4/4.0PK6	4.75/15.8	.3/3.0PK4.5	13x5x2.5
ZPS-300A*	300	4.75/5.25	4.5/45.0	11.5-25.2	0.6/6.0PK9	4.75-15.8	0.8/8.0PK12	4.75/15.8	0.4/4.0 PK6	13x5x2.5
ZPS-400A*	400	4.75/5.25	5.5/55.0	11.5-25.2	0.7/7.0PK10.5	4.75-15.8	1.0/10.0PK15	4.75/15.8	0.6/6.0PK9	13x6x2.5

*BS6301 Note: Above models can be ordered with covers at an additional charge.

Medical Models (UL 544 & IEC 601)

ZPS-30M*	30	5	0.1/3PK4	+12	0.1/2PK3	-12	0/.7	-	-	5x3x1.35
ZPS-30MC*	30	5	0.1/3PK4	+12	0.1/2PK3	-12	0/.7	-	-	5x3x1.35
ZPS-30-15M*	30	5	0.1/3PK4	+15	0.1/1.5PK2	-15	0/.7	-	-	5x3x1.35
ZPS-30-15MC*	30	5	0.1/3PK4	+15	0.1/1.5PK2	-15	0/.7	-	-	5x3x1.35
ZPS-45M*	45	5	0.1/5PK7	+12	0.1/2PK3	-12	0/.7	-	-	5x3x1.35
ZPS-45MC*	45	5	0.1/5PK7	+12	0.1/2PK3	-12	0/.7	-	-	5x3x1.35
ZPS-45-15M	45	5	0.1/5PK7	+15	0.1/1.5PK2	-15	0/.7	-	-	5x3x1.35
ZPS-45-15MC*	45	5	0.1/5PK7	+15	0.1/1.5PK2	-15	0/.7	-	-	5x3x1.35
ZPS-150AM†	150	4.75/5.25	2.0/20.0	11.5-25.2	0.3/3.0PK4.5	9.5-15.8	0.3/4.0PK5	4.75/12.6	0.2/2.0	11x5x25
ZPS-200AM†	200	4.75/5.25	3.0/30.0	11.5-25.2	0.4/4.0PK6	9.5-15.8	0.4/5.0PK6	4.75/12.6	0.2/2.0	11x5x25
ZPS-250AM†	250	4.75/5.25	3.5/35.0	11.5-25.2	0.4/4.0PK6	4.75-15.8	0.4/4.0PK6	4.75/15.8	0.3/3.0PK4.5	13x5x25
ZPS-300AM†	300	4.75/5.25	4.5/45.0	11.5-25.2	0.6/6.0PK9	4.75-15.8	0.8/8.0PK12	4.75/15.8	0.4/4.0PK6	13x5x25
ZPS-400AM†	400	4.75/5.25	5.5/55.0	11.5-25.2	.7/7.0PK10.5	4.75-15.8	1.0/10.0PK15	4.75/15.8	06/6.0PK9	13x6x25

*UL 544; †UL 544 & IEC 601. Complete specifications available upon request. Models ZPS-150AM through ZPS-400AM can be ordered with covers at an additional charge.

Features

Medical and Adjustable

- Output 2 adjustable between 11.5 & 25.2 volts, output 3 adjustable between 9.5 and 15.8 volts, output 4 adjustable between 4.75 and 12.6 volts for adjustable and medical models 150W through 200W. For models 250W through 400W, output 2 is adjustable between 11.5 and 26 volts, output 3 and 4 adjustable between 4.75 and 16 volts.
- High efficiency regulators on all auxiliary outputs; switching regulators on medical and adjustable models 150W through 200W and mag amp regulators on medical and adjustable models 250 through 400W.

Power Factor Correction

- Independent and isolated quad outputs.
- Output voltages on outputs 2, 3 and 4 are user-adjustable and voltage-selectable.
- Universal input.
- 90-132 VAC / 180-264 VAC continuous input.
- UL 1950, CSA 22.2 234, IEC 950, VDE EN 60950.
- Compliant to FCC Part 15J, Class B, VDE 0871/B.
- Main channel is overvoltage and short circuit protected.
- Remote on/off switch.
- Power good signal.

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DC/DC CONVERTERS

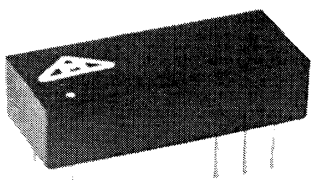
FEATURES

- *Compact Design*
- *PC Board Mounted*
- *Operating Temp: 0°C To +70°C*
- *Option For Output Shutdown*
- *Option For Output Voltage Adjustment*

APPLICATIONS

- *Distributed Power Systems*
- *Electroluminescent Display*
- *Computer Equipment*
- *Vacuum Fluorescent Display*
- *Industrial And Process Control*
- *Telecommunications Equipment*
- *Local Area Network*
- *POS Terminals*

These converters operate over a wide range of input voltages while maintaining excellent output regulation. These power supplies are capable of withstanding simultaneous and continuous short circuits across their outputs.

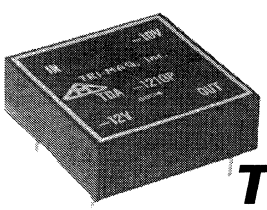


Size: 0.89 (L) x 0.39 (W) x 0.33 (H)

TDB1 SERIES

1 Watt, 2:1 Wide Range Input

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
1 WATT	5	5V, 9V, 12V, 15V, 24V	500V
	12	5V, 9V, 12V, 15V	500V
	24	5V, 12V, 15V	500V

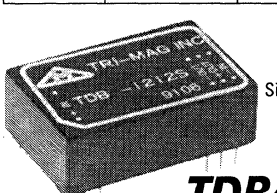


Size: 1.03 (L) x 1.30 (W) x 0.4 (H)

TDA2 SERIES

2-3 Watt, 2:1 Wide Range Input

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
2-3 WATT	4.5–6.0 (5)	5V, 12V, 15V, ±12V, ±15V	2500V
	9–18 (12)	5V, 9V, 12V, 15V, ±12V, ±15V	2500V
	18–36 (24)	5V, 12V, 15V, ±12V, ±15V	2500V
	36–72 (48)	5V, 12V, 15V, ±12V, ±15V	2500V

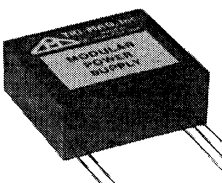


Size: 1.25 (L) x 0.80 (W) x 0.4 (H)

TDB4 & TDB3 SERIES

2 Watt, 24 Pin DIL Single & Dual Output

OUTPUT POWER TDB3	OUTPUT POWER TDB4	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
2W	3W	5	5V, 9V, 12V, 15V,+5V, +12V, +15V	500V
		12	5V, 9V, 12V, +12V, +15V	500V
		24	5V, 12V, 15V,+12V, +15V	500V
		48	5V, 12V, 15V,+12V, +15V	500V

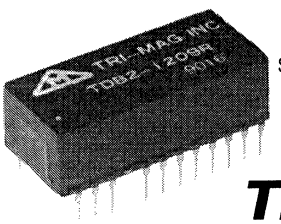


Size: TSP1 - 0.8(L) x 0.24(W) x 0.4(H)
Size: TSP2 - 1.10(L) x 0.34(W) x 0.57(H)

TSP1 & TSP2 SERIES

1-2 Watt, Sip Type

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
1-2 WATT	5	5V, 9V, 12V, 15V, ±12V, ±15V	500V
	12	5V, 9V, 12V, ±12V, ±15V	500V
	24	5V, 12V, 15V, ±12V, ±15V	500V

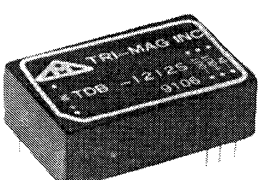


Size: 1.27 (L) x 0.6 (W) x 0.4 (H)

TDB2 SERIES

2 Watt, 24 Pin DIL Single & Dual Output

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
2 WATT	5	5V, 9V, 12V, 15V, ±5V, ±12V, ±15V	500V
	12	5V, 9V, 12V, ±12V, ±15V	500V
	24	5V, 12V, 15V, ±12V, ±15V	500V



Size: 1.25 (L) x 0.80 (W) x 0.4 (H)

TDH4W & TDB4W SERIES

2 Watt, 24 Pin DIL Single & Dual Output

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE TDB4W	ISOLATED VOLTAGE TDH4W
3W	4.5-6.0 (5)	5V, 12V,15V	500V	2100V
	9-18 (12)	5V, 12V, 15V,+5V,+12V,+15V	500V	2100V
	18-36 (24)	5V, 12V, 15V,+5V,+12V,+15V	500V	2100V
	36-72 (48)	5V, 12V, 15V,+5V+12V,+15V	500V	2100V

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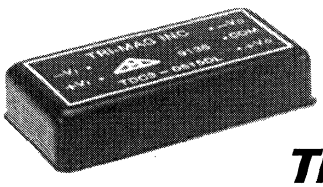
DC/DC CONVERTERS

Continued

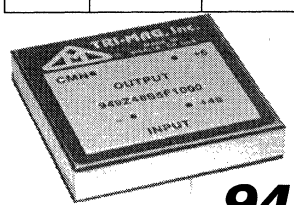


Size: 2.0 (L) x 1.0 (W) x 0.4 (H)

TDC7 SERIES

23 Watt, 2:1 Wide Range Input

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
7.5 WATT	9-18 (12)	5V, 12V, 15V	500V
	18-36 (24)	5V, 12V, 15V	500V
	26-72 (48)	5V, 12V, 15V,	500V

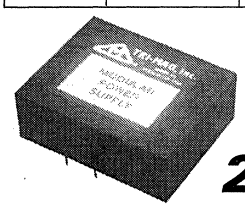


Size: 2.0 (L) x 2.0 (W) x 0.4 (H)

949ZX SERIES

5 Watt, 3:1 Wide Range Input

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
5 WATT	9-36(12)	5V, 12V, 15V, ±12V, ±15V	500V
	20-72(48)	5V, 12V, 15V, ±12V, ±15V	500V
		5V, 12V, 15V, ±12V, ±15V	500V

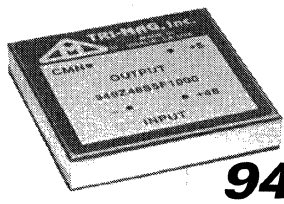


Size: Standard; 2.5 (L) x 2.0 (W) x 0.9 (H)
Low Profile; 3.0 (L) x 2.0 (W) x 0.610 (H)

200Z SERIES

5-12 Watt, For Display & High Voltage

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
5-12 WATT SINGLE OUTPUT	+5	+55V, +180V, +200V, +250V	NONE
	+12	+55V, +120V, +130V, +180V, +190V, +200V, +350V	
	+24	+55V, +130V, +350V	
	+28	+180V, +200V	
5-12 WATT DUAL OUTPUT	12	(+55V, +20V), (70V, -120V), (100V, -90V), (110V, -110V), (55V, 120V), (180V, +90V), (190V, -160V), (32V, +20V), (90V, 100V), (50V, +20), (110V, -110V)	NONE
	15	(200V, -200V)	
	28	(100V, -100)	
5-12 WATT FIXED OUTPUT SINGLE AND DUAL	5	(12V), (24V), (5V, -5V), (12V, -12V), (15V, -15V)	NONE
	12	(12V, -12V), (15V, -15V), (18V, -18V), (100V, -100), (200V), (250V)	
	15	(200V, -200V)	
	20	(45V)	
	24	(250V), (185V), (80V, -80V)	
	28	(100V, -100)	

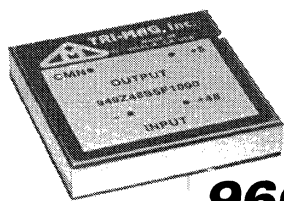


Size: 2.0 (L) x 2.0 (W) x 0.4 (H)

949ZW SERIES

5 Watt, 2:1 Wide Range Input

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
5 WATT	4.5–6.0 (5)	5V, 12V, 15V, ±12V, ±15V	500V
	9–18 (12)	5V, 9V, 12V, ±12V, ±15V	500V
	18–36 (24)	5V, 12V, 15V, ±12V, ±15V	500V
	36–72 (48)	5V, 12V, 15V, ±12V, ±15V	500V

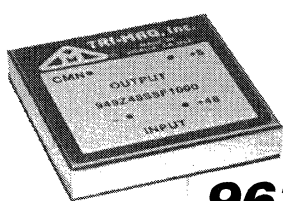


Size: 2.0 (L) x 2.0 (W) x 0.88 (H)

960ZW SERIES

10 Watt, 2:1 Wide Range Input

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
10 WATT	9–18 (12)	5V, 9V, 12V, ±12V, ±15V	500V
	18–36 (24)	5V, 12V, 15V, ±12V, ±15V	500V
	36–72 (48)	5V, 12V, 15V, ±12V, ±15V	500V



Size: 2.0 (L) x 2.0 (W) x 0.4 (H)

962ZW SERIES

10 Watt, 2:1 Wide Range Input, Low Profile

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
10 WATT	4.5–6.0 (5)	3.3V, 5V, 12V,15V ±12V, ±15V	500V
	9–18 (12)	3.3V, 5V, 12V,15V ±12V, ±15V	500V
	18–36 (24)	3.3V, 5V, 12V,15V ±12V, ±15V	500V
	36–72 (48)	3.3V, 5V, 12V,15V ±12V, ±15V	500V

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DC/DC CONVERTERS

FEATURES

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- *Option For Output Voltage Adjustment*

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- *Plasma Gas Discharge Display*
- *Distributed Power Systems*
- *Electroluminescent Display*
- *Computer Equipment*
- *Vacuum Fluorescent Display*
- *Industrial And Process Control*
- *Telecommunications Equipment*
- *Battery-powered Equipment*

These converters operate over a wide range of input voltages while maintaining excellent output regulation. These power supplies are capable of withstanding simultaneous and continuous short circuits across their outputs.

Size: 975ZW - 3.0 (L) x 2.56 (W) x 0.83 (H)
972ZW - 2.0(L)x2.0(W)x0.4(H)

972ZW & 975ZW SERIES

15 Watt, 2:1 Wide Range Input, Single Output

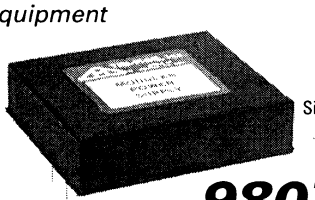
OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
15 WATT	9–18 (12)	5V, 12V, 15V	500V
	18–36 (24)	5V, 12V, 15V	500V
	36–72 (48)	5V, 12V, 15V	500V

15 Watt, 2:1 Wide Range Input, Dual Output

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
15 WATT	9–18 (12)	±12V, ±15V	500V
	18–36 (24)	±12V, ±15V	500V
	36–72 (48)	±12V, ±15V	500V

15 Watt, 2:1 Wide Range Input, Triple Output

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
15 WATT	9–18 (12)	+5V, +12V, -12V	500V
	18–36 (24)	+5V, +15V, -15V	500V
	36–72 (48)	+5V, +12V, -5V	500V



Size: 3.0 (L) x 2.56 (W) x 0.83 (H)

980ZW SERIES

30 Watt, 2:1 Wide Range Input

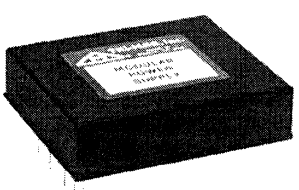
OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
30 WATT	18–36 (24)	5V, 12V, 15V	500V
	36–72 (48)	5V, 12V, 15V	500V

Size: 3.0 (L) x 2.56 (W) x 0.83 (H)

980ZX SERIES

30 Watt, 4:1 Wide Range Input

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
30 WATT	9–36 (24)	5V, 12V, 15V, 5/±12V, 5/±15V, +5/+12/-5V	500V
	20–72 (48)	5V, 12V, 15V, 5/±12V, 5/±15V, +5/+12/-5V	500V



Size: 975 ZX - 3.0(L) x 2.56(W) x 0.83(H)
Size: 972 ZX - 2.0(L) x 2.0(W) x 0.4(H)

972 ZX & 975 ZX SERIES

15Watt, 4:1 Wide Range Input, Triple Output

OUTPUT POWER	INPUT VOLTAGE	OUTPUT VOLTAGE(S)	ISOLATED VOLTAGE
15WATT	9-36(24)	+5/±12V, +5/±15V, +5/+12/-5V	500V
	20-72(48)	+5/±12V, +5/±15V, +5/+12/-5V	500V

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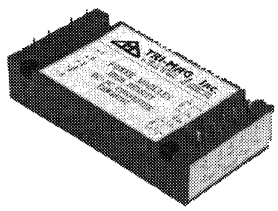
HIGH DENSITY
FRONT-END RECTIFIER AND DC-DC CONVERTER

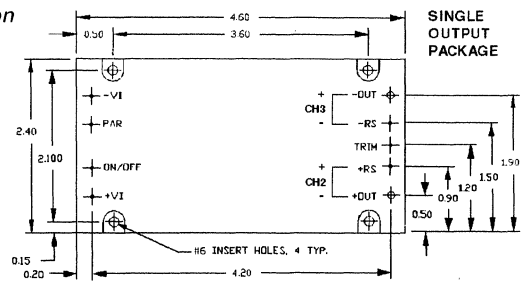
FEATURES

- *P.C. Board Mountable*
- *Internal EMI Filter and Active Inrush Limiter*
- *Inhibit and Load Share (Option)*
- *High Stable Regulated Output*
- *Thermally Conductive Encapsalant*
- *MTBF: 280,000 Hours Minimum*
- *100% Burn-in and Tested*
- *Overvoltage Protection*
- *Thermal Sutdown*
- *Remote Sense*

APPLICATIONS

- *Distributed Power Systems*
- *Computer & Local Area Network*
- *NEI Redundant Systems*
- *Telecommunications*
- *Industrial and Testing Equipment*
- *Battery-powered Equipment*
- *Medical Equipment*





1. SINGLE OUTPUT PACKAGE: 4.6 (L) X 2.4 (W) X 0.85 (H)
2. TRIPLE OUTPUT PACKAGE: 4.6 (L) X 2.4 (W) X 1.0 (H)
3. FRONT END RECTIFIER: 4.6 (L) X 2.4 (W) X 1.0 (H)

200 WATT: 2:1 WIDE RANGE INPUT, SINGLE OUTPUT

MODEL #	INPUT VOLTAGE(VDC)	OUTPUT VOLTAGE(VDC)	OUTPUT CURRENT A (MAX.)
THW1202S	10-20 (12)	2	18
THW1203S	10-20 (12)	3.3	18
THW1205S	10-20 (12)	5	12
THW1206S	10-20 (12)	6	11
THW1212S	10-20 (12)	12	5
THW1215S	10-20 (12)	15	4
THW1224S	10-20 (12)	24	3
THW1248S	10-20 (12)	48	1.3
THW2402S	20-36 (24)	2	25
THW2403S	20-36 (24)	3.3	25
THW2405S	20-36 (24)	5	25
THW2406S	20-36 (24)	6	20
THW2412S	20-36 (24)	12	11
THW2415S	20-36 (24)	15	9
THW2424S	20-36 (24)	24	5.5
THW2448S	20-36 (24)	48	3
THW4802S	40-65 (48)	2	30
THW4803S	40-65 (48)	3.3	30
THW4805S	40-65 (48)	5	30
THW4806S	40-65 (48)	6	25
THW4812S	40-65 (48)	12	14
THW4815S	40-65 (48)	15	11
THW4824S	40-65 (48)	24	7
THW4848S	40-65 (48)	48	3.5
THW2C02S	110-185 (155)	2	35
THW2C03S	110-185 (155)	3.3	35
THW2C05S	110-185 (155)	5	35
THW2C06S	110-185 (155)	6	30
THW2C12S	110-185 (155)	12	18
THW2C15S	110-185 (155)	15	15
THW2C24S	110-185 (155)	24	9
THW2C48S	110-185 (155)	48	4.5
THW3C02S	220-380 (300)	2	40
THW3C03S	220-380 (300)	3.3	40
THW3C05S	220-380 (300)	5	40
THW3C06S	220-380 (300)	6	35
THW3C12S	220-380 (300)	12	20
THW3C15S	220-380 (300)	15	16
THW3C24S	220-380 (300)	24	10
THW3C48S	220-380 (300)	48	5

200 WATT: 2:1 WIDE RANGE INPUT, TRIPLE OUTPUT

MODEL #	INPUT VOLTAGE(VDC) WIDE RANGE	OUTPUT VOLTAGE / OUTPUT CURRENT (VDC) A (MAX.) CH1	CH2	CH3
THW12T01	10-20 (12)	5/10	12/3	12/3
THW12T02	10-20 (12)	5/10	15/2.5	15/2.5
THW24T01	20-36 (24)	5/20	12/3	12/3
THW24T02	20-36 (24)	5/20	15/2.5	15/2.5
THW48T01	40-65 (48)	5/20	12/4	12/4
THW48T02	40-65 (48)	5/20	15/3.5	15/3.5
THW2CT01	110-180 (155)	5/25	12/4	12/4
THW2CT02	110-180 (155)	5/25	15/3.5	15/3.5
THW3CT01	220-380 (300)	5/25	12/4	12/4
THW3CT02	220-380 (300)	5/25	15/3.5	15/3.5

200 WATT: 4:1 WIDE RANGE INPUT, SINGLE OUTPUT

MODEL #	INPUT VOLTAGE(VDC)	OUTPUT VOLTAGE(VDC)	OUTPUT CURRENT A (MAX.)
THX4802S	20-70 (48)	2	30
THX4803S	20-70 (48)	3.3	30
THX4805S	20-70 (48)	5	20
THX4806S	20-70 (48)	6	16
THX4812S	20-70 (48)	12	8
THX4815S	20-70 (48)	15	6.5
THX4824S	20-70 (48)	24	4
THX4848S	20-70 (48)	48	2

200 WATT: 4:1 WIDE RANGE INPUT, TRIPLE OUTPUT

MODEL #	INPUT VOLTAGE(VDC) WIDE RANGE	OUTPUT VOLTAGE / OUTPUT CURRENT (VDC) A (MAX.) CH1	CH2	CH3
THX48T01	20-70 (48)	5/20	12/3	12/3
THX48T02	20-70 (48)	5/20	15/2.5	15/2.5

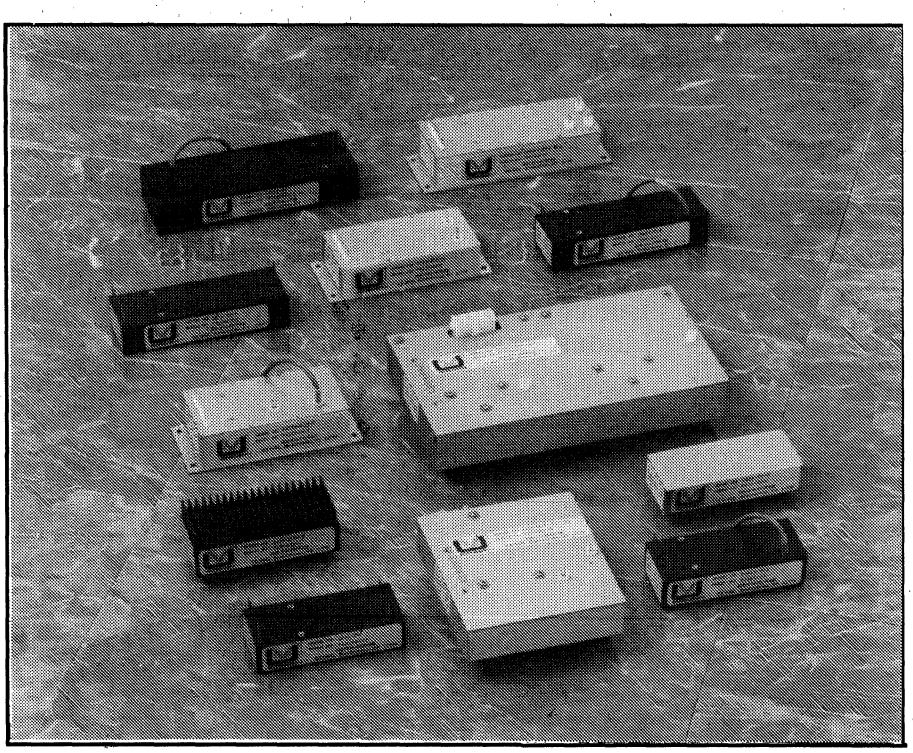
A. FOR OUTPUT CONFIGURRATION OTHER THAN SHOWN ABOVE, PLEASE CONSULT THE MANUFACTURER.
B. PROPER HEAT SINK IS REQUIRED FOR ALL MODELS.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

High Voltage DC to DC Power Supplies

ULTRAVOLT

"Making High Voltage Easier"®



4 Watt to 30 Watt Modules

- "A" Series DC power/**Low Ripple**
- Models from **125VDC** to **30kV** Output
- **Regulated** Output from 0 to Max Voltage
- Full Output Current from 0 to Max Voltage
- **DAC & ADC** Ready
- Small **4.3 In^3** to **11.6** In^3 Size
- High Efficiency (80% to 90%)
- 9 to 32VDC Input Range
- IDC Compatible Input Pins
- **>430,000** Hour MTBF
- **UL-1950, CUL-950, IEC-950**

60 Watt to 250 Watt Modules

- "C" Series DC power/Fast Rise **Cap Charging**
- High Efficiency (85% to 90%)
- Small **19 In^3** to **38 In^3** Size
- 9 to 32VDC Input Range
- Models from **125VDC** to **15kV** Output
- **Regulated** Output from 0 to Max Voltage
- Voltage & Current Monitors standard
- **DAC & ADC** Ready with **TTL** enable
- Full Output Current from 0 to Max Voltage
- Standard Products!

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Because power needs come in infinite variations, so do Vicor power solutions. Vicor's comprehensive line of power solutions

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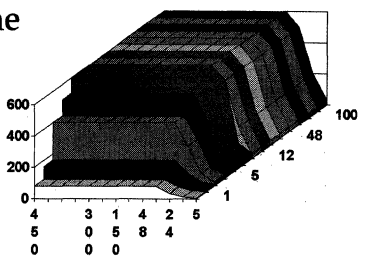
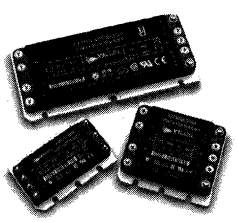
COMPONENT POWER MODULES

Vicor component converters come in thousands of combinations:

- Any DC input from 4.5 - 450V
- Any AC input including universal input, autoranging, or PFC
- Any output from 1 - 100 Vdc
- Any power from 25 - 600W (parallelable)



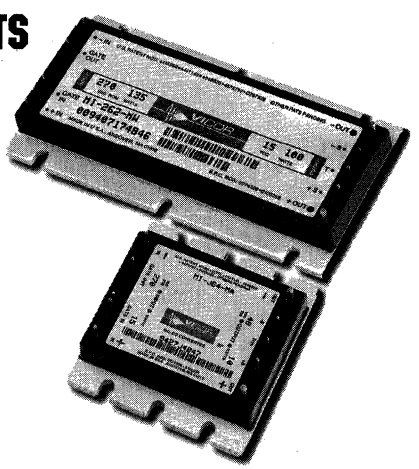


AGENCY APPROVED

COTS POWER COMPONENTS FOR MILITARY POWER SYSTEMS

Vicor defense products include:

- Power modules
- Input and output filters
- AC front ends
- Complete power supplies



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VICOR

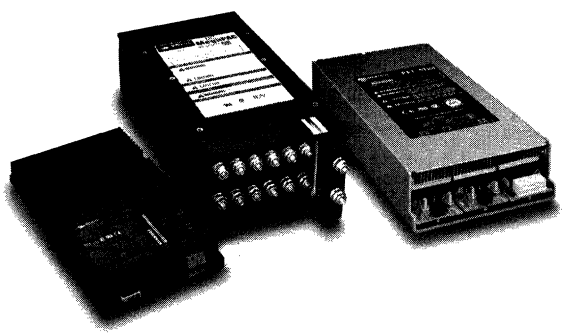
includes modular, high-density DC-DC converters and accessory components, configurable power supplies, and custom power solutions.

CONFIGURABLE POWER SUPPLIES

Vicor's compact, configurable power solutions come in thousands of combinations:

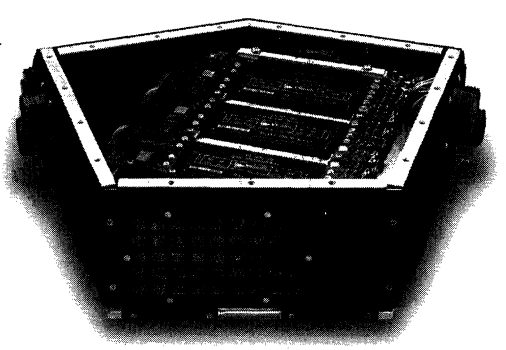
- AC-DC switchers
- DC-DC switchers
- 50 - 2000W
- 1 - 20 outputs
- With or without fans

QUICKTURNS



CUSTOM POWER SOLUTIONS

Vicor Integration Architects, located throughout the U.S., design, manufacture and arrange for agency approvals on your component-based custom or customized solution.



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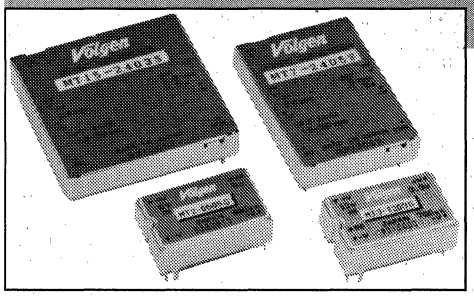
Volgen **Volgen** America

Quality First

Board Level DC/DC Converters

MT Series



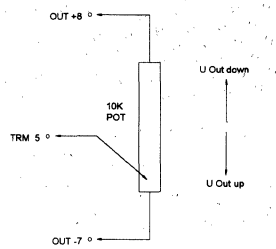
Features:

- Wide Input Voltage Range
- High Efficiency & Reliability
- Single and Dual Outputs
- I/O Isolation 500 VDC (1500:MT5)
- Regulated Outputs
- Internal EMI Filter
- Low Output Ripple and Noise
- Short Circuit Protection
- Direct PCB-Soldering
- Industry Standard Pinout (IC-24P)
- Low Profile, 10mm (0.39" Height)
- Stainless Steel Case

Board Level DC/DC Converters

Series	Power Rating	DC Input	Output Voltage	Efficiency	Dimensions
MT2	2 Watts	5 VDC (4.5-5.5V) 12 VDC (9-18V) 24 VDC (18-36V)	Single: 5, 12, 15 VDC Dual: +, -12, 15 VDC	60%	Inch=1.26L x .79W x .39H mm=32L x 20W x 10H (24 Pin DIP)
MT3-DH, HL	3 Watts	12 VDC (9-36V) 24/48 VDC (18-72V)	Single: 5, 12, 15 VDC Dual: +, -5, 12, 15 VDC	80%	Inch=1.26L x .79W x .39H mm=32L x 20W x 10H (24 Pin DIP)
MT3	3 Watts	5 VDC (4.5-7V) 12 VDC (9-18V) 20 VDC (10-30V) 24 VDC (18-36V) 48 VDC (36-72V)	Single: 3.3, 5, 12, 15 VDC Dual: +, -12, 15 VDC	75%	Inch=1.26L x .79W x .39H mm=32L x 20W x 10H (24 Pin DIP)
MT5	5 Watts	24 VDC (18-36V) 48 VDC (36-72V)	Single: 5, 12 VDC Dual: +, -12, 15 VDC	85%	Inch=1.26L x.79W x .39H mm=32L x 20W x 10H (24 Pin DIP)
MT7	7 Watts	48 VDC (36-72V) 24 VDC (18-36V)	Single: 5, 12, 15 VDC Dual: +, - 5, 12, 15 VDC	80%	Inch=2.0L x 1.42W x .37H mm=50.8L x 36.3W x 9.5H (6 sided stainless steel)
MT10	10/15 Watts	24 VDC (18-36V) 48 VDC (36-72V)	Single: 3.3, 5, 12, 15 VDC Dual: +, -12, 15 VDC	80%	Inch=2.0L x 1.0W x .39H mm=50.8L x 25.4W x 10H (5 sided stainless steel)
MT15	15 Watts	24 VDC (18-36V) 48 VDC (36-72V)	Single: 3.3, 5, 12, 15 VDC Dual: +, - 5, 12, 15 VDC	80%	Inch=2.0L x 2.0W x .37H mm=50.8L x 50.8W x 9.5H (6 sided stainless steel)

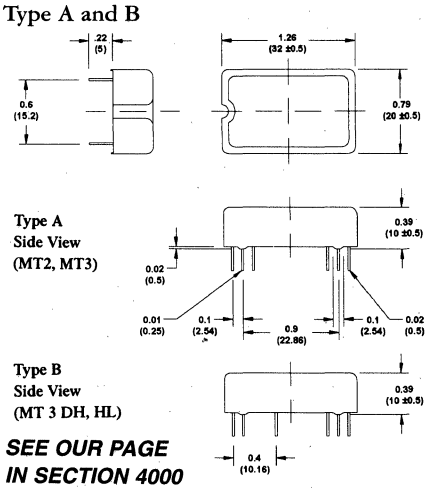
Output Voltage Adjustment (TRM)



MT7 & MT15

Pin Connections		
Pin	Single Output	Dual Output
1	Case FG	Case FG
2	+V Input	+V Input
3	-V Input	-V Input
4	Ext. ON/OFF RC	Ext ON/OFF RC
5	TRM	-V Output
6	NC	Common Output
7	-V Output	Common Output
8	+V Output	+V Output

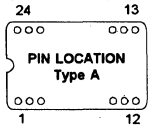
Type A and B



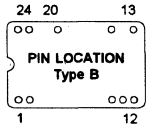
SEE OUR PAGE IN SECTION 4000

Type A: Single Output	
1, 24	Input +V
12, 13	Input-V
11, 14	Output +V
10, 15	Output -V
2, 23	NC
3, 22	NC

Type A: Dual Output	
1, 24	Input +V
12, 13	Input-V
11, 14	Output 1+V
10, 15	Output 1-V
2, 23	Output 2 -V
3, 22	Output 2 +V



Top View

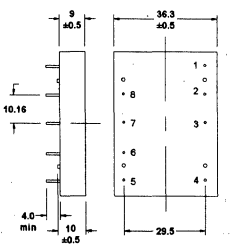


Top View

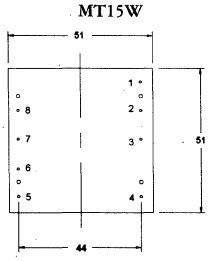
Type B: Single Output	
1, 2	Input +V
23, 24	Input-V
13	Output +V
12	Output -V
10, 11, 15	NC
20	Shutdown

Type B Dual Output	
1, 2	Input +V
23, 24	Input-V
15	Output +V
13	Output -V
10, 11	Common
12	NC
20	Shutdown

MT7W



MT15W



Bottom View

Pin dia.: 0.8mm
Dimensions: mm

***PLEASE CALL FOR ADDITIONAL 24 PIN DIP CONFIGURATIONS, MT5, & MT10 PINOUT.**

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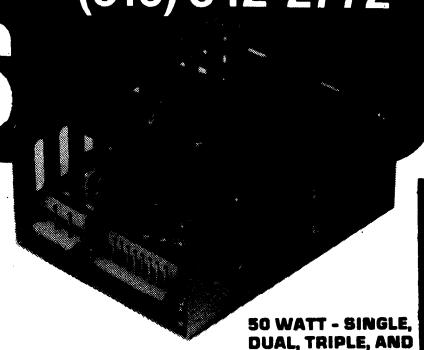


compact, competitive and powerful.

AC to DC switchmode power supplies

model number	power watts	output #1 V A	output #2 V A	output #3 V A	output #4 V A
VLX-82-714-1	50	5-10			
VLX-82-714-2		12-4			
VLX-82-714-3		15-3			
VLX-82-714-4		24-2			
VLX-82-713-1		5-5	12-2		
VLX-82-713-2		5-5	15-1.5		
VLX-82-713-3		12-2	12-2		
VLX-82-713-4		15-1.5	15-1.5		
VLX-82-712-1		5-5	12-1	12-1	
VLX-82-712-2		5-5	15-1	15-1	
VLX-82-712-3		5-5	12-1	24-0.5	
VLX-82-711-1		5-4	12-1	12-1	5-1
VLX-82-711-2		5-4	15-1	15-1	5-1
VLX-82-711-3		5-4	12-1	12-1	24-0.5

model number	power watts	output #1 V A	output #2 V A	output #3 V A	output #4 V A
LPX-82-710-1	100	5-20			
LPX-82-710-2		12-8			
LPX-82-710-3		15-7			
LPX-82-710-4		24-4			
LPX-82-709-1		5-10	12-4		
LPX-82-709-2		5-10	15-3		
LPX-82-709-3		5-10	24-2		
LPX-82-709-4		12-4	12-4		
LPX-82-709-5		15-3	15-3		
LPX-82-708-1		5-10	12-2	12-2	
LPX-82-708-2		5-10	15-1.5	15-1.5	
LPX-82-708-3		5-10	12-2	24-1	
LPX-82-707-1		5-10	12-2	12-2	5-1
LPX-82-707-2		5-10	15-1.5	15-1.5	5-1
LPX-82-707-3		5-10	12-1.5	12-1.5	24-0.5
LPX-82-707-4		5-10	15-1.5	15-1.5	24-0.5
LPX-82-707-5		5-10	12-1.5	12-1.5	12-1.5
LPX-82-707-6		5-10	15-1.5	15-1.5	15-1.5

model number	power watts	output #1 V A	output #2 V A	output #3 V A	output #4 V A
MPX-82-706-1	150	5-30			
MPX-82-706-2		12-12			
MPX-82-706-3		15-10			
MPX-82-706-4		24-6			
MPX-82-705-1		5-15	12-6		
MPX-82-705-2		5-15	15-5		
MPX-82-705-3		12-6	12-6		
MPX-82-705-4		15-5	15-5		
MPX-82-704-1		5-15	12-3	12-3	
MPX-82-704-2		5-15	15-3	15-3	
MPX-82-704-3		5-15	12-3	24-1.5	
MPX-82-703-1		5-15	12-3	12-3	5-1
MPX-82-703-2		5-15	15-2.5	15-2.5	5-1
MPX-82-703-3		5-15	12-2.5	12-2.5	24-0.5

model number	power watts	output #1 V A	output #2 V A	output #3 V A	output #4 V A
MLX-82-715-1	200	5-40			
MLX-82-715-2		12-16			
MLX-82-715-3		15-13			
MLX-82-715-4		24-8			
MLX-82-716-1		5-20	12-8		
MLX-82-716-2		5-20	15-6		
MLX-82-716-3		5-20	24-4		
MLX-82-716-4		12-8	12-8		
MLX-82-716-5		15-6	15-6		
MLX-82-717-1		5-20	12-4	12-4	
MLX-82-717-2		5-20	15-3	15-3	
MLX-82-717-3		5-20	12-4	24-2	
MLX-82-718-1		5-20	12-4	12-4	5-1
MLX-82-718-2		5-20	15-3	15-3	5-1
MLX-82-718-3		5-20	12-3	12-3	24-1
MLX-82-718-4		5-20	15-2.5	15-2.5	24-1
MLX-82-718-5		5-20	12-3	12-3	12-2
MLX-82-718-6		5-20	15-2	15-2	15-2

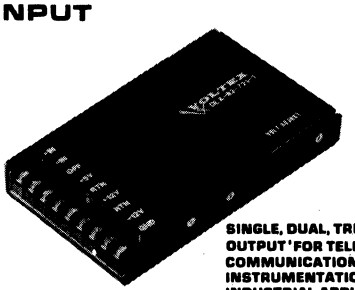
DC to DC switchmode power converters

model number	power watts	output #1 V A	output #2 V A	output #3 V A	output #4 V A
DLX-82-719-1	25	5-5			
DLX-82-719-2		12-2			
DLX-82-719-3		15-2			
DLX-82-719-4		24-1			
DLX-82-720-1		5-3	12-1		
DLX-82-719-4		24-1			
DLX-82-720-1		5-3	12-1		
DLX-82-720-2		5-3	15-1		
DLX-82-720-3		12-1	12-1		
DLX-82-720-4		15-1	15-1		
DLX-82-721-1		5-3	12-0.5	12-0.5	
DLX-82-721-2		5-3	15-0.5	15-0.5	
DLX-82-722-1	50	5-10			
DLX-82-722-2		12-4			
DLX-82-722-3		15-4			
DLX-82-722-4		24-2			
DLX-82-723-1		5-5	12-2		
DLX-82-723-2		5-5	15-2		
DLX-82-723-3		12-2	12-2		
DLX-82-723-4		15-2	15-2		
DLX-82-724-1		5-5	12-1	12-1	
DLX-82-724-2		5-5	15-1	15-1	
DMX-82-725-1	100	5-20			
DMX-82-725-2		12-8			
DMX-82-725-3		15-7			
DMX-82-725-4		24-4			
DMX-82-726-1		5-10	12-4		
DMX-82-726-2		5-10	15-4		
DMX-82-726-3		12-4	12-4		
DMX-82-726-4		15-4	15-4		
DMX-82-727-1		5-10	12-2	12-2	
DMX-82-727-2		5-10	15-2	15-2	
DMX-82-728-1		5-10	12-1	12-1	24-1
DMX-82-728-2		5-10	15-1	15-1	24-1

model number	power watts	output #1 V A	output #2 V A	output #3 V A	output #4 V A
DMX-82-729-1	150	5-30			
DMX-82-729-2		12-12			
DMX-82-729-3		15-10			
DMX-82-729-4		24-6			
DMX-82-730-1		5-15	12-6		
DMX-82-730-2		5-15	15-5		
DMX-82-730-3		12-6	12-6		
DMX-82-730-4		15-5	15-5		
DMX-82-731-1		5-15	12-3	12-3	
DMX-82-731-2		5-15	15-3	15-3	
DMX-82-732-1		5-15	12-1.5	12-1.5	24-1.5
DMX-82-732-2		5-15	15-1.5	15-1.5	24-1.5
DPX-82-733-1	200	5-40			
DPX-82-733-2		12-16			
DPX-82-733-3		15-14			
DPX-82-733-4		24-8			
DPX-82-734-1		5-20	12-8		
DPX-82-734-2		5-20	15-7		
DPX-82-734-3		12-8	12-8		
DPX-82-734-4		15-7	15-7		
DPX-82-735-1		5-20	12-4	12-4	
DPX-82-735-2		5-20	15-4	15-4	
DPX-82-736-1		5-20	12-2	12-2	24-2
DPX-82-736-2		5-20	15-2	15-2	24-2

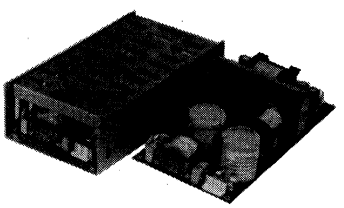
50 WATT - SINGLE, DUAL, TRIPLE, AND QUAD OUTPUTS

UNIVERSAL INPUT

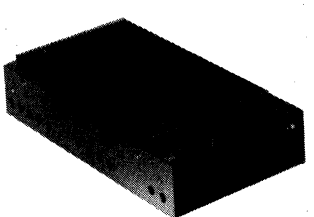


SINGLE, DUAL, TRIPLE, OUTPUT FOR TELE-COMMUNICATIONS, INSTRUMENTATION AND INDUSTRIAL APPLICATION

25 & 50 WATT
DC-DC CONVERTERS



PC BOARD OR CASED
100 WATT-SINGLE, DUAL, TRIPLE, AND QUAD OUTPUTS-



100 WATT
DC-DC CONVERTERS
SINGLE, DUAL, TRIPLE, AND QUAD OUTPUT FOR TELECOMMUNICATIONS, INSTRUMENTATION AND INDUSTRIAL APPLICATIONS.

Reliability

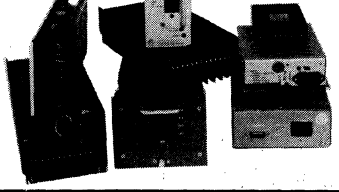
Reliability is designed into any power supply delivered by Voltex. Long, trouble free operation is assured by paying attention to all details.

Dependability

From prototype through production we endeavor to meet your requirements. A close liaison is established to make sure that our performance matches your schedule.

Capability

The entire power system is designed by Voltex. Magnetics, sheet metal, etc. are designed and fabricated in our plant. This assures you of consistent, high quality power systems. Instrumentation, such as power failed detect systems, sequencing systems, in fact all systems associated with power systems can be designed. Power related control systems, such as motor speed controls, have also been designed.



Custom Designed Power Supplies for OEM applications

VOLTEX CO., INC.

3460 Great Neck Road, North Amityville, New York 11701

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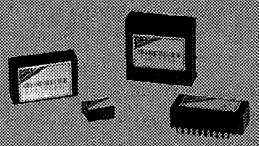
AC/DC POWER SUPPLIES STANDARD PRODUCT

Wall Industries, Inc.

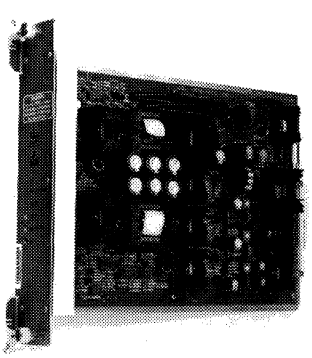


PARAMETERS	AC/DC POWER SUPPLIES	LAN UNITS SIPS AND DIPS	1 X 2" CASE PC BOARD MOUNT	2 X 2" CASE PC BOARD MOUNT
POWER LEVEL	**TO 100 WATTS**	**TO 3 WATTS**	**TO 10 WATTS**	**TO 20 WATTS**
INPUT VOLTAGES	85 Through 265 VAC	4.5-72 VDC (±10%, 2:1, 4:1)	4.5-72 VDC (±10%, 2:1, 4:1)	4.5-72 VDC (±10%, 2:1, 4:1)
OUTPUT VOLTAGES	5, 10, 12, 15, 18, 19, 20, 24, 28 VDC	5, 9, 12, 15, 24, 30, 48 VDC	3.3, 5, 9, 12, 15, 24 VDC	3.3, 5, 9, 12, 15, 24 VDC
# OF OUTPUTS	SINGLE, DUAL AND TRIPLE	SINGLE AND DUAL	SINGLE AND DUAL	SINGLE, DUAL AND TRIPLE
CASE DIMENSIONS	0.88 X 2.5 X 3.5" (FOR W12D50)	INDUSTRY STANDARD SIPS, AND 24 PIN DIPS	1 X 2 X 0.38" METALLIC AND NON-METALLIC CASES	2 X 2 X 0.38" METALLIC AND NON-METALLIC CASES
LINE AND LOAD REGULATION	REGULATED	REGULATED AND NON-REGULATED AVAILABLE	REGULATED AND NON-REGULATED AVAILABLE	REGULATED AND NON-REGULATED AVAILABLE
NOISE	LINEAR: <1mV RMS SWITCHING: <7mV RMS	<50mV P-P TYPICAL	<50mV P-P TYPICAL	<50mV P-P TYPICAL
ISOLATION LEVEL	1500V RMS to 3750VAC	500VDC, 750VDC, 3000VDC	500VDC, 1600VDC	500VDC, 1600VDC
SERIES NAMES	W, T, E, FE	"LAN A, B, C, D, E, F"; B, AND RB	IB, VLK, KR, JR	L, LW, YF, MS, MSW, N

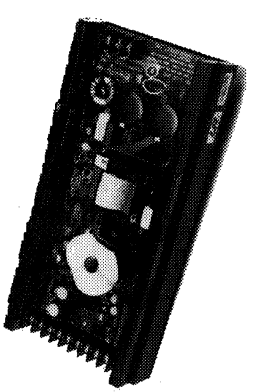
Telephone ringing generators available **ISO9001 REGISTERED BY UL**

CUSTOM POWER SOURCES

For more information regarding Wall Industries, Inc. DC/DC converters or AC/DC power supplies, contact the factory. Individual data sheets on standard and custom product are available upon request.



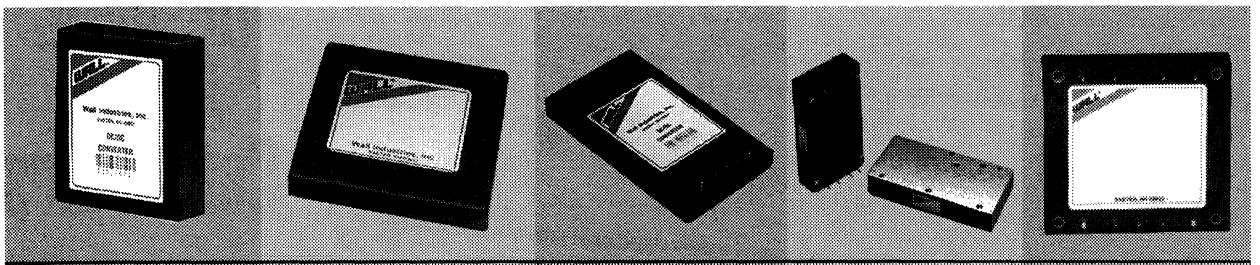
Looking for a Custom AC or DC input power source? Wall provides DC output custom supplies ranging from 5 to 1800 Watts output power in single and multiple outputs, regulated and non-regulated, isolated and non-isolated available.



Wall Industries Inc.
5 Watson Road, Exeter, NH 03833 USA ☎ : 603/778-2300 FAX: 603/778-9797
www.wallind.com e-mail: wallind@nh.ultranet.com

& DC/DC CONVERTERS STANDARD PRODUCT

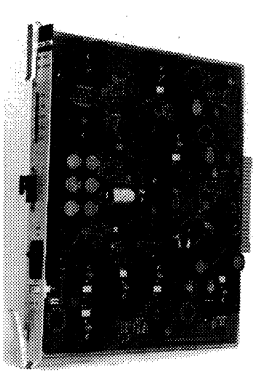
Wall Industries, Inc.



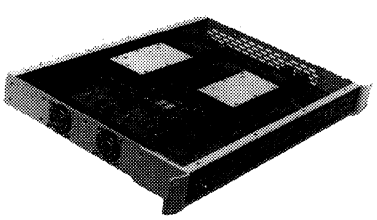
PC BOARD MOUNT	LOW PROFILE PC BOARD MOUNT	LOW PROFILE CHASSIS OR BOARD MOUNT	CHASSIS OR BOARD MOUNT	PC BOARD MOUNT
TO 30 WATTS	**TO 40 WATTS**	**TO 100 WATTS**	**TO 150 WATTS**	**TO 100 WATTS**
4.5-72 VDC (2:1 AND 4:1)	4.5-72 VDC (2:1, 3:1, AND 4:1)	21-400 VDC (2:1)	18-72 VDC (2:1)	18-75VDC (2:1 AND 4:1)
3.3, 5, 12, 15, 24, 48 VDC	3.3, 5, 12, 15, 24 48 VDC	3.3, 5, 12, 15, 24 48 VDC	3.3, 5, 12, 15, 24 48 VDC	3.3, 5, 12, 15, 24 48 VDC
SINGLE, DUAL AND TRIPLE	SINGLE, DUAL AND TRIPLE	SINGLE	SINGLE, DUAL	SINGLE, DUAL
2.56 X 3.0 X 0.84" METALLIC CASE	3.0 X 3.0 X 0.38" METALLIC CASE	2.4 X 4.6 X0.52" METALLIC CASE WITH BASEPLATE	2.4 X 4.6 X 1.0" METALLIC CASE WITH BASEPLATE	2.28 X 2.4 X .50
ALL REGULATED	REGULATED AND QUASI-REGULATED AVAILABLE	ALL REGULATED	ALL REGULATED	ALL REGULATED
<75mV P-P TYPICAL	<75mV P-P TYPICAL	<1% of Vout Max	<1% of Vout Max	<1.5% of Vout Max
500VDC I/O	500 VDC I/O	500VDC I/O	500VDC I/O	1500VDC I/O
SI, SIW	CA, CAQ	PD	HD	SP

Power Supply contract assembly available **ISO 9001 Registered by UL**

CUSTOM POWER SOURCES



Designs are developed per customer spec. Options include N+1 redundancy, hot-swappable, alarm and logic circuitry, transient protection, ultra-wide input voltages, and can be designed to be compliant with safety agency specifications.

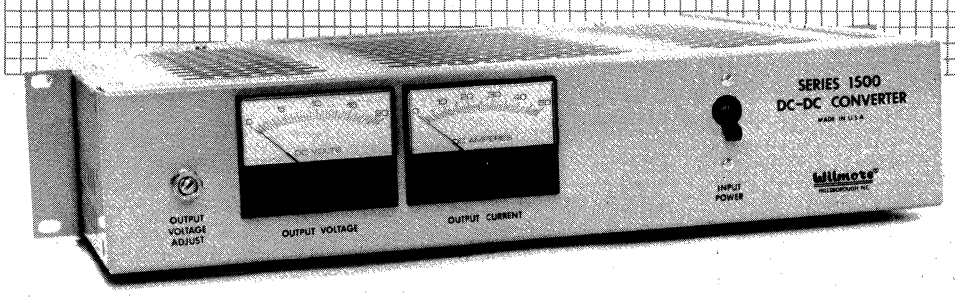


For more information regarding Wall Industries, Inc. DC/DC converters or AC/DC power supplies, contact the factory. Individual data sheets on standard and custom product are available upon request.

Wall Industries Inc.
5 Watson Road, Exeter, NH 03833 USA ☎ : 603/778-2300 FAX: 603/778-9797
www.wallind.com e-mail: wallind@nh.ultranet.com

Wilmore

DC-To-DC Power Converters



- **80% To 90% Efficient**
- **200, 400 Or 800 Watts**
- **Height 3.45" (2 Rack Spaces)**
- **Input/Output Isolation**

The Series 1500 converters provide an isolated, regulated, adjustable dc output from station batteries or other widely fluctuating dc sources to reliably power telecommunications equipment, supervisory control systems, and other sensitive electronic equipment. Conservatively rated and very efficient, these converters will operate at any load within their rating over a wide ambient temperature range with simple convection cooling. Their minimal no-load input power (about 5 watts) and correspondingly high light-load efficiencies make them uniquely suited for applications in which extended periods of "standby" service are encountered.

Front-Panel Controls And Indicators

A combination circuit breaker and ON/OFF switch is provided for the input power. A voltmeter and ammeter display the dc output. A screwdriver-slotted potentiometer shaft with locking nut is provided to adjust the output voltage level.

Size And Weight

All converters measure 3.45" high by 17.0" wide. The 200-watt and 400-watt units are 13.2" deep, and the 800-watt units measure 13.4" deep. All units weigh less than 18 pounds.

Optional Features

Standard options for Series 1500 converters include paralleling diodes for multiple-unit redundancy applications and auxiliary Form C contacts for remote indication of improper converter output. In addition, many other input/output voltage combinations not listed in the adjacent table are available. Contact our sales department for details.

Other Rack Mounted DC-To-DC Converters

In addition to the Series 1500, Wilmore manufactures many other standard and custom, single and multiple-output rack-mounted DC-to-DC Converters. Each series is isolated, regulated and highly efficient. Each is designed and manufactured in accordance with Wilmore's emphasis on conservative electrical ratings and long product life. Contact our sales department for more information.

Input† Voltage Range (Vdc)	Adjustable Output Voltage Range (Vdc)	Output Current (Adc)	Model Number
20-29	12-14	0-15	**1502-24-13-15**
20-29	12-14	0-30	**1502-24-13-30**
20-29	22-26	0-8	**1502-24-24-8**
20-29	22-26	0-16	**1502-24-24-16**
20-29	44-52	0-4	**1502-24-48-4**
20-29	44-52	0-8	**1502-24-48-8**
21-29	45.5-50.5	0-16	**1560-24-48-16**
40-58	12-14	0-15	**1502-48-13-15**
40-58	12-14	0-30	**1502-48-13-30**
40-58	22-26	0-8	**1502-48-24-8**
40-58	22-26	0-16	**1502-48-24-16**
42-58	22-26	0-30	**1561-48-24-30**
42-58	25-29	0-30	**1567-48-28-30**
40-58	44-52	0-4	**1502-48-48-4**
40-58	44-52	0-8	**1502-48-48-8**
40-58	56-64	0-7	**1502-48-60-7**
40-58	123.5-136.5	0-1.5	**1502-48-130-1.5**
40-58	123.5-136.5	0-3	**1502-48-130-3**
42-58	123.5-136.5	0-6	**1562-48-130-6**
105-140	12-14	0-15	**1502-130-13-15**
105-140	12-14	0-30	**1502-130-13-30**
105-140	22-26	0-8	**1502-130-24-8**
105-140	22-26	0-16	**1502-130-24-16**
105-140	44-52	0-4	**1502-130-48-4**
105-140	44-52	0-8	**1502-130-48-8**
105-140	123.5-136.5	0-1.5	**1502-130-130-1.5**
105-140	123.5-136.5	0-3	**1502-130-130-3**

† Nominal 60-Vdc versions and wide input-range versions are available.

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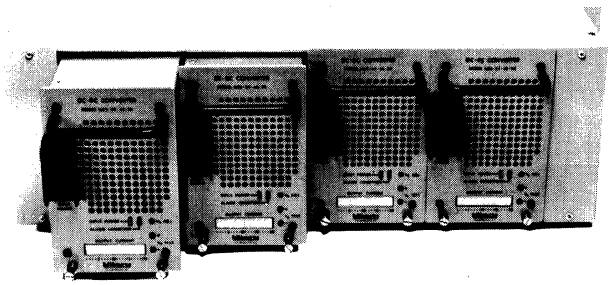
Wilmore

Modular DC-To-DC Converters



- **500 And 1000 Watt Modules**
- **Integral Paralleling Diode And Load Sharing Capability**
- **Module Insertion/ Removal Without System Shutdown**
- **80%–90% Efficiency**
- **Input/Output Isolation**
- **Shelf Wiring Accessible From The Front**

Designed for cell-site, central office, fiber-in-the-loop (FITL) and other telecommunications power applications, these converter module/shelf systems provide a well-regulated dc output voltage from station batteries or other widely-fluctuating dc sources. This output is galvanically isolated from the source and chassis and, therefore, may be connected either as a positive or a negative output. Each converter shelf can be equipped with up to four plug-in modules that can be removed without system shutdown, allowing for easy service and expansion of existing power installations. Each converter module has its own integral paralleling diode and alarm-signalling circuitry for applications requiring the security of redundant operation. For example, a user needing three modules to power the intended load can add a fourth module to avoid power interruptions due to a fault in any one converter module. The converter shelf contains no semiconductors or active electronics that might compromise this redundancy.

Converter Module Controls and Indicators

Front-panel controls and indicators for each module include a combined input-power circuit breaker and ON/OFF switch, a green and a red LED to indicate the status of the module, an LED bar-graph ammeter for measuring output current, output-voltage test points, and a screwdriver adjustment for setting the output voltage. Also, an internal Form C relay provides contact points for remote signaling of improper module output.

Converter Shelf Wiring and Physical Characteristics

Series 1625 and Series 1635 Converter shelves are pre-wired with separate input power connections for each of the four converter bays. The outputs of all four converter bays are paralleled and terminated to provide one set of output terminals in the shelf. This automatically parallels the output of modules installed in the shelf and also helps to prevent a fault in one converter module from affecting others in the shelf. The Series 1625 shelf is 7 inches high (4 vertical rack spaces) and is mountable in 23-inch equipment racks. The Series 1635 shelf is 5.25 inches high (3 vertical rack spaces) and designed to be mounted in 19-inch or 23-inch equipment racks.

Series 1635: 500 Watts per Module

Nominal Input Voltage (Vdc)	Nominal Output Voltage (Vdc)	Module Output Current (Adc)	Shelf Output Current (Adc Max)	Shelf Dimensions (h" x w" x d")	Module Model Number	Shelf Model Number
24	48	0–10	40	5.2 x 17.0 x 15.3 For use with 19" and 23" equipment racks (3 rack spaces)	1635-24-48-10	1635-24-48-SH
48	24	0–20	80		1635-48-24-20	1635-48-24-SH
48	130	0–3.8	15.2		1635-48-130-3.8	1635-48-130-SH

Series 1625: 1000 Watts per Module

Nominal Input Voltage (Vdc)	Nominal Output Voltage (Vdc)	Module Output Current (Adc)	Shelf Output Current (Adc Max)	Shelf† Dimensions (h" x w" x d")	Module Model Number	Shelf Model Number
24	48	0–20	80	7.0 x 21.0 x 15.3 For use with 23" equipment racks (4 rack spaces)	1625-24-48-20	1625-24-48-SH
48	24	0–40	160		1625-48-24-40	1625-48-24-SH
48	130	0–7.5	30		1625-48-130-7.5	1625-48-130-SH

†NEW 19-inch shelf with three converter modules now available.

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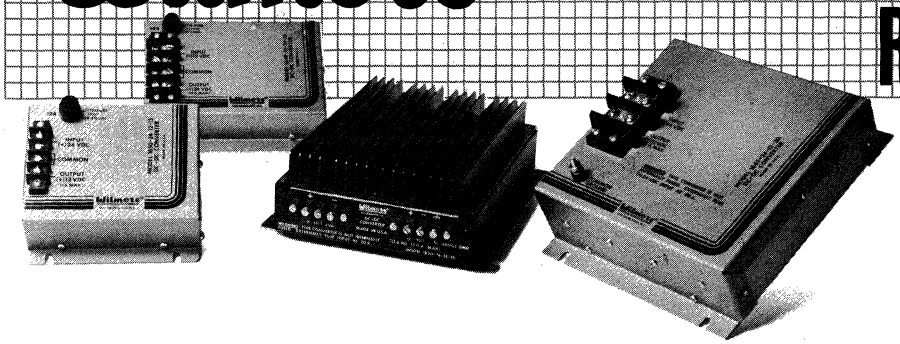
Wilmore

Mobile And Railroad/Transit DC-To-DC Converters



DC-to-DC Converters for Mobile Communications

These converters are designed primarily to power standard 12-volt and 24-volt mobile communications equipment from any vehicular electrical system that may be encountered. Units are mechanically and electrically rugged, inexpensive, and shipped from stock.

DC-to-DC Converters for Railroad/Transit Applications

The Railroad/Transit (RT) Series of dc-to-dc converters is especially designed to power radio transceivers, fuel management systems, LSI/PTS equipment and other sensitive electronic equipment aboard locomotives and electric rail vehicles.

Transient Withstand Capability

High-voltage, high-energy transients on locomotive power busses will damage inadequately protected electronic equipment. Wilmore's RT Series of converters protect sensitive loads while operating through input transients commonly found on rail vehicles. These converters do not rely on gas discharge tubes, varistors, power zeners or other limited-life transient suppression devices to achieve this capability.

Custom-Designed RT Series Converters

As the use of sensitive electronic equipment on rail vehicles continues to grow and diversify, user's needs for reliable power conversion are becoming highly individualized. The majority of Wilmore's work for the rail transportation industry is the design and manufacture of custom power products. Our field-proven circuitry can be readily scaled to provide different input/output voltage combinations, output power levels, and package sizes for use on diesel-electric locomotives and electrically-powered rail transit cars. Our engineering charges for custom units are modest, and our turnaround times are short. If you have some special requirements regarding any performance criteria, our New Products Group would like to hear from you.

DC-to-DC Converters for Mobile Communications

Input Voltage Range (Vdc)	Nominal Output Voltage† (Vdc)	Maximum Output Current (Adc)	Isolated/ Polarity-Reversing	Dimensions (h" x w" x d")	Efficiency (Typical)	Model Number
21-32	13.5	0-15	No	4 x 9.2 x 10.4	80%	1416-15
21-32	13.5	0-25	No	4 x 9.2 x 10.4	80%	1416-25
21-32	13.5	0-35	No	4 x 9.2 x 10.4	80%	1416-35
10-15	12.0	0-15	Polarity-Reversing	1.9 x 4.5 x 6.9	80%	1649-12-12-15
10-15	24.0	0-15	No	1.9 x 4.5 x 6.9	90%	1649-12-24-15
20-30	12.0	0-15	No	1.9 x 4.5 x 5.5	90%	1650-24-12-15
20-32	13.6	0-30	No	2.5 x 9.3 x 7.9	90%	1645-24-13-30
10-16	13.6	0-15	Isolated	3.0 x 5.1 x 9.7	80%	1675-12-12-15
10-16	24.0	0-8	Isolated	3.0 x 5.1 x 9.7	85%	1675-12-24-8
10-16	48.0	0-4	Isolated	3.0 x 5.1 x 9.7	85%	1675-12-48-4
20-56	13.6	0-7.5	Isolated	1.9 x 7.0 x 9.4	80%	1640-12-7.5
20-56	13.6	0-15	Isolated	2.9 x 7.0 x 9.4	80%	1640-12-15
20-56	24.0	0-4	Isolated	1.9 x 7.0 x 9.4	80%	1640-24-4
20-56	24.0	0-8	Isolated	2.9 x 7.0 x 9.4	80%	1640-24-8

†Models 1649 and 1650 provide voltages directly proportional to input voltage. All other models provide regulated output voltages.

DC-to-DC Converters for Railroad/Transit Applications

Nominal Input Voltage (Vdc)	Output Voltage† (Vdc)	Output Current (Adc)	Dimensions (h" x w" x d")	Weight (Pounds)	Mounting and Connections	Model Number
24	13.6	0-12	2.9 x 7.0 x 9.4	5	Mounting flange on base accepts #8 hardware. Input and output connections are made via barrier-strip terminal blocks.	1620-24-13-12
36	13.6	0-7.5	1.9 x 7.0 x 9.4	3.5		1620-36-13-7.5
36	13.6	0-15	2.9 x 7.0 x 9.4	5		1620-36-13-15
74	13.6	0-7.5	1.9 x 7.0 x 9.4	3.5		1620-74-13-7.5
74	13.6	0-15	2.9 x 7.0 x 9.4	5		1620-74-13-15
72	13.6	0-30	3.1 x 12.0 x 15.0	14		1554-72-13-30
110	13.6	0-7.5	1.9 x 7.0 x 9.4	3.5		1620-110-13-7.5
110	13.6	0-15	2.9 x 7.0 x 9.4	5		1620-110-13-15

†Other output voltages in the range of 5 to 28 volts are also standardly available.

WILMORE ELECTRONICS CO., INC.

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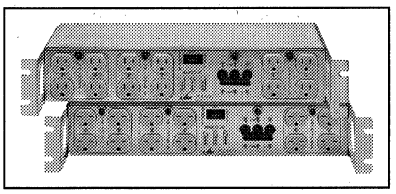
FAX: (919) 732-9359

MAXIMUM CURRENT CAPACITY—CONDUCTORS

Size, AWG	MIL-W-5088				National Electrical Code	Underwriters Laboratory		American Insurance Association	500 c mils/A
	Copper		Aluminum			60°C	80°C		
	Single-wire	Wire-bundled	Single-wire	Wire-bundled					
30	...	...	...	...	...	0.2	0.4	...	0.20
28	...	...	...	...	...	0.4	0.6	...	0.32
26	...	...	...	...	...	0.6	1.0	...	0.51
24	...	...	...	...	...	1.0	1.6	...	0.81
22	9	5	...	...	...	1.6	2.5	...	1.28
20	11	7.5	...	...	...	2.5	4.0	3	2.04
18	16	10	...	...	6	4.0	6.0	5	3.24
16	22	13	...	...	10	6.0	10.0	7	5.16
14	32	17	...	...	20	10.0	16.0	15	8.22
12	41	23	...	...	30	16.0	26.0	20	13.05
10	55	33	...	...	35	...	...	25	20.8
8	73	46	58	36	50	...	...	35	33.0
6	101	60	86	51	70	...	...	50	52.6
4	135	80	108	64	90	...	...	70	83.4
2	181	100	149	82	125	...	...	90	132.8
1	211	125	177	105	150	...	...	100	167.5
0	245	150	204	125	200	...	...	125	212.0
00	283	175	237	146	225	...	...	150	266.0
000	328	200	...	...	275	...	...	175	336.0
0000	380	225	...	...	325	...	...	225	424.0

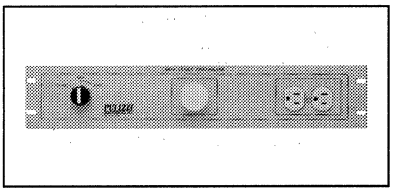
AC Power Distribution SHOWCASE

Recessed Single Phase Power Controller



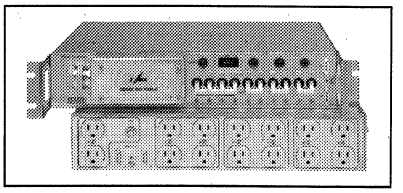
Rack mounted. Designed to fit standard 19" wide EIA STD. Standard and optional features including EMI/RFI filter, spike and surge suppression, 12 front panel mounted NEMA outlets, remote I/O ports, current protection up to 24 AMPS. Other features include three sections of four outlets either all switched or two switched and one unswitched, Multiple Time Delay® power-up/down, various current/voltage ratings.

Remote Power Control Panel



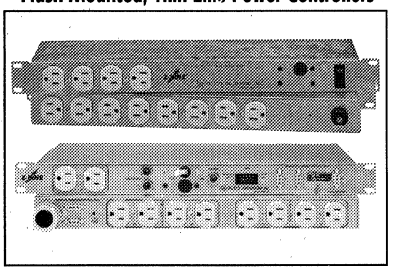
Centralize your system's power controls. Controls all Power Conditioners with standard industry configuration 3-pin remote connectors. Panels for both standard and latch type controllers. Needs only 3-1/2" height. Includes a utility convenience outlet, red EPO mushroom switch and reset (on/off) switch. Finished in light textured gray, FED-STD 595 #26559.

3-Phase Power Controllers



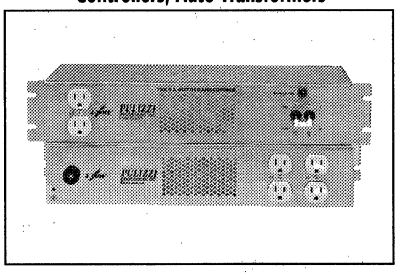
Rack mounted. 3-1/2" (2U) high. Depths from 8-1/2" to 14-1/2". Includes spike and surge protection, EMI/RFI filter, remote I/O connectors for power on/off, EPO and power-up of additional equipment down line; precision electromagnetic circuit breakers and power indicator lights. Options include Multiple Time Delay® power-up between sections, receptacle type and output voltages of 125 or 208 VAC. Designed to meet UL 1950 and CSA 22.2-950.

Flush Mounted, Thin Line Power Controllers



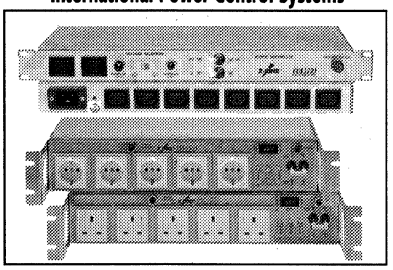
Ideal for restricted space applications. Large selection with up to 16 IEC type outlets. Many optional features including current/voltage rating, quantity and type of outlets, switched/unswitched sections, Multiple Time Delay®, EMI/RFI filtering (standard on some series), remote I/O ports and latching function.

Step Up, Step Down Voltage Controllers, Auto Transformers



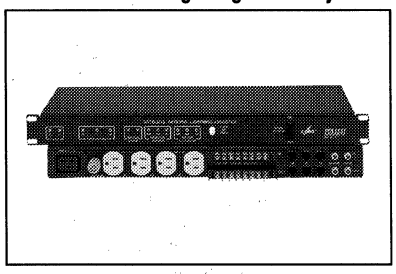
Change European voltage to 125VAC or step up domestic voltage to accommodate 220VAC. Current ratings from 10 to 30 AMPS, 750 to 2880 Volt AMPS. Up to 12 NEMA or IEC receptacles. Optional protection from spikes and surges, EMI/RFI filter. Only 3-1/2" high (2U).

International Power Control Systems



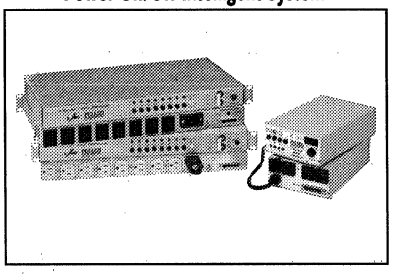
Controllers with IEC, "SCHUKO", British, German and other international receptacles. All units meet IEC 950 safety requirements. Includes voltage sensitive, voltage selectable and fixed voltage controllers. Up to 16 receptacles in 1U high. Some with Multiple Time Delay® or individual outlet control.

Satellite Antenna Lightning Arrester System



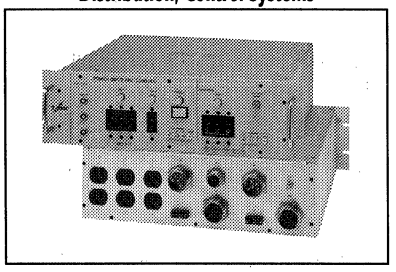
The solution to multiple line protection problems. Protects all circuit functions, including motor drives and sensors, linking a satellite tracking station with a remote receiver. Can withstand spikes and surges as extreme as lightning strikes on AC power, RF and telephone lines. Provides EMI/RFI filtering on low frequency circuits. NEMA connectors available for AC lines, RJ45 for phone and data lines, terminals for motor drive and sensor circuits as well as "F" type connectors for coaxial cables. Convenient, easy to install 19" rack mountable steel enclosure is a slim 1.75" high, 6" deep.

µP Controlled RS232 Remote Power On/Off Intelligent System



Pulizzi's advanced design, Intelligent Power Controllers® allow access and individually controlled power distribution from a remote location, even with a laptop computer, through a RS 232 communication link. A factory programmed microprocessor continuously monitors and reacts to customer specified parameters. Options include local control, IEC or NEMA receptacles, password security, multi-unit addressability, "watch dog" (self-boot) function, spike and surge suppression, EMI/RFI filter, customer specified power up sequencing.

Custom Designed Distribution, Control Systems



Can't find the Power Distribution Unit (PDU) you need? Pulizzi Engineering, with over 20 years experience, can design and manufacture the exact PDU you want and meet agency requirements. Eliminate the time and costs to design, fabricate and wire in-house power controllers. Let Pulizzi Engineering do it for you, better, faster and less expensively. Call us at the design stage and let us show you how a Z-Line PDU can more than pay for itself when it comes to total system cost.

Express 48-hour shipping on selected models.
Over 100 models on file with UL, CSA or Tuv recognition.
Serving commercial and mil/aero industries since 1973.

Z-LINE®

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ac power supplies-4050

LINE REGULATORS/CONDITIONERS

Manufacturer	Starting EEM Page No.	Model/Series	Power Rating (VA)	Frequency (Hz)	Phase		Voltage Protection	Surge Protection
					Single	Multiple		
ACI World	D•2155	3S-58	1-100	50/60	√		√	√
Advanced Conversion Products	D•2156	ACS	1.2KVA-10KVA	60, 50, 400	√	√	√	√
Behlman Electronics, Inc.	D•2161	ACM, ACP, BC, PA	250-120K	45-2500	√	√	√	√
California Instruments Corp.	D•2168	FCS, WP, iM	100VA-54kVA	16Hz-20,000VA	√	√	√	
Compact Power Company	D•2171	MAC	165VA-10KVA	45-20KHz	√	√	√	√
Controlled Power Company	D•2172	700A Series 800A Series 800 PI 900A Series	5K-500K 250-15K 250-25K 15K-450K	50, 60 50, 60 50, 60 50, 60	√ √ √ √	√	√ √ √ √	√ √ √ √
Elgar Electronics Corp.	D•2187	SW	1.75-21KVA	DC OR 45-5KHz	√	√	√	√
Falcon Electric	D•2193	WS Series	800VA-1.5KVA	50, 60	√		√	√
Georator Corp.	D•2194	Series 37	2.5-625K	50, 60	√	√	√	√
Hewlett-Packard Company	D•2199	681XA Series 6814B 6834B	375-1750VA 3000VA 4500VA	45-1KHz 45-5KHz 45-5KHz	√ √ √	 √	√ √ √	√ √ √
Marway Power Systems	D•2205	MPD	1440, 24000	50-60	√	√	√	√
Nova Electric	D•2209	Galaxy Series	100-60K	25, 50, 60, 100, 400	√	√		
Powertronix Corp.	D•2216	PLC	500-5,000	50, 60	√		√	√
Pulizzi Engineering Inc.	D•2218	SUC 1558 TPC 115-8 TPC 115-10/MTD TPC 2234 1PC 3200 PC 125 TPC 12 TPC 115-10 1PC 3202 1PC 3201 PC 500 TPC 884-1 PC 301/MTD™ PC 726 PC 726/MTD SDC 1559 PC 301	1440 & 2880 1440 & 2880 1440 & 2880 1440 1440 1440 & 3840 1440 - 2880 1440 & 2880 1440 1440 & 2880 5760 1440 - 2880 4320/7200 8640 8640 1440 - 2880 4320/7200	50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60 50/60	√ √ √ √ √ √ √ √ √ √ √ √ √ √ √	 √ √ √ √	√ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √	√ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √
Tracewell Power	D•2224	STF PCI	500, 1000 and 2000 350, 500		√ √	√		
Xentek Power Systems	D•2230	Power Guard Life Guard	125-250K 500-100K	50/60 50/60	√ √	√ √		

UPS SYSTEMS

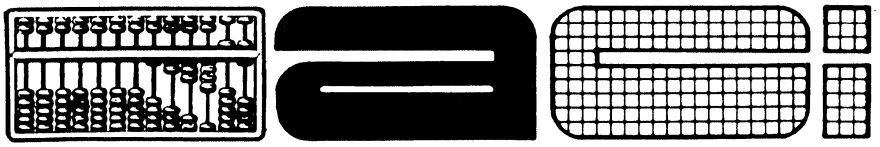
Manufacturer	Starting EEM Page No.	Model/Series	Output (VA)	Output Frequency (Hz)	Phase	
					Single	Multiple
Abacus Controls Inc.	D•2149	Stand-By	700-2200	50/60	√	
Advanced Conversion	D•2156	MIL-UPS	1KVA-10KVA	50, 60, 400	√	√
Behlman Electronics, Inc.	D•2161	HBL Series PUPS Series RS Series	1500 - 5000 650 - 1500 2100 - 6000	50/60 60 60	√ √ √	
Centralion Power Systems	D•2170	DL 50 CON	500 1K-10K	50/60 50/60	√ √	
Controlled Power Company	D•2172	LT Series LTR Series MD Series HV Series Source 8 Source 9	700-2.1K 700-2.1K 3.1K-7.5K 7.5K-25K 10K-30K 35-60K	50, 60 50, 60 50, 60 50, 60 60 60	√ √ √	 √ √
Falcon Electronic	D•2193	SG Series P Series MLT Series SSG Services	600VA-6KVA 250Va- 750VA 500VA-1KVA 800VA-2KVA	50, 60 50, 60 50, 60 50, 60	√ √ √ √	
Instrumentation & Control Systems	D•2203	Electro-Pac Lifeline Series	2K-20K 200, 600	50, 60 60	√ √	
Marway Power Systems	D•2205	7210700 7210900 7211100 7211400	700 900 1100 1400	50-60 50-60 50-60 50-60	√ √ √ √	
Nova Electric	D•2209	Galaxy & MK Series	500 - 300K	50, 60, 400	√	√
Wilmore Electronics Company, Inc.	D•2228	1400, 1600, 1653, 1654	50-1K	50, 60	√	
Xentek Power Systems	D•2230	Life Guard	400/1000	50/60	√	

FREQUENCY CONVERTERS

Manufacturer	Starting EEM Page No.	Model/Series	Output (VA)	Output Frequency (Hz)	Phase	
					Single	Multiple
Abacus Controls Inc.	D•2149	100/200	500-150,000	50-400	√	√
Advanced Conversion	D•2156	ACS	1KVA-10KVA	50, 60, 400	√	√
Behlman Electronics, Inc.	D•2161	ACM/ACP Series BL Series PA Series	250-50K 1350-20K 30-480K	45-10,000 45-1000 45-2000	√ √ √	√ √ √
California Instruments Corp.	D•2168	i, iL, iX, L, T, P, WP, RP Series	100VA-72,000VA	16-20,000	√	√
Compact Power Company	D•2171	MAC	165-10KVA	45Hz-20KHz	√	√
Converter Concepts	D•2178	VLC40 VLC60 VLC80 MD30 MD80 MD100 BC VI ST XT VT/VX VF	40-60 60-80 80-100 30 80 100 40 120 25 25 15-100 65, 100	47-440 47-440 47-440 47-63 47-63 47-63	√ √ √ √ √ √ √ √ √ √ √	√ √ √ √ √ √
Ectron Corp.	D•2186	1500	1500/3000/4500	45-440	√	√
Falcon Electric	D•2193	UVS Series SSG Series	800VA-1.5KVA 800VA-8KVA	50, 60 50, 60	√ √	
Georator Corp.	D•2194	Sprint, Triathlon, 30, 33, 37, 39	250-625K	50, 60, 40, 45-500	√	√
Hewlett-Packard Company	D•2199	681XA Series 6814B 6834B	375-1750VA 3000VA 4500VA	45-1KHz 45-5KHz 45-5KHz	√ √ √	 √
Industrial Test Equipment Company	D•2200	C	10-9,000	10-10,000,000		√
KGS Electronics, Inc.	D•2204	HS Series SPC6 Series	500-3500 750-1500	60, 50 50, 440	√ √	 √
Nova Electric	D•2209	Galaxy	100-60K	25, 50, 60, 100, 400	√	√
Panel Components Corp.	D•2215	International Power Source	1250	50, 60	√	
Unitron	D•2226	PS, CR, MFC Series	2K-400K, 115, 115/200	50, 60, 400	√	√

STATIC INVERTERS

Manufacturer	Starting EEM Page No.	Model/Series	Output (VA)	Output Frequency (Hz)	Phase	
					Single	Multiple
Abacus Controls Inc.	D•2149	400	800-150,000	50-400	√	√
Abbott Electronics	D•2152	SN, S Series	180, 5-120 Watts Sine Wave	400-1600	√	
Abbott Technologies	D•2154	KN-PN-LN-TN	30-320	50, 60, 400	√	
Advanced Conversion Products	D•2156	ACE	1KVA-10KVA	50, 60 400	√	√
Behlman Electronics, Inc.	D•2161	ACM, ACP, BL, PA	250-120K	45-10,000	√	√
Compact Power Company	D•2171	MAC	165-10KVA	45Hz-20KHz	√	√
Controlled Power Company	D•2172	700A	6K-500K	50, 60		√
Exeltech Inc.	D•2191	MX XP	up to 20K 125, 250, 600, 1100	400, 60, 50 400, 60, 50	√ √	√ √
Falcon Electric	D•2193	UVS Series SSG Series	800VA-1.5KVA 800-8KVA	50, 60 50, 60	√	
Instrumentation & Control Systems	D•2203	Electro-Pac	500-20K	50, 60	√	
KGS Electronics	D•2204	SS Series SC Series SEA Series	500-2000 500-1500 1500	50, 60 400 400	√ √	 √
Nova Electric	D•2209	Galaxy	100-60K	25, 50, 60, 100, 400	√	√
Wilmore Electronics Company, Inc.	D•2228	1400, 1600, 1653, 1654	50-1K	50, 60	√	
Xentek Power Systems	D•2230	Life Guard	500-100K	50/60	√	√



abacus controls inc.

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SOMERVILLE, NJ 08876
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UNINTERRUPTIBLE POWER SUPPLIES SINGLE PHASE 50Hz/60Hz 700VA-17KVA RACKMOUNT AND FREE STANDING SYSTEMS

STAND-BY SERIES

- **Site Voltage / Power Indication**
- **Low Distortion Sinewave Output**
- **Site Wiring Fault Indicator**
- **Interfaces with Unattended Shutdown Software**

The Stand-by Model is designed to protect all types of micro, supermicro, workstations and small minicomputers from all forms of power problems. The unit provides protection against blackouts, brownouts, sags, surges, spikes, RFI/EMI conducted noise and interference, plus persistent overvoltage/undervoltage conditions.
The Stand-by Model features an inverter pre-synchronized and phase locked to the utility supply. Also automatic transfer to battery/inverter on utility power fault and automatic re-synchronization and transfer back to utility power on recovery to normal limits.

MODEL	VA RATING	RUNTIME (Minutes)	
		© 100%	© 50%
972-4M1	700	5	17
913A-4M1	1000	6	18
9142-4M1	1400	6	11
9222-4M1	2200	9	24

STAND-BY SPECIFICATIONS

Input Voltage: 120 VAC ± 10%
Output Voltage: 120 VAC
Voltage Regulation on Inverter: ±2%
Wave Form: Sinewave 2% THD
Efficiency: Greater than 90%
Temperature Range: 0–40°C
Humidity: 95% Non-condensing
Circuit Protection: CKT BKR: Fuse; By Pass Switch
Overload Capability: 105% PEAK
Transfer Time: 2 milliseconds, typ.; 4 milliseconds
Filter and Surge Suppression: per IEEE 587 Cat.

STAND-BY SPECIFICATIONS

Model	Output Power (VA)	Output Frequency	Dimensions (Inches)			Weight Lbs.	Battery System
			H	W	D		
972-4	700	60	8.5	6.7	17.3	52	Internal
913A-4	1000	60	8.5	6.7	17.3	56	Internal
9222-4	2200	60	17	7.7	21.5	120	Internal

50 Hz and other voltages available, call for details.

abacus controls inc.

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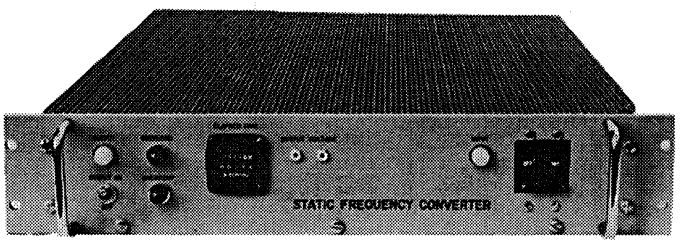
• POWER FREQUENCY CONVERTERS
• SOLID-STATE INVERTERS
• UNINTERRUPTIBLE FREQUENCY CONVERTERS



Model 152-1 (60Hz to 400Hz)

- **Digital Sinewave Generator**
- **77% Efficiency**
- **Low Cost**
- **Light Weight**
- **Proven Reliability**
- **Switching Power Transistors**
- **Useable as AC Power Supply**
  - **Motor Controller**
  - **Power Oscillator**
  - **Power Converter**
  - **Lab AC Source**

FREQUENCY CONVERTERS
50-60-400 Hz

Input Voltage: 115V AC, ±10%, single-phase for units 2000VA and below. 208V AC, ±10%, three-phase for units above 2000VA. 220V AC, ±10%, 50Hz is a no charge option. Other inputs available on a custom basis.

Input Frequency: 47 to 65Hz. 380 to 420Hz input is a no charge option.

Output Voltage: Adjustable 100 to 130 volts. Voltage adjust is internal for fixed frequency models, on the front panel for adjustable frequency models. (Other ranges available, consult factory.)

Voltage Regulation: Less than ±2% for combined no load to full load change and rated input voltage change.

Load Power Factor: 0.7 lead to 0.7 lag. Continuous zero lead to zero lag at full rated output without damage.

Output Waveshape: Sinewave less than 4% THD, 3% max any single frequency.

Protective Circuits: All models are equipped with automatic overload protection, including short circuit. Automatic reset upon overload removal. Circuit breaker on the input and fuse on the output. Automatic shutdown for input overvoltage, undervoltage.

Meters: Output voltmeter ammeter, and frequency meter offered as options.

Output Frequency: Rated output frequency for each model is shown on chart. For adjustable frequency models, adjustment is on the front panel. Internal frequency adjust is a no charge option.

Frequency Stability: Oscillator included in the unit base price. Fixed frequency oscillators are crystal controlled with a stability of ±0.05%. Adjustable oscillators are RC controlled and have a stability of ±0.25%.

Efficiency: Between 70 to 80 percent (typical 75%). At least 70% from 40% of full load to full load.

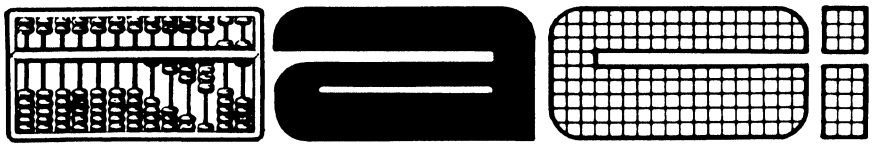
Peak Output Current: 150% of full rated current is available for three-cycles. Unit is set to current limit at 120% after three cycles.

SINGLE PHASE — 50/60 Hz

Model	Output Power (VA)	Output Frequency	Dimensions (inches) H	W	D	Weight (Lbs.)
152-3	500	50	3 1/2	19	20	50
152-4	500	60	3 1/2	19	20	50
152-5	500	45-65	8 3/4	19	20	50
113-3	1000	50	8 3/4	19	20	70
113-4	1000	60	8 3/4	19	20	70
113-5	1000	45-65	8 3/4	19	20	70
223-3	2000	50	12 1/4	19	20	130
223-4	2000	60	12 1/4	19	20	130
223-5	2000	45-65	12 1/4	19	20	130
233-3	3000	50	21	19	20	180
233-4	3000	60	21	19	20	180
233-5	3000	45-65	21	19	20	180
243-3	4000	50	21	19	20	180
243-4	4000	60	21	19	20	180
243-5	4000	45-65	21	19	20	180
263-3	6000	50	30	24	30	590
263-4	6000	60	30	24	30	590
263-5	6000	45-65	30	24	30	590
2153-3	15000	50	63	24	30	1100
2153-4	15000	60	63	24	30	1100
2153-5	15000	45-65	63	24	30	1100
214-3	10000	50	30	24	30	775
214-4	10000	60	30	24	30	775
214-5	10000	45-65	30	24	30	775
224-3	20000	50	30	24	30	1200
224-4	20000	60	30	24	30	1200
225-5	20000	45-65	30	24	30	1200
254-3	50000	50	63	46	30	2500
254-4	50000	60	63	46	30	2500
254-5	50000	45-65	63	46	30	2500

THREE PHASE — 50/60 Hz

Model	Output Power (VA)	Output Frequency	Dimensions (inches) H	W	D	Weight (Lbs.)
117-3	1000	50	8 3/4	19	20	75
117-4	1000	60	8 3/4	19	20	75
117-5	1000	45-65	8 3/4	19	20	75
118-3	1600	50	8 3/4	19	20	110
118-4	1600	60	8 3/4	19	20	110
118-5	1600	45-65	8 3/4	19	20	110
238-3	3000	50	17 1/2	19	20	170
238-4	3000	60	17 1/2	19	20	170
238-5	3000	45-65	17 1/2	19	20	170
268-3	6000	50	51	24	30	590
268-4	6000	60	51	24	30	590
268-5	6000	45-65	51	24	30	590
219-3	10000	50	51	24	30	750
219-4	10000	60	51	24	30	750
219-5	10000	45-65	51	24	30	750
2158-3	15000	50	51	24	30	1100
2158-4	15000	60	51	24	30	1100
2158-5	15000	45-65	51	24	30	1100
229-3	20000	50	63	46	30	1500
229-4	20000	60	63	46	30	1500
229-5	20000	45-65	63	46	30	1500
239-3	30000	50	63	46	30	2250
239-4	30000	60	63	46	30	2250
239-5	30000	45-65	63	46	30	2250
259-3	50000	50	83	60	42	3300
259-4	50000	60	83	60	42	3300
259-5	50000	45-65	83	60	42	3300
2159-3	150000	50	82	96	30	7500
2159-4	150000	60	82	96	30	7500
2159-5	150000	45-65	82	96	30	7500



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FREQUENCY CONVERTERS
50-60-400 Hz

Voltage Regulation: 2% or less for combined no load to full load changes and rated input voltage changes. Voltage regulation also applies for three phase Frequency Converters regardless of load imbalances.

Output Waveshape: Sinewave less than 2% THD, 1% max. any single frequency. Less than 4% for non-linear loads such as computer power supplies.

Peak Output Current: 110%

Output Frequency: Rated output frequency for each model is shown on chart. For adjustable frequency models, adjustment is on the front panel. (Custom output frequencies are available, consult factory.)

SINGLE PHASE — 400 Hz

Model	Output Power (VA)	Output Frequency	Dimensions (inches) H	W	D	Weight (Lbs.)
152-1	500	400	3 1/2	19	20	40
152-2	500	350-450	8 3/4	19	20	40
162-1	600	400	3 1/2	19	20	45
162-2	600	350-450	8 3/4	19	20	45
113-1	1000	400	3 1/2	19	20	70
113-2	1000	350-450	8 3/4	19	20	70
223-1	2000	400	12 1/4	19	20	130
223-2	2000	350-450	12 1/4	19	20	130
233-1	3000	400	21	19	20	180
233-2	3000	350-450	21	19	20	180
243-1	4000	400	21	19	20	210
243-2	4000	350-450	21	19	20	210
263-1	6000	400	30	24	30	550
263-2	6000	350-450	30	24	30	550
283-1	8000	400	30	24	30	650
283-2	8000	350-450	30	24	30	650
214-1	10000	400	30	24	30	775
214-2	10000	350-450	30	24	30	775
224-1	20000	400	51	24	30	1100
224-2	20000	350-450	51	24	30	1100

THREE PHASE — 400 Hz

Model	Output Power (VA)	Output Frequency	Dimensions (inches) H	W	D	Weight (Lbs.)
117-1	1000	400	8 3/4	19	20	70
117-2	1500	350-450	8 3/4	19	20	70
118-1	1600	400	8 3/4	19	20	110
118-2	1600	350-450	8 3/4	19	20	110
228-1	2500	400	12 3/4	19	20	140
228-2	2500	350-450	12 1/4	19	20	140
238-1	3500	400	17 1/2	19	20	170
238-2	3500	350-450	17 1/2	19	20	170
268-1	6000	400	30	24	30	590
268-2	6000	350-450	30	24	30	590
278-1	7500	400	30	24	30	650
278-M	7500	400	17 1/2	19	24	245
278-2	7500	350-450	30	24	30	650
219-1	10000	400	51	24	30	750
219-2	10000	350-450	51	24	30	750
2158-1	15000	400	63	24	30	1000
2158-2	15000	350-450	63	24	30	1000
229-1	20000	400	63	46	30	1400
229-2	20000	350-450	63	46	30	1400
239-1	30000	400	63	46	30	2100
239-2	30000	350-450	63	46	30	2100
259-1	50000	400	80	63	42	3000
259-2	50000	350-450	80	63	42	3000

STATIC INVERTERS
50-60-400 Hz

Voltage Regulation: ±2% or less for combined no load to full load changes and rated input voltage changes. Voltage regulation also applies for three phase Frequency Converters regardless of load imbalances.

Output Waveshape: Sinewave less than 2% THD, 1% max. any single frequency. Less than 4% for non-linear loads such as computer power supplies.

Peak Output Current: 110%

Output Frequency: Rated output frequency for each model is shown on chart. For adjustable frequency models, adjustment is on the front panel. (Custom output frequencies are available, consult factory.)

SINGLE PHASE

Model	Output Power (VA)	Output Frequency	Dimensions (inches) H	W	D	Weight (Lbs.)
452-1	500	400	3 1/2	19	18	40
452-3	500	50	3 1/2	19	18	40
452-4	500	60	3 1/2	19	18	40
413-1	1000	400	3 1/2	19	18	50
413-3	1000	50	3 1/2	19	18	50
413-4	1000	60	3 1/2	19	18	50
423-1	2000	400	12 1/4	19	20	80
423-3	2000	50	12 1/4	19	20	85
423-4	2000	60	12 1/4	19	20	85
433-1	3000	400	12 1/4	19	20	110
433-3	3000	50	12 1/4	19	20	120
433-4	3000	60	12 1/4	19	20	120
443-1	4000	400	12 1/4	19	20	140
443-3	4000	50	12 1/4	19	20	150
443-4	4000	60	12 1/4	19	20	150
463-1	6000	400	30	24	30	350
463-3	6000	50	30	24	30	400
463-4	6000	60	30	24	30	400
483-1	8000	400	30	24	30	400
483-3	8000	50	30	24	30	440
483-4	8000	60	30	24	30	440
414-1	10000	400	30	24	30	470
414-3	10000	50	30	24	30	540
414-4	10000	60	30	24	30	540
424-1	20000	400	30	24	30	950
424-3	20000	50	30	24	30	1050
424-4	20000	60	30	24	30	1050
454-3	50000	50	82	24	30	2200
454-4	50000	60	82	24	30	2200

THREE PHASE

Model	Output Power (VA)	Output Frequency	Dimensions (inches) H	W	D	Weight (Lbs.)
417-1	1000	400	8 3/4	19	20	60
417-3	1000	50	12 1/4	19	20	70
417-4	1000	60	12 1/4	19	20	70
418-1	1600	400	12 1/4	19	20	90
418-3	1600	50	12 1/4	19	20	100
418-4	1600	60	12 1/4	19	20	100
438-1	3000	400	17 1/2	19	20	160
438-3	3000	50	17 1/2	19	20	175
438-4	3000	60	17 1/2	19	20	175
468-1	6000	400	30	24	30	350
468-3	6000	50	30	24	30	390
468-4	6000	60	30	24	30	390
419-1	10000	400	30	24	30	470
419-3	10000	50	30	24	30	530
419-4	10000	60	30	24	30	530
4158-1	15000	400	30	24	30	700
4158-3	15000	50	30	24	30	775
4158-4	15000	60	30	24	30	775
429-1	20000	400	63	24	30	940
429-3	20000	50	63	24	30	1040
429-4	20000	60	63	24	30	1040
439-1	30000	400	63	46	30	1410
439-3	30000	50	63	46	30	1560
439-4	30000	60	63	46	30	1560
459-1	50000	400	63	46	30	2070
459-3	50000	50	63	46	30	2290
459-4	50000	60	63	46	30	2290
4159-3	150000	50	82	72	30	4800
4159-4	150000	60	82	72	30	4800

MARTEK POWER ABBOTT

abbott electronics

28 VDC to AC Sine Wave

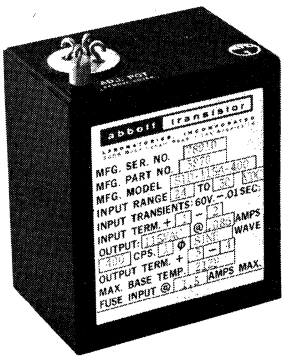
S

SPECIFICATIONS

Input Voltage Range: 24 to 30 volts DC. Other input ranges are available.
Load Regulation: ±1.0% from ½ to full load.
Frequency Stability: ±1.0%
Voltage Adjustment Range: 12% by screwdriver adjustment.
Reliability: Up to 340,600 Hrs. MTBF per MIL-HDBK-217C.
Input Transient Protection: In accordance with MIL-STD-704A, Limit 1, Fig. 9 (80 volts for 0.1 seconds).
Environment: +212°F max. at mtg. base using adequate heat sink. −65°F min. at mounting base. Encapsulated to meet the environmental requirements of MIL-STD 810C and MIL-E 5400P, Class 2, including: altitude (to a vacuum), vibration, shock, acceleration, sand, dust, humidity, saltspray, fungus, explosion, etc.

Input Voltage Range	Output Frequency (Hertz)	Output Voltage Range	Output Power (Volt-Amps)	Harmonic Distortion (%)	Size (See Below)	Weight (Lbs.)	Model Number
24-30	400	25.4-28.6	5	2.0	4	1.6	S05D-27A-400
			10	2.5	4C	1.7	S1D-27A-400
			20	2.5	4B	2.3	S2D-27A-400
			30	2.5	6A	2.4	S3D-27A-400
			60	3.0	12	4.8	S6D-27A-400
			120	4.0	14	9.1	S12D 27A-400
24-30	400	108-122	5	2.0	4	1.6	S05D-115A-400
			10	2.5	4C	1.7	S1D-115A-400
			20	2.5	4B	2.3	S2D-115A-400
			30	2.5	6A	2.4	S3D-115A-400
			60	3.0	12	4.8	S6D-115A-400
			120	4.0	14	9.1	S12D-115A-400
24-30	800	25.4-28.6	5	2.0	4	1.6	S05D-27A-800
			10	2.5	4C	1.7	S1D-27A-800
			20	2.5	4B	2.3	S2D-27A-800
			30	2.5	6A	2.4	S3D-27A-800
			60	3.0	12	4.8	S6D-27A-800
			120	4.0	14	9.1	S12D-27A-800
24-30	800	108-122	5	2.0	4	1.6	S05D-115A-800
			10	2.5	4C	1.7	S1D-115A-800
			20	2.5	4B	2.3	S2D-115A-800
			30	2.5	6A	2.4	S3D-115A-800
			60	3.0	12	4.8	S6D-115A-800
			120	4.0	14	9.1	S12D-115A-800

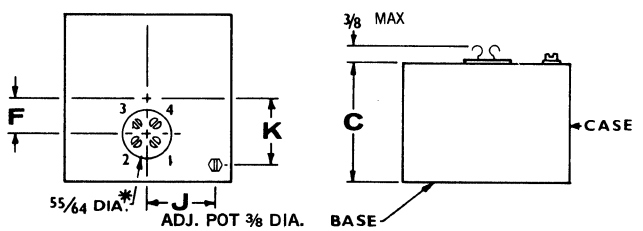
Output frequencies up to 1600 Hz available as standard models. Contact our nearest office for information.

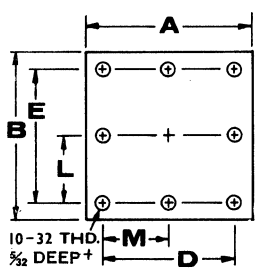


Sine Wave — 1 Ø 400 to 1600 Hz

- Operating temperature range: −55°C to +100°C.
- High reliability. Up to 340,600 hrs. MTBF per MIL-HDBK-217C.
- Encapsulated and hermetically sealed per MIL-STD-810C and MIL-E-5400P.

CASE DIMENSIONS FOR ABBOTT MODELS W, WW, C, CC, B AND S





* Models CC and WW use special 8 pin header. Size of special headers is 1¼6 dia. by 5/16 high.
† 6-32 Thd, 3/16 deep on case size 1B.

Size	A	B	C	D	E	F	J	K	L	M
1	1½	2¾	3	1.00	2.25	5/16	½	1⅛	—	—
1A	1½	2¾	2¾	1.00	2.25	5/16	½	1⅛	—	—
1B	1½	2	2	1.00	1.50	0	½	¾	—	—
2	1⅞	2¾	3¼	1.37	2.25	¾	11/16	1⅛	—	—
2C	2	2¾	2⅛	1.50	2.25	0	¾	1⅛	—	—
2D	2	3	3½	1.50	2.50	¾	¾	1¼	—	—
2E	2⅛	3¼	3¼	1.62	2.75	⅞	13/16	1⅜	—	—
3	2¾	2¾	3	2.25	2.25	¾	1⅛	1⅛	—	—
3A	2¾	2¾	2¾	2.25	2.25	¾	1⅛	1⅛	—	—
4	2¼	2¾	3¼	1.75	2.25	¾	⅞	1⅛	—	—
4B	2½	3	3¾	2.00	2.50	¾	1	1¼	—	—
4C	2¼	2¾	3½	1.75	2.25	¾	⅞	1⅛	—	—
4D	2½	3½	3½	2.00	3.00	0	1	1½	—	—
5	2¾	2¾	3¼	2.25	2.25	¾	1⅛	1⅛	—	—
6	2¾	3	3¼	2.25	2.50	¾	1⅛	1¼	—	—
6A	2¾	3	4	2.25	2.50	¾	1⅛	1¼	—	—
6B	2¾	3⅛	3⅝	2.25	2.62	¾	1⅛	13/16	—	—
7	2¾	2¾	4	2.25	2.25	¾	1⅛	1⅛	—	—
7A	2⅞	3⅜	4½	2.37	2.87	¾	13/16	17/16	—	—
8B	2⅝	3½	2⅞	2.12	3.00	¾	1¼	1½	—	—
9A	2¾	4¾	3¾	2.25	4.25	0	1⅛	2⅛	—	—
9B	2¾	4¾	3½	2.25	4.25	0	1⅛	2⅛	—	—
9C	2½	4⅜	3⅛	2.00	3.87	1	1	1 15/16	—	—
9D	2⅝	4¾	3⅝	2.12	4.25	1	1 1/16	2⅛	—	—
10A	3	5	4	2.50	4.50	0	1¼	2¼	—	—

Size	A	B	C	D	E	F	J	K	L	M
10B	2⅞	4¼	4⅜	2.37	3.75	1⅜	1 3/16	1⅞	—	—
10C	3⅜	3⅜	3¾	2.87	2.87	¾	1 7/16	1 7/16	—	—
10D	3½	3½	4	3.00	3.00	¾	1½	1½	—	—
10G	3½	5½	2½	3.00	3.50	**	**	**	—	—
10H	4	5½	2⅝	3.50	3.50	**	**	**	—	—
11	3	5½	3¼	2.50	5.00	2⅛	1¼	2½	2.50	—
11C	4¼	5¼	4	3.75	4.75	0	1⅞	2⅜	2.37	—
11D	4	4⅞	3⅞	3.50	4.37	1⅜	1¾	2 3/16	—	—
11E	3¾	4½	4¼	3.25	4.00	¾	1⅝	2	—	—
11F	2¾	6¼	2¾	2.25	5.75	1	1⅛	2⅞	2.87	—
11K	3⅝	8 13/16	2⅝	2.55	4.31	**	**	**	—	—
12	3	5½	4	2.50	5.00	2⅛	1¼	2½	2.50	—
12A	4½	6	4	4.00	5.50	0	2	2¾	2.75	—
12C	3⅞	6¼	2¾	3.37	5.75	1½	1 1/16	2⅞	2.87	—
12G	5⅛	8¾	2⅝	4.62	6.56	**	**	**	3.28	—
13A	5½	6½	4½	5.00	6.00	0	2½	3	3.00	2.50
14	6	6	4	5.50	5.50	2⅜	2¾	2¾	2.75	2.75
14C	5½	5½	3⅝	5.00	5.00	1⅞	2½	2½	2.50	2.50
14D	6	6¼	3⅞	5.50	5.75	1¼	2¾	2⅞	2.87	2.75
14E	5¾	6¼	2¾	5.25	5.75	1¼	2⅝	2⅞	2.87	2.62
16A	6¾	7½	4¼	6.25	7.00	2¾	3⅛	3½	3.50	3.12

DIMENSIONAL TOLERANCES: FRACTIONS ±1/32; DECIMALS .XX ±0.015.

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MARTEK POWER ABBOTT

abbott electronics

28 VDC to AC Sine Wave

SN

SPECIFICATIONS:

Input: 24 to 30 V dc. Other inputs available. (See Option H.)

Efficiency: 55% minimum at 27 V dc input and full load.

Line Regulation: Within 0.5% for full input change 24 V dc to 30 V dc with load constant.

Load Regulation: Within 1.0% for load change of one half to full load with line constant.

Wave Form: Sinusoidal with a maximum harmonic distortion into a resistive load of 4%.

Frequency Stability: ± 1% drift with time (within 8 hours after 30 seconds warm-up).

Frequency Accuracy: ± 0.5% is initial setting tolerance.

Load Power Factor: Derate linearly from 100% rated power at unity to 70% rated power at 0.7 power factor lagging or leading.

Isolation Voltage: 200 V dc input to case, 750 V dc output to case and input to output.

Insulation Resistance: 50 megohms minimum between input and output, input and case, output and case when measured at 50 V dc.

Temperature Range: Operating – 55°C to + 100°C baseplate temperature; storage temeprature – 65°C to + 125°C ambient.

Temperature Coefficient: 0.06% / °C from – 55°C to + 100°C, voltage change, frequency change, 1% maximum.

Input Transient Protection: In accordance with MIL-STD-704A, Figure 9, Limit 1 (80 V dc for 0.1 second).

Load Transient Response: Output voltage returns to regulation limits within 5 cycles for a load change of no load to full load.

Load Transient Overshoot: 10% maximum from nominal voltage set point.

Short Circuit Protection: Completely protected against short circuit of any duration. Unit must be recycled to restore output to normal.

Reliability: The MTBF calculated per MIL HDBK-217D, under operating conditions of 50°C baseplate temperature, maximum operating input voltage and full rated output power is 156,366 hours for ground benign and 15,722 hours for air inhabited transport environments. With Enhanced Reliability Option (-ER) ground benign is 907,070 hours; air inhabited transport is 93,030 hours.

Environment: Hermetically sealed and encapsulated to meet the environmental requirements of MIL-STD-810C.

Maintainability: Units are repairable at depot level.

OPTIONAL FEATURES

The following standard options are available on the SN Series inverters. Please refer to option section of this catalog for detailed information.

Special Connectors: A military-type hermetically sealed connector is provided as **Option A** in place of our standard header to extend out the top surface. (To order, replace "D" in model number with "A", i.e., SN180A-27A-400.)

Severe Shock, Acceleration and Vibration: Special encapsulation, **Option E**, enables all units to withstand 60 g's shock, 50 g's acceleration and 30 g's vibration. (To order, add "E" after "D" in model number, i.e., SN180DE-27A-400).

Wide Input Voltage: Option H recenters the input voltage to provide alternate inputs from 18 V dc to 32 V dc. Call an Abbott Sales Office for output current derating. (To order, add "H" after the "D" in model number and specify input voltage range in parentheses after the entire model number, i.e., SN180DH-27A-400 (18-30).)

Remote Turn On/Off: Option L provides isolated terminals to turn outputs on/off with TTL logic signal. (To order, add "L" to character preceding first dash in model number, i.e. SN180DL-27A-400.)

Remote Output Adjustment: With **Option R**, an adjustment potentiometer can be remotely located to adjust the output voltage. (To order, add "R" after "D" in model number, i.e., SN180DR-27A-400.)

Frequency Adjustment: Option -4 enables output frequency to be adjusted ± 5% by means of an external potentiometer. (To order, add "-4" at the end of the entire model number, i.e., SN180D-27A-400-4.)

Enhanced Reliability: -ER Option provides increased reliability by using higher levels of military-grade components. (To order, add "-ER" at the end of the entire model number, i.e., SN180D-27A-400-ER.)

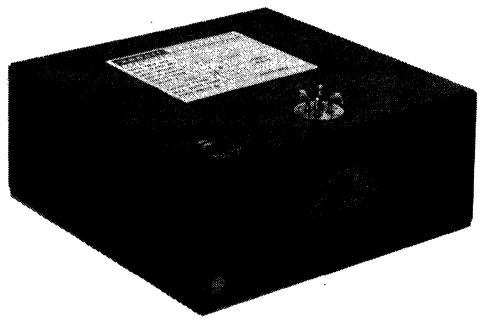
6 Standard Models

Output Frequency (Hertz)	Output[1] Voltage Range	Output Amps (Resistive Load) Continuous	Harmonic Distortion (%)	Size (See Dwg.)	Weight[2] lbs.)	Weight[2] (Kgs.)	Model Number
400	25.4-28.6	6.667	4.0	14H	5.5	2.5	SN180D-27A-400
	108-122	1.565	4.0	14H	5.5	2.5	SN180D-115A-400
800	25.4-28.6	6.667	4.0	14H	5.5	2.5	SN180D-27A-800
	108-122	1.565	4.0	14H	5.5	2.5	SN180D-115A-800
1600	25.4-28.6	6.667	4.0	14H	5.5	2.5	SN180D-27A-1600
	108-122	1.565	4.0	14H	5.5	2.5	SN180D-115A-1600

1. Output voltage is continuously adjustable between the limits shown by means of an externally accessible screwdriver adjustment potentiometer.
2. Weights are ± 5%.

Model Numbering System

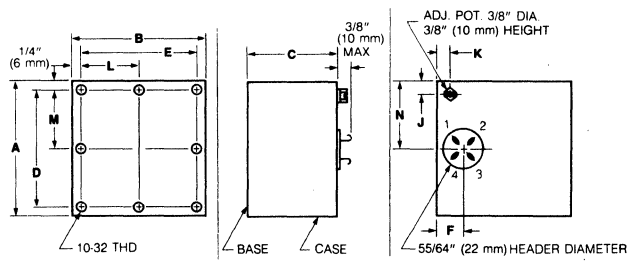
Product Line Series	Output Power Watts	Header Type	Options	Dash	Output Voltage AC	A	Dash	Frequency Hz
SN	180	D		–	27	A	–	400



Sine Wave - 1ϕ 400 to 1600 Hz

- High Density 2 w/in³ 180-Watt Inverter
- Operating temperature range: – 55°C to + 100°C.
- High reliability. Up to 907,070 hrs. MTBF per MIL-HDBK-217D.
- Encapsulated and hermetically sealed per MIL-STD-810C and MIL-E-5400P.

CASE DRAWINGS



CASE DIMENSIONS

Model	Case Size	A	B	C	D	E	F	J	K	L	M	N
SN180	14H	6	6	2½	5.50	5.50	¾	¼	¼	2.75	2.75	3
		152	152	64	139.7	139.7	19	6	6	69.8	69.8	76.2

Tolerances: If English unit is a fraction, ± 1/32 inch (0.8 mm); if English unit is a decimal, ± .015 inc. (0.4 mm).

Material: Base – Aluminum 6061-T6, Case – Steel

Finish: Black flat lacquer per FED-STD-595. Color 37038.

Mounting: 10-32 THD inserts
9/32" minimum depth are provided in baseplate. Steel 10-32 bolts American Standard, unified national fine series, slotted studs are supplied with each unit. Metric hardware and inserts available as a special order.

INPUT CURRENT (Amps)

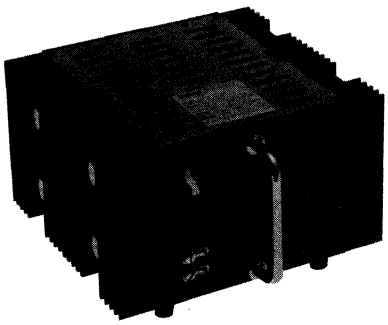
Load	24V Input	30V Input
100%	12A	12A
75%	9A	9.1A
50%	6A	6.1A

Abbott Electronics, Inc., 2727 S. La Cienega Blvd, Los Angeles, CA 90034 USA (310) 202-8820 Fax: (310) 836-4926
http://abbottelectronics.com sales@abbottelectronics.com

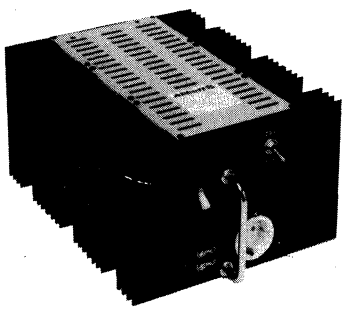
Abbott TECHNOLOGIES, INC.

Sine Wave Inverters

MODELS KN-PN LN-TN



Standard Models: KN, PN, LN, TN Cases K2, F2, J2



Abbott's sine wave inverters convert dc battery power to regulated clean ac. They are used to provide uninterrupted power to operate computers, motors, lamps, digital processors, TV broadcast equipment and telecommunication electronics.

Our inverters have become the industry standard by providing dependable performance in such rugged applications as marine radar, railway signal and communications, security electronics, and mobile test equipment.

11 to 54 VDC Input 30 to 320 VA Output

- A wide range of standard models.
- 50 Hz or 60 Hz output.
- Surge current capabilities up to 3 times rated output power.
- Exceptional reliability. Typical MTBF: 90,586 hours for model LN8.
- High efficiency provided by sine wave. Conserves power.
- Saves motors by reducing overheating.
- Low distortion. 2% typical.
- Compact. Lightweight.
- Switchable 115 VAC 60 Hz/230 VAC 50 Hz.
- Wide temperature range: −20°C to +55°C ambient operation.
- Special models available.
- 2-year warranty.

11 to 15 VDC Input

Output Power (VA)	Case	Weight (Lbs.)	Single Output 115 VAC 60 Hz	Single Output 220 VAC 50Hz	Switchable Output 115V 60Hz/220V 50 Hz
30	K2	16	KN3T-115-60	KN3T-220-50	KN3T-50/60
60	F2	18	KN6T-115-60	KN6T-220-50	KN6T-50/60
120	J2	30	KN12T-115-60	KN12T-220-50	KN12T-50/60

22 to 30 VDC Input

Output Power (VA)	Case	Weight (Lbs.)	Single Output 115 VAC 60 Hz	Single Output 220 VAC 50Hz	Switchable Output 115V 60Hz/220V 50 Hz
60	K2	16	PN6T-115-60	PN6T-220-50	PN6T-50/60
120	F2	18	PN12T-115-60	PN12T-220-50	PN12T-50/60
240	J2	30	PN24T-115-60	PN24T-220-50	PN24T-50/60

29 to 38 VDC Input

Output Power (VA)	Case	Weight (Lbs.)	Single Output 115 VAC 60 Hz	Single Output 220 VAC 50 Hz	Switchable Output 115V 60 Hz/220V 50 Hz
80	K2	16	LN8T-115-60	LN8T-220-50	LN8T-50/60
160	F2	18	LN16T-115-60	LN16T-220-50	LN16T-50/60
320	J2	30	LN32T-115-60	LN32T-220-50	LN32T-50/60

42 to 54 VDC Input

Output Power (VA)	Case	Weight (Lbs.)	Single Output 115 VAC 60 Hz	Single Output 220 VAC 50 Hz	Switchable Output 115V 60 Hz/220V 50 Hz
80	K2	16	TN8T-115-60	TN8T-220-50	TN8T-50/60
160	F2	18	TN16T-115-60	TN16T-220-50	TN16T-50/60
320	J2	30	TN32T-115-60	TN32T-220-50	TN32T-50/60

Also see listing for Power Supplies in this Volume, Pages **D**•1412-**D**•1413 and Transformers in Volume **A**, Pages **A**•2100-**A**•2102

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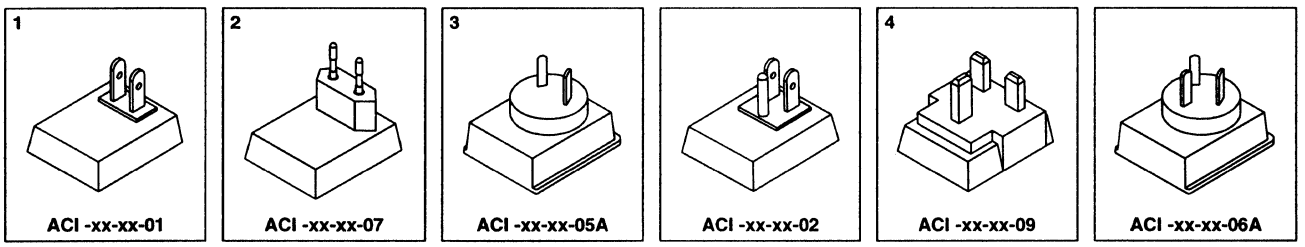
AC/AC WALLMOUNT DIRECT PLUG-IN ADAPTORS FOR THE WORLD

U.S.A., Canada, Japan | European | Australian



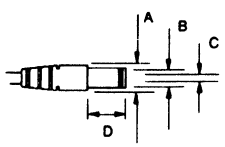
AC/AC ADAPTORS

Model	VAC	Current
35 A-3-50 thru 35A-3-900	3V	50mA-900mA
35A-3.6-50 thru 35A-3.6-900	3.6V	50mA-900mA
48A-4-900 thru 48A-4-1000	4V	900mA-1000mA
35A-4.5-50 thru 41A-4.5-1600	4.5V	50mA-1600mA
35A-5-50 thru 35A-5-700	5V	50mA-700mA
35A-6-50 thru 48A-6-2000	6V	50mA-2000mA
41A-7-350 thru 41A-7-1400	7V	350mA-1400mA
35A-7.5-50 thru 48A-7.5-1900	7.5V	50mA-1900mA
35A-8-50 thru 35A-8-600	8V	50mA-600mA

Model	VAC	Current
35A-9-50 thru 48A-9-1800	9V	50mA-1800mA
41A-10-250 thru 48A-10-1700	10V	250mA-1700mA
35A-12-50 thru 48A-12-1500	12V	50mA-1500mA
41A-14-150 thru 48A-14-1200	14V	150mA-1200mA
35A-15-50 thru 48A-15-1200	15V	50mA-1200mA
41A-16-250 thru 48A-16-1100	16V	300mA-1100mA
35A-18-50 thru 48A-18-1000	18V	50mA-1000mA
35A-21-50 thru 48A-21-850	21V	50mA-850mA
35A-24-50 thru 48A-24-750	24V	50mA-750mA

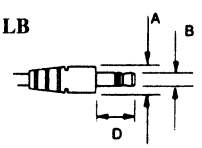
OUTPUT PLUG OPTIONS

Model ME



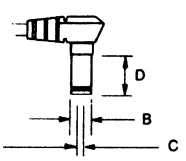
Model	A	B	C	D
ME1	9.5	5.5	2.5	8-14
ME2	9.5	5.5	2.1	8-14
ME3	10.5	5.5	2.5	8-14
ME4	10.5	5.5	2.1	8-14
ME5	9.5	5.0	2.5	8-14
ME5	10.5	5.0	2.1	8-14

Model LB



Model	A	B	D
LB1	9.5	5.5	8-14
LB2	9.5	5.5	8-14
LB3	10.5	5.5	8-14
LB4	10.5	5.5	8-14

Model JS



Model	B	C	D
JS1	5.5	2.1	10-15
JS2	5.5	2.5	10-15
JS3	5.0	2.1	10-15
JS4	5.0	2.5	10-15

Advanced Conversion Products

Inverters • Frequency Changers • Uninterruptible Power Systems • Battery Chargers • Custom Power Supplies

Advanced Conversion Products designs and manufacturers standard and custom inverters, converters and UPS systems for a broad range of applications including Industrial, Transit & Railway, Utility & Oil Patch, Airborne and Mobile Military. Our units are recognized for their robust reliability, quality and value.

PRODUCTS:

INVERTERS- Solid State DC-AC Inverters deliver pure sinusoidal output from a wide variety of DC sources, 36VA to 15KVA

UNINTERRUPTIBLE POWER SYSTEMS-Rugged rack mountable UPS system for Military, Industrial, Oil Patch applications, 1kVA to 15KVA

TYPICAL SPECIFICATIONS

Input: 12V to 400VDC-30% +70% of Nominal
Output: Pure sinewave 25 THD
Regulation: 0.1% Frequency, 1.0% Voltage
Power Factor: 0 to 1 Lead or Lag
Efficiency: 83% Min. (half to full load)
Environmental: MIL-STD 810D Shock Vibration
Operating Temp: -30° to +55°C
Protection: OV, OT°, OI and Shortcircuit

DESIGN FEATURES

Precision regulated output is "synthesized" using high frequency Pulse Width Modulation. Wide input range, rugged construction. Lightweight compact design. 6KVA unit is under 75 pounds!

POWER RANGES

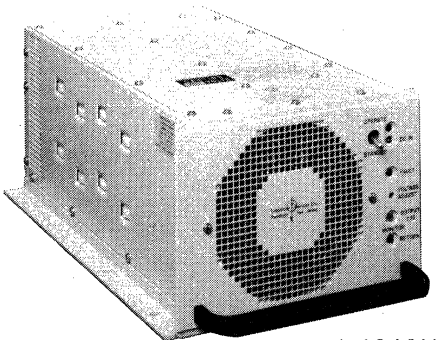
"A" Series 36VA to 500VA
"ACE" Series 1KVA to 15KVA

Single and Three Phase Models Available

ACP inverters are used in one of the roughest of Marine Environments on the U.S. Coast Guard's Rescue Life Boats to power their Navigation and Communication equipment.
ACP has versions of power equipment available to meet military specifications.
ACP static inverters are used by major Public Utility companies throughout the United States.

ACE SERIES
SINE WAVE INVERTER

1kVA to 10kVA 1 & 3-Phase
COMPACT LIGHTWEIGHT & RUGGED
1% THD SINUSOIDAL OUTPUT
50/60/400HZ MODELS
MOBILE, AIRBORNE & SHIPBOARD



1-10 KW BCE
BATTERY CHARGERS

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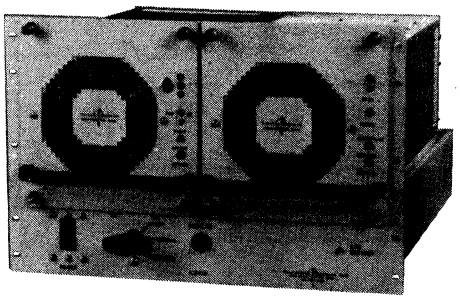
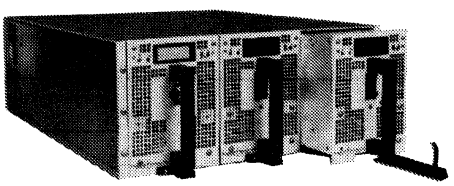
- Universal 90-264VAC Input
- On-Line Seamless Back-up
- Lightweight (<85Lbs. 2.7KVA)



- Precision AC Output, 2% THD
- Immune to Shock & Vibration
- Conservatively Rated

MODULAR UNINTERRUPTIBLE POWER SYSTEMS FOR TELECOM & COMMERCIAL APPLICATION

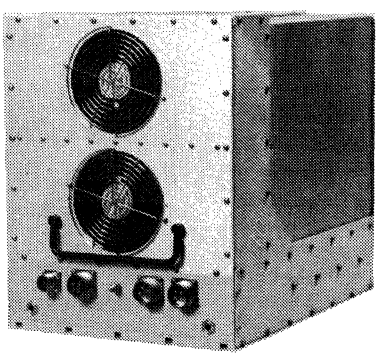
- Compact 19" rack mount
- Only 7" Panel Height
- Low Battery Alarm
- Uninterruptible DC & AC Outputs



- Field Replaceable Modules
- On-Line Seamless Back-up
- Power Factor Corrected
- –10 to +40 C Operation

1 - 10KVA FREQUENCY CONVERTERS

- Low Harmonic Distortion
- 1 or 3 Phase Units
- Lightweight & Rugged



- 400Hz to 60Hz
- Airborne / Military
- Powers Any Load

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PRODUCT SELECTION GUIDES

TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 1999 EDITION OF EEM

Batteries, Product Selection Guide D•1313
Cabinets, Enclosures, Racks & Chassis, Product Selection Guide C•1003
Capacitors, Product Selection Guide A•1003
Coils, Chokes, Inductors, Product Selection Guide A•1153
Connectors & Sockets, Product Selection Guide C•1127
Cores, Magnets & Ferrites A•1349
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Guide A•1365
Data Acquisition/Handling Systems & Accessories D•1139
DC-DC Converters D•1879
Delay Lines, Product SelectionGuide A•1545
Discrete Semiconductors, Product Selection Guide A•2049
Displays, Readouts, & CRTs, Product Selection Guide B•1006
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide C•1470
Fiber Optics, Product Selection Guide B•1163
Filters, Power, Product Selection Guide A•1577
Filters, Signal, Product Selection Guide A•1615
Instruments, Test & Measuring, Product Selection Guide D•1178
Keyboards, Keypads & Membrane Switches, Product Selection Guide B•1613
Lamps, Lights, & Indicators, Product Selection Guide B•1089
LAN Products B•1002
Microwave Components, Product Selection Guide A•1671
Motors, Drives, & Rotating Components, Product Selection Guide B•1169
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Power Supplies, DC, Product Selection Guide D•1379
Protective Components (Fuses, Circuit Breakers, etc.) Product Selection Guide B•1231
Relays, Product Selection Guide B•1285
Resistors, Product Selection Guide A•1857
Solenoids, Product Selection Guide B•1450
Switches, Product Selection Guide B•1467
Terminal Blocks C•1383
Test Accessories D•1270
Thermal Components, Product Selection Guide B•1667
Transducers & Encoders, Product Selection Guide B•1736
Transformers, Product Selection Guide A•2079
Wire & Cable, Product Selection Guide C•1581

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
A/D acrylonitrile butadiene-styrene
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AFC audio frequency control
AFT automatic filter test
ALGOL algorithmic language
AM a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
ASIC application specific IC
ATE automatic test equipment
ATG automatic test generation
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility syste

C
CAD computer-aided design
CAE computer-aided engineering
CAM computer-aided manufacture
CAMAC computer-automated measurement and control
CAPP computer-aided process planning
CAT computer-aided test
CATV cable television or community antenna television
CCC (leaded) ceramic chip carriers
CCD computer-controlled display
CERMET ceramic metal element
CIE computer-integrated engineering
CIM computer-integrated manufacturing
CLCC ceramic leadless chip carriers
CMOS complementary metal-oxide semiconductor
Comm. communications
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DBMS data base management system
DC direct current
DFT design for testability
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DRAM dynamic RAM
DTL diode transistor logic

E
EDA electronic design automation
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EIA Electronic Industries Association
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM erasable programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide FET
CMIP commn management information protocol
GPIB general purpose interface bus
GPS global positioning system

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement, and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IAB Internet Activities Board
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared
ISDN integrated services digital network
ISO International Standards Organization

J
JEDEC Joint Electronic Device Engineering Council
JFET junction FET
JMOS junction MOS

K
kHz kilohertz (10^3 hertz)
KSR keyboard send /receive

L
LAN local area network
LC (filters) inductance/capacitance
LCC leaded chip carrier
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microfarad
MHz megahertz
MIC microwave IC
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor FET
MOSIGT metal oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM national instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator
OSI open systems interconnection

P
PAL programmable array logic
PC printed circuit
PCB printed circuit board
PCM pulse code modulation
PCS plastic clad silica
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLCC plastic leaded chip carrier
PLL phased lock loop
PPI plan position indicator
PROM programmable ROM
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon-controlled switch
SDA source & detector assemblies
SGMP simple gateway monitoring protocol
SIDAC bidirectional voltage-triggered switch
SIMM single in-line memory module
SIP single in-line package
SMD surface mount device
SMT surface mount technology
SNMP simpole network management protocol
SO small outline
SOIC small outline IC
SOT small outline transistor
SSI small scale integration
SSR solid-state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCE thermal coefficient of expansion
TXCO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

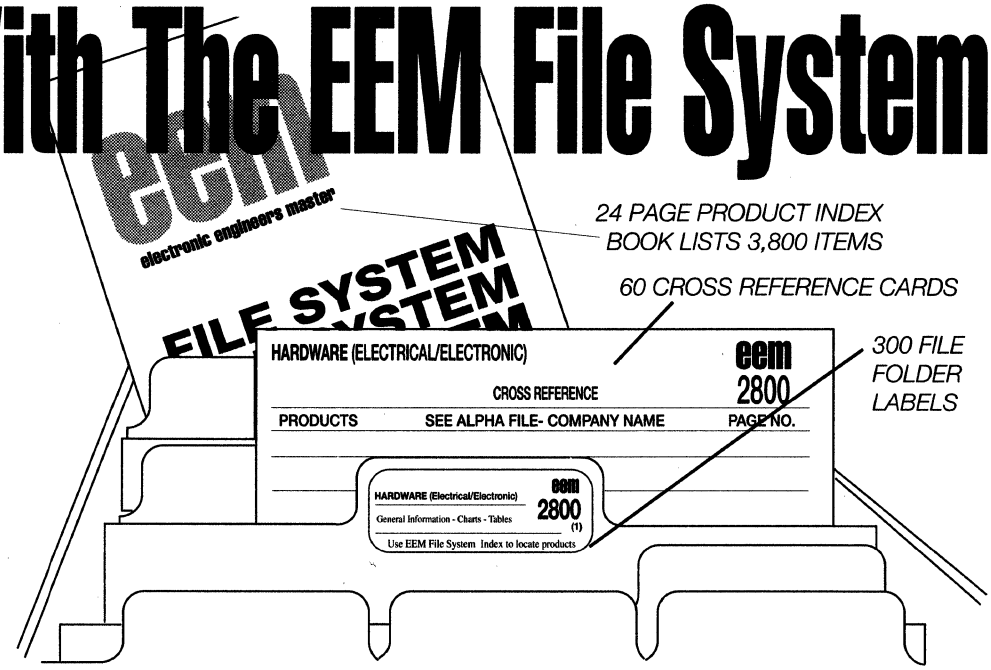
V
VAC volts (of) alternating current
VAN value-added network
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency (30 kHz to 300 MHz)
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

Organize Your Files... With The EEM File System!



The EEM File System was developed 35 years ago to help you organize your catalog files the EEM way. The EEM File System follows the EEM cataloging system that organizes all electronic product information by the four-digit EEM Product Section Number. It puts an end to catalog clutter and filing frustration.

The EEM File System comes in one neat package:

Product Index Book - Tells you where to file information on each and every type of electronic product by generic product name and EEM Product Section Number.

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60 Cross Reference Cards - You'll never lose track of where you filed a catalog from a multi-product manufacturer.

With the EEM File System you can get organized and stay organized. You'll save countless hours of searching for elusive catalogs and data sheets. You'll be able to quickly find the catalog you need when you need it. The EEM File System is in everyday use in thousands of engineering and purchasing departments around the world. This proven, time-saving system belongs in your department!

The EEM File System is very affordable and easy to order...

- **Charge it to your VISA or MasterCard by calling toll-free 1-800-833-7138.**
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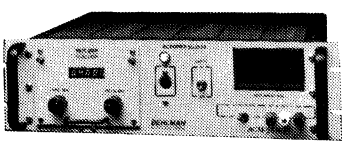
AC POWER

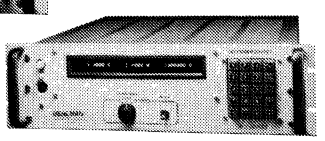
Designed for every need

When selecting an AC power source you're presented with difficult price/performance decisions. That's why Behlman manufactures a complete range of AC power supplies, offering unparalleled quality and dependability at every performance and price level. CE

INSTRUMENT-QUALITY AC POWER SOURCES



NOW AVAILABLE OPTION 100 FOR IEC TESTING



Behlman ACM and ACP Series instrument quality AC power sources provide cost-effective ways to enhance your capabilities for computer controlled or manual testing.

These highly efficient linear sources are available in 1Ø or 3Ø at power levels of 100VA to 9 kVA and greater. They are widely used in ATE systems, laboratories, production lines, test facilities, quality control and many other applications.

The ACM Series offers precision, manually controlled power. For computer controlled programmable applications there's our ACP Series with fully variable voltage and frequency. Specific events such as dropouts, brownouts and line surges can be simulated automatically, and measurements recorded via an IEEE-488 interface.

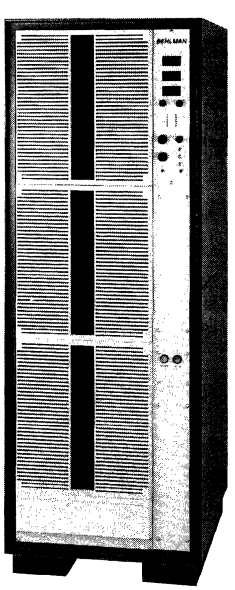
Optional Flicker Standard Impedance.

HIGH POWER FREQUENCY CONVERTERS

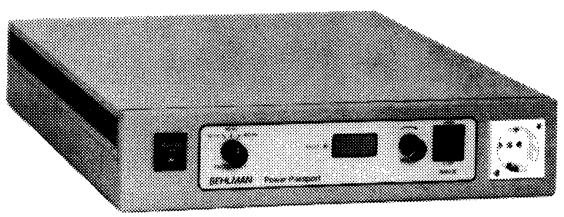
Behlman's PA Series frequency converters provide economical, high quality power up to 120 kVA for a wide range of applications in commercial and military aviation, marine, industrial and electronics.

The PA Series offers solid-state 45-2000 Hz power in fixed, variable and computer controlled models.

They're whisper quiet, requiring very little maintenance, and are far more efficient than rotary systems. The PA features a very small footprint, plus a built-in skid for easy transport. Plug-in modules prevent costly power shut downs, and permit easy expansion.



WORLD WIDE POWER ON YOUR BENCH

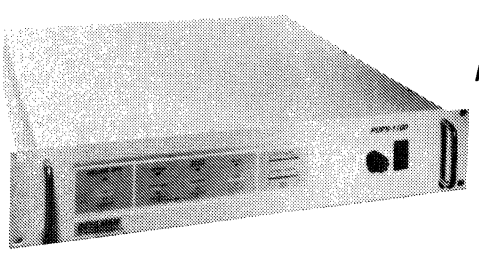


MODEL: P1350

Behlman's New *Power Passport* easily converts the 120VAC, 60Hz power to any single phase international power as well as shipboard or avionics power.
1350VA in a 3 1/2"H bench top unit.

RUGGED, INSTRUMENT-QUALITY UPS

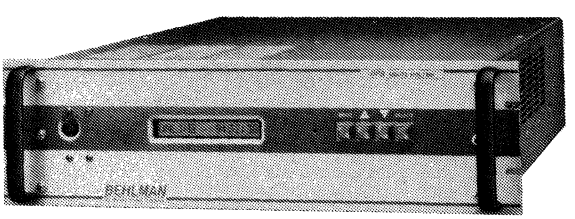
These rugged, compact units are ideal for process control, ATE, industrial computers, scientific instrumentation, telecommunications equipment and other power sensitive devices.



PUPS

Available in 650, 800, 1100 and 1500 VA models.

Behlman's PowerUPS Series delivers the greatest value in an uninterruptible power supply. This advanced, full feature UPS features digital microprocessor technology to provide true on-line full time power conditioning and fail safe equipment protection.



HBL

Behlman's HBL Series is a true on-line UPS, available in 1.5, 2, 3 and 5 kVA models, that continuously conditions incoming power, providing a high quality sine wave with very low distortion. Available in a ruggedized version and for 50/60 Hz conversion.

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BL SERIES
AC POWER SOURCE LOW COST AC POWER IN A COMPACT PACKAGE

APPLICATIONS

- Aerospace
- Motor Generator Replacements
- Power Supply Testing
- General Laboratory Support
- Motor Testing
- Transformer Testing
- Magnetics Testing
- Military System Diagnostics
- Missile Testing
- Electromechanical Testing
- Ground Support
- QC/QA, Reliability Testing

The BL Series by Behlman features fully adjustable frequency and voltage, and true RMS display of voltage and current and frequency. All can be accessed through IEEE-488 (Lab Windows Compatible) or RS232. Control can also be through 0-10VDC. The series features a unique overload protection scheme to provide protection without output distortion. Another feature is line drop compensation which eliminates the need for remote sensing.

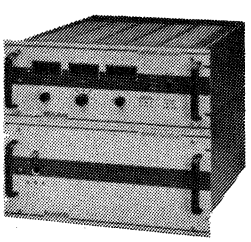
BL1350

In just 3½" of rack height and weighing less than 40 lbs., the BL1350 delivers 1350 VA of quality AC Power all for about half the cost of competitive models.

These units are stackable for additional power and can be used in a 3Ø configuration because they contain a PLL and have phase shifting capability.

Available with pf corrected input.

HIGH POWER BL MODELS 3Ø (3 kVA to 20 kVA) SINGLE Ø & SPLIT SINGLE PHASE (3 kVA to 12 kVA)



Very high power in compact sizes. Low cost per VA. Multipulse Input Transformer for low input current harmonics and high input pf. Available in any world input power configuration.

3 kVA models rack mount 10½" H

5, 6, 7 & 10 kVA models rack mount 15¾" H

12 & 20 kVA models rack cabinet 30.3" H

BLMT SERIES MOTOR TESTER (1350 VA, 3 kVA, 5 kVA & 10 kVA)

Motor friendly design offers the ability to drive motors with pure sinewaves, even during startup. Running currents are 40% higher than standard models (50% duty cycle). Capable of starting motors requiring up to 10 times the normal current rating during locked rotor starting conditions. The Motor Testers offer a "soft start" feature which reduces input service requirements and eliminates the need for hard restraints on motors during production testing.

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BL SERIES
AC POWER SOURCE LOW COST AC POWER IN A COMPACT PACKAGE

OPTIONS (ALL MODELS)
E Extended Frequency
I IEEE 488 Interface
L Locking Pots
S Slides

SPECIFICATIONS
INPUT
Voltage: (see ordering information).
Frequency: 47-440Hz. (pf model 45-63 Hz)
pf: pf model .98.

OUTPUT
Voltage: (see ordering information).
Current Crest Factor: 3:1
Frequency: 45-500Hz (Optional 45-1000Hz).
Line Regulation: ±0.1% for ±10% Line change.
Load Regulation: ±0.7% No Load to Full Load.
Power Factor: 100% of rated output into any power factor load.
Environmental: Operating temp. 0-55°C.

PROTECTIVE CIRCUITS
Input Protection: Fast acting main circuit breaker.
Constant Current Mode: Overload automatically causes voltage foldback to provide maximum current without distorting output waveform.
Thermal Protection: Internal temperature sensor prevents heat damage.
Short Circuit Protection: Electronically latches output open to protect load. Power restored by recycling circuit breaker.

CONTROL INPUTS
Voltage/Frequency: 0-10 volts DC programming—voltage/frequency.
External Sync: Synchronizes AC output with external input.

FRONT PANEL CONTROLS
Power On/Off circuit breaker.
Output On/Off toggle switch.
Frequency and amplitude control (optional locking controls).
Digital readout (3½ digits)—True RMS voltage/true RMS current/frequency.

ORDERING INFORMATION

MODEL#	INPUT VOLTAGE	OUTPUT VOLTAGE	DUAL RANGE	ISOLATED OUTPUT
BL1350A-1	115V	0-135V		
BL1350B-1	115V	0-135V 0-270V	✓	
BL1350C-1	115/230V	0-135V		✓
BL1350C-2	115/230V	0-135V 0-270V	✓	✓
BL1350pf	85-270V	0-135V 0-270V	✓	✓

OPTIONS
T O/P: 0-150 and 0-300, with B1 or C2
B Rubber Feet
J I/P: 100/200, 1Ø, with C1 or C2
H Cabinet Enclosure for 3 units
P Wiring for paralleling up to 3 units
W Wiring for 3Ø configuration

OUTPUT
Max Power: 1350VA
Efficiency: BL1350A-1 80%
All other models 70%
Max Current: 10 Amps 0-135V Range
5 Amps 0-270V Range
Distortion: 0.5% Maximum THD Typical.

MECHANICAL
19" Rack Mounted Chassis.
3.5" high, 22"deep.
Weight A-1 40 lbs. All others under 70 lbs.
Front panel binding post output and rear mounted barrier strips input and output.

ORDERING INFORMATION

MODEL#	OUTPUT		
	POWER	VOLTAGE	CURRENT (max)
BL3100	3KVA	0-135 1 phase	22 Amps
BL3200	3KVA	0-270 1 phase	11 Amps
BL3300	3KVA	0-135 L-N 3 phase	7.5 Amps/phase
BL5000	5KVA	0-135 L-N 3 phase	12.5 Amps/phase
BL6000	6KVA	0-270 1 phase	22 Amps
BL7000	7KVA	0-135 1 phase	52 Amps
BL10000	10KVA	0-135 L-N 3 phase	25 Amps/phase
BL12000	12KVA	0-270 1 phase	44 Amps
BL20000	20KVA	0-135 L-N 3 phase	50 Amps/phase

INPUT (ALL MODELS)
C-1: 120/208
C-2: 220/380
C-3: 277/480
C-4: 200 Delta
C-5: 346/600
C-6: 230/400
C-7: 240/415

Other inputs available.

OUTPUT OPTIONS:
0-300V L-N
* Add 7" Chassis
* T5 (BL5000)
* T10 (BL10000)
T 20 (BL20000)

Efficiency: 85-90%.
Distortion: 1.5% Maximum THD Typical.

ORDERING INFORMATION

MODEL#	INPUT VOLTAGE	OUTPUT VOLTAGE	DUAL RANGE	ISOLATED OUTPUT
BL1350A-1-MT	115V	0-135V		
BL1350B-1-MT	115V	0-135V 0-270V	✓	
BL1350C-1-MT	115/230V	0-135V		✓
BL1350C-2-MT	115/230V	0-135V 0-270V	✓	✓
BL3000-MT	*	0-135V		✓
BL5000-MT	*	0-135V		✓
BL10000-MT	*	0-135V		✓

Options, Efficiency and Distortion:
Same as for Non-MT models

*See models and input voltage for BL3000, BL5000 and BL10000

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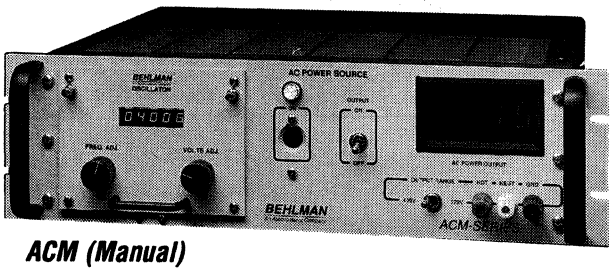
INSTRUMENT QUALITY LINEAR AC POWER SOURCES

ACP (Programmable)



ACM (Manual)

APPLICATIONS

- Aerospace
- Motor Generator Replacement
- Power Supply Testing
- General Laboratory Support
- Motor Testing
- Transformer Testing
- Magnetics Testing
- Military System Diagnostics
- Missile Testing
- Electromechanical Testing
- Ground Support
- QC/QA, Reliability Testing
- IEC Testing

MODEL INFORMATION

MODEL	19" RACK MOUNT PANEL HEIGHT	Rated Current Output/Phase 135V RANGE	270V RANGE	MAXIMUM POWER OUTPUT	MODEL	19" RACK MOUNT PANEL HEIGHT
Single Phase					**Single Phase**	
ACP-250	5.25"	2.5	1.3	335VA	ACM-250	5.25"
ACP-500	7.00"	5.0	2.5	675VA	ACM-500	5.25"
ACP-750	7.00"	7.5	3.8	1000VA	ACM-750	7.00"
ACP-1000	8.75"	10.0	5.0	1350VA	ACM-1000	8.75"
ACP-1500	14.00"	15.0	7.5	2025VA	ACM-1500	14.00"
ACP-2000	14.00"	20.0	10.0	2700VA	ACM-2000	14.00"
ACP-3000	21.00"	30.0	15.0	4050VA	ACM-3000	21.00"
Three Phase					**Three Phase**	
ACP-3X100	5.25"	1.0	0.5	400VA	ACM-3X100	5.25"
		2.5	1.3	1000VA	ACM-3X250	7.00"
ACP-3X350	14.00"	3.5	1.8	1425VA	ACM-3X350	8.75"
ACP-3X500	14.00"	5.0	2.5	2025VA	ACM-3X500	14.00"
ACP-3X750	14.00"	7.5	3.8	3050VA		
		10.0	5.0	4050VA	ACM-3X1000	28.00"
ACP-3X1500	33.25"	15.0	7.5	6075VA	ACM-3X1500	28.00"
ACP-3X2000	35.00"	20.0	10.0	8100VA	ACM-3X2000	35.00"
ACP-3X3000[1]	42.00"	30.0	15.0	12150VA	ACM-3X3000[1]	42.00"

[1] Includes cabinet, total height 51.3".

INPUT

Voltage:
Maximum Power Output: ≤ 2025 VA
115/230 VAC, ±10%, 1 Ø
Maximum Power Output: > 2025 VA
120/208 ±10%, 3 Ø
Frequency: 47-72Hz.

OUTPUT

Voltage: 0-135 or 0-270 VAC per Ø
Load Regulation: ±0.5% NL-FL
Current Crest Factor: 2:1
Frequency: 45-2500Hz
Power Factor: 100% rated output into any pf load
Line Regulation: ±0.1% for ±10% line change
Distortion to 2500 Hz: 0.5% (ACM), 1.0% ACP Max THD

OPTIONS

- Flicker Standard Impedance for IEC 1000-3-3 (555-3)
- Special Input and Output Voltages
- Paralleling for extra power
- Input frequency to 440 Hz
- IEC Testing
- External Sync
- 0-10 VDC external programming (ACM)
- Output frequency to 10 kHz
- Preprogrammed Waveforms for MIL-STD-704 & IEC 1000-4-11

FEATURES

- Electronic overload and short circuit protection with instantaneous automatic recovery.
- Very low EMI/RFI.
- Actual Measurement reported over IEEE-488 Bus and on front panel (ACP).
- Built-in Measurement capability eliminates need for external support equipment (ACP).
- Independent or Simultaneous control of 3 Ø voltages and phase angles (ACP).
- Microprocessor based, crystal referenced synthesized sine wave with .005% accuracy (ACP).
- I/O isolation.

NOW AVAILABLE WITH OPTION 100 FOR IEC TESTING

OPTIONAL FEATURES (ACP)

- Event programming simulates dropouts, transients and surges.
- PC controlled models with ARB and Harmonic Analysis.
- True Power and Power factor measurements.
- True RMS Measurements.

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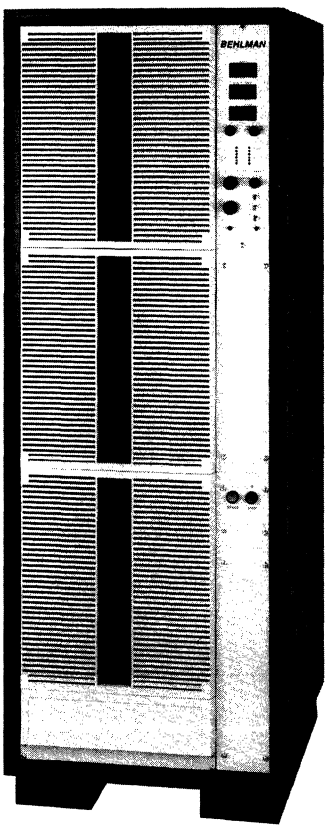
PA SERIES UP to 120kVA FREQUENCY CONVERTER



FEATURES

- Lowers operational cost. High efficiency of 88-90%.
- Small footprint saves up to 50% over the space of competitive units.
- Soft-start ramp-up eliminates input power line surges and the need for oversized utility service.
- Low input distortion using 36-phase rectification per MIL-STD-1399, Section 300.
- Self-diagnostics and module level replacement of electronics allow rapid and easy servicing.
- Redundant power circuits allow system operation in case of individual power device failure.
- Easy installation, no special connections.
- Workplace compatible with low audible noise.
- Precision output provides precisely controlled power into extremely complex loads.
- Very cost effective at all VA levels.
- Input isolation provided by power transformers.
- Versatile voltage ratings offer wide range of input and output combinations in Wye or Delta configurations.
- Optional IEEE-488 and/or RS232 interface allows user control and monitoring for remote applications.

APPLICATIONS

- Automatic test equipment.
- Computer programmable power.
- Facilities power.
- Avionics support testing, including PMG simulation.
- Motor generator replacements.
- 50Hz power requirements.
- 400Hz military power.
- Variable frequency testing, 45 to 2000 Hz.
- Flightline power.
- Electronic product burn-in and testing.
- Dock-side marine power.
- International power requirements.

ORDERING INFORMATION

MODEL #	RATED POWER	OUTPUT
PA30	30 kVA	1Ø or 3Ø
PA60	60 kVA	All Standard
PA90	90 kVA	World Voltages
PA120	120 kVA	

SPECIFICATIONS

INPUT

Voltage: All models are provided with a multi-tapped input transformer which accommodates most forms of 3-phase power (Specify when ordering).
Frequency: 47-63 Hz.
Current Distortion: per MIL-STD-1399, Section 300, (60, 90, & 120 kVA units).
Power Factor: 0.98 Typical.
Soft-Start Limits input surge currents on start-up.
Efficiency: Typically 88-90%.

OUTPUT

Power: Single and Three-Phase through 120kVA.
Voltage: Adjustable from 0 to 132 VAC L-N. Configurable in Wye or Delta outputs and in single phase. Higher voltages are also available.
Load Regulation: 0.25% typical
Line Drop Comp.: 0 to +10%.
Frequency: Fixed or variable frequencies from 45 to 2500Hz.
Repetitive Peak: 290% of nominal current.
Distortion: 0.5% THD. Linear Loads 45-500Hz typical.
Phase Separation: 120 degrees ±1 degree.
Load Imbalance: 100% load imbalance acceptable.

MECHANICAL

Dimensions: 48" or 78" x 27" x 36". Incorporates fork lift base.
Weight: 900 to 1800 lbs., depending on model.

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WORLD WIDE POWER ON YOUR BENCH OR IN YOUR TEST RACK

POWER PASSPORT AC SOURCE SPECIFICATONS

POWER 1350 VA

INPUT 120 VAC, ±10%, 47-440Hz
Supplied with North American line cord with NEMA 5-15 plug.

OUTPUT

Voltage: Dual range; 0-135 & 0-270 VAC, full isolation from input

Frequency: Switch selectable: 50, 60 or 400Hz

Current: 10 Amps from 0-135 V or 5 Amps from 0-270 V

Crest Factor: 3 : 1

Power Factor: 100% of rated output into any power factor load

Distortion: 1% Typ THD (measured at full load, 115V, 60Hz)

Load Regulation: ±1.0% No Load to Full Load

Line Regulation: ±0.1% for ±10% line change

MODEL P1350

Behlman's *Power Passport* delivers 1350 VA of clean, regulated AC power in a 3-1/2" high bench top unit, that easily converts to rack mount, for far less cost than competitive models.

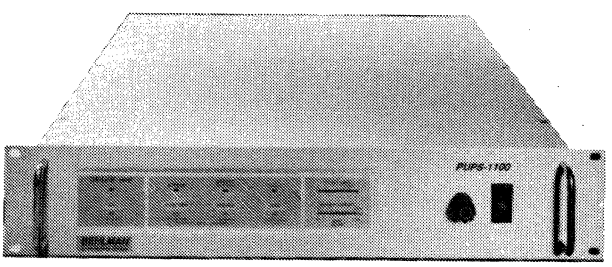
The *Power Passport* will simulate any world wide utility, aircraft and shipboard power.

UNINTERRUPTIBLE POWER SUPPLY

PowerUPS

FEATURES

- 650VA to 1100VA in only 3.5″ rack heights.
- New 1500 VA Model.
- True on-line design.
- Full time power conditioning.
- True voltage regulation. Brown out protection.
- Fault-tolerant, fail safe design.
- Extended battery options.
- DOS, Windows, Network and UNIX Software Interface and Shutdown.
- Also available in Horizontal/Desktop and vertical tower model.

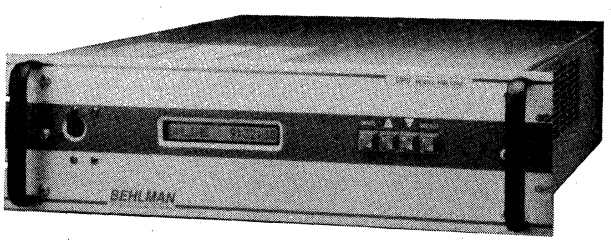


MODEL #	OUTPUT POWER VA/WATTS	OUTPUT CURRENT	WEIGHT-LBS. R	WEIGHT-LBS. V/H	TYPICAL RUN TIME
PUPS-650	650/433	5.6A	39	31	12 min.
PUPS-800	800/533	7.0A	39	31	9 min.
PUPS-1100	1100/733	10.0A	45	38	12 min.
PUPS-1500	1500/1000	12.5A	50	NA	12 min.

HBL Series

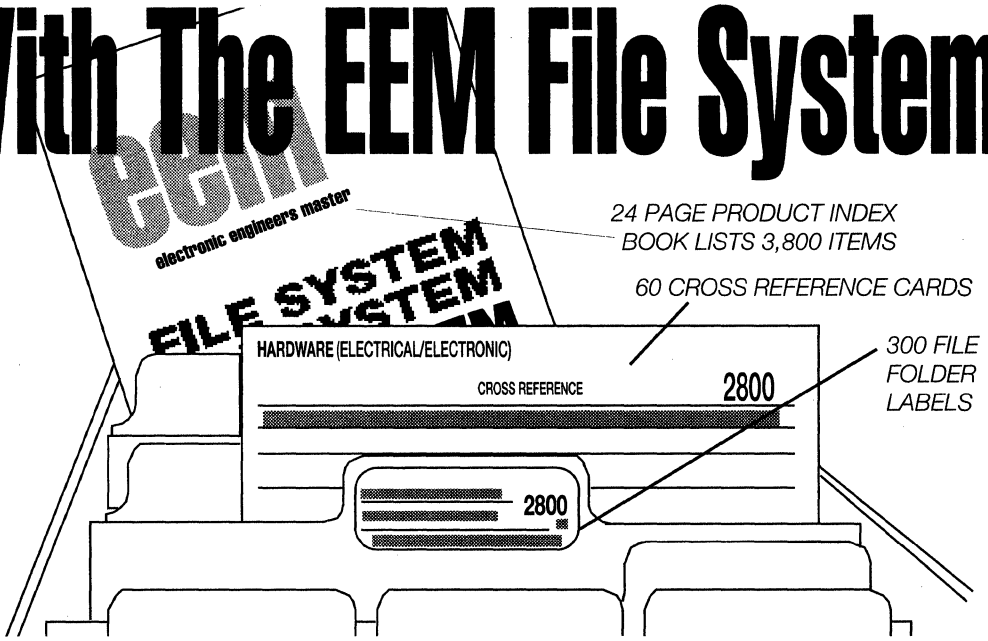
FEATURES

- 1500VA to 5000VA.
- Rugged, instrument quality, rack mountable.
- True on-line UPS.
- Delivers high quality sine wave with very low distortion.
- High peak current to drive switching power supplies.
- Control and monitoring through front panel keys and display, and through RS232.
- 50/60 Hz conversion.



MODEL #	OUTPUT POWER	OUTPUT CURRENT @ 115V/230V	RUN TIME FULL LOAD
HBL 1500	1500 VA	12.5/6.25	15 min.
HBL 2000	2000 VA	17.0/8.5	20 min.
HBL 3000	3000 VA	26.0/13.0	12 min.
HBL 5000	5000 VA	44.0/22.0	7 min.

Organize Your Files... With The EEM File System!



The EEM File System was developed 36 years ago to help you organize your catalog files the EEM way. The EEM File System follows the EEM cataloging system that organizes all electronic product information by the four-digit EEM Product Section Number. It puts an end to catalog clutter and filing frustration.

The EEM File System comes in one neat package:

Product Index Book - Tells you where to file information on each and every type of electronic product by generic product name and EEM Product Section Number.

300 File Folder Labels - Pressure sensitive labels are pre-printed with product names and EEM Product Section Number. You apply the labels to as many, or as few, file folders as you choose.

60 Cross Reference Cards - You'll never lose track of where you filed a catalog from a multi-product manufacturer.

With the EEM File System you can get organized and stay organized. You'll save countless hours of searching for elusive catalogs and data sheets. You'll be able to quickly find the catalog you need when you need it. The EEM File System is in everyday use in thousands of engineering and purchasing departments around the world. This proven, time-saving system belongs in your department!

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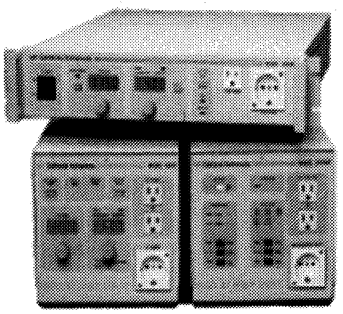
California Instruments

P, RP and WP Series - AC Sources / Frequency Converters



The P and WP Series are portable, lightweight frequency changers that can be used anywhere in the world to select any combination of standard line voltage and frequency. As such, this equipment is ideally suited to test products for use in other countries or as a source of known stable AC power anywhere in the world. USA and European sockets are provided right on the front panel to connect the load.
The RP Series uses a 19 inch wide rack mount chassis suitable for both ATE applications and bench use. The high efficiency and input power factor correction of these units allows them to be plugged in anywhere in the world. P and WP models are UL and CSA listed and all models carry the CE Mark. Available output power is either 800VA, 1000 VA or 1250 VA.

Model	Power ranges	Voltage	Max Current Low Vrange	Size & Weight
801RP	800 VA	135/270	6.0	A
1001WP	1000 VA	127/264	9.0	B
1001P	1000 VA	135/270	7.4	B
1251RP	1250 VA	135/270	9.2	A

Style	Height		Width		Depth		Weight	
	in.	mm	in.	mm	in.	mm	lb.	kg
A	3.5	89	16.8	427	22	560	34	15.4
B	8.25	210	8.5	216	18.3	464	30	13.6

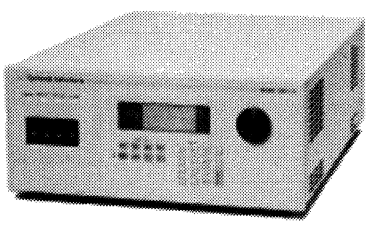
Programmable Controllers

The P and RP Series are fully programmable using rotary knobs. Frequency can be set between 16 Hz and 500 Hz and output voltage is available on two ranges from 0 to 135 V and 0 to 270 V. A user programmable current limit function protects the load from over current conditions. Frequency, Voltage and Current are displayed on large LCD's. For remote control applications, an optional RS232C serial interface is available on the 1001P and a combined RS232C and IEEE-488 is offered on the RP Series. Each interface option is supplied with a Windows™ control program for operation from a PC. The low cost, small size and reduced weight of the P and RP Series make them very suitable as a source of 400 Hz avionics power.

Manual Controller - 1001WP

The 1001WP unit offers simple front panel operation using clearly marked buttons to select voltage and frequency output parameters. Limit testing is built in using front controls to select ± 10 % of selected nominal line voltage and ± 3 Hz of selected line frequency.

i Series / iX Series - AC and DC Power / Arbitrary Waveforms / Power Analysis



The i and iX Series consists of very compact high output AC and DC power units that can be combined to provide up to 30 kVA of power in a small amount of space. Offering 5 kVA per unit in a height of only 7 inches, the i and iX Series represents the most compact AC power available today.

Configuration options include multiple unit single phase as well as multiple unit three phase systems for a power output level of 5 kVA, 10 kVA, 15kVA or 30 kVA. The i Series is available with a manual oscillator for applications requiring only basic frequency conversion. (iM models)

For more demanding applications, the programmable version offers a full set of features including Line Distortion Simulation (LDS), measurement functions and IEEE-488 or RS232C remote control. A Windows™ Graphical User Interface (CIGUI) is included with this power source for operation from a PC.

The iX controller version provides arbitrary waveform generation, built-in power analysis and waveform acquisition on all phases. These advanced controller features are accessible from both the front panel as well as RS232C or IEEE-488 interfaces.

Determine the output power level and the number of phases (1 or 3) required for your application. Select the controller type, either manual or programmable (i or iX). Select the correct model number from the table below.

Model[1]	Controller Suffix	Output Power at 35° C	Phases	Phase mode	Progr, Z	Current Rating 135 V range A rms	A peak[2]	Amps/phase 3ø mode	Size & Weight[3]
3001	i, iX or iM	3000 VA	1		iX only	22	110	n/a	A
5001	i, iX or iM	5000 VA	1		iX only	37	110	n/a	A
10001	i, iX or iM	10,000 VA	1			74	220	n/a	B
15001	i, iX or iM	15,000 VA	1			111	330	n/a	C
15003	i, iX or iM	15,000 VA	1 or 3	√	iX only	111	330	37	C
30003	iX only	30,000 VA	3			74 / ø	220 / ø	74	D

Notes: 1 All models are factory configured 2 Peak inrush current capability. (non-repetitive) 3 See Mechanical specification table

Line Input Configuration

The i, iX and iM Series can be factory configured for two types of Line input modes:

- 240 ±10% Volt L-N Standard (for 3001 models only)
- 208-240 ±10% Volt L-L Standard
- 400-480 ±10% Volt. L-L Option -400

Three phase input modes are 4 wire including ground or 3 phase Delta (Δ) 3 wire.

Style	Height		Width		Depth		Weight	
	in.	mm	in.	mm	in.	mm	lb.	kg
A	7	178	19	483	24	610	61	28
B	14	356	19	483	24	610	122	56
C	21	534	19	483	24	610	183	84
D	42	1068	19	483	24	610	244	112

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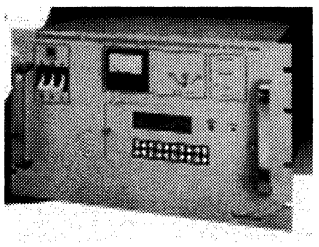
California Instruments

L Series / iL Series Precision AC Power Sources



The L and iL Series Precision AC Power Sources consist of a range of models offering output power levels between 833 VA and 15 kVA. Using the latest power electronics technology, these units provide compact, precise AC power outputs in single or three phase configurations. L Series units can be manually controlled using the -M option, or operated under computer control using one of the -P, -PT or -HGA controller options. Specify the controller option required when ordering. Units equipped with -P, -PT or -HGA controller options also offer sophisticated measurement functions.

Select the AC Amplifier model that best meets your output power level needs. Then select the appropriate controller type from the controller table. L-Series AC Power sources can be equipped with any one of four different controller types. The iL Series always includes an arbitrary waveform controller. If a programmable controller is used, a Windows™ control program is included.

Model	Output Power at 35° C[1]	Phase[2]	Current Rating @ 135 V range A rms	A peak[3]	A peak[4]	Amps/phase 3 phase	Size	Weight
751L	833 VA	1	6.1	13.8	15	n/a	5.25" x 19" x 23"	85 lb
1501L	1667 VA	1	12.3	27.8	30	n/a	133 x 483 x 584 mm	38.3
1503L	1667 VA	3	12.3	27.8	30	4.1		
2001L	2000 VA	1	14.8	55.6	60	n/a		
2750L	3000 VA	1 or 3	22.2	83.3	90	7.4	10.5" x 19" x 23"	175 lb
3000iL	3000 VA	1 or 3	20	120	120	6.6	267 x 483 x 584 mm	97.2 Kg
4500iL	4500 VA	1 or 3	30	120	120	10		
4500L	5000 VA	1 or 3	37	83.3	90	12.3		
4801iL	4800 VA	1	32	96	96	12.3		
6000L	6000 VA	1 or 3	44.4	157.4	170	14.8		
9000L	10,000 VA	1 or 3	74	166.7	180	24.7	21" x 19" x 23"	350 lb
12000L	12,000 VA	1 or 3	90	314.8	340	30	533 x 483 x 584 mm	158 Kg
13500L	15,000 VA	1 or 3	111.2	250	270	37	31.5" x 19" x 23"	525 lb

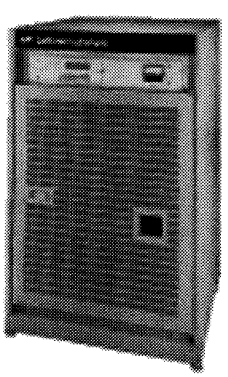
Notes: 1 Derate power by 10% for operation at 50° C ambient or when using the -UP option
2 1 or 3 phase systems are factory configured unless the "MODE" option is specified
3 Repetitive peak current capability
4 Non repetitive peak inrush current capability

Controller Selection Table[1]:

Specification	Programmable -P	Programmable -PT	-HGA	Manual -M
Type	Programmable controller	Fast Transient controller	Harmonic Generation and Analysis	Manual control oscillator
Frequency Range	45 Hz to 5 kHz (some models 2 kHz or 440 Hz)	45 to 550 Hz 6000L, 12000L: 45 to 440 Hz	45 Hz - 66 Hz	45 Hz to 5 kHz (some models 2 kHz or 440 Hz)
Measurements	Vrms, Arms, F, VA, W, phase, PF	Vrms, Arms, F, VA, W, phase, PF	Same as -PT plus harmonics volt and current up to 50th harmonic	

Note 1 One of these four controller types must be specified when ordering a L Series power source

FCS Series High Power AC Systems



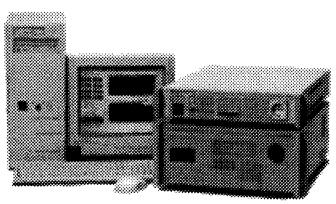
The FCS Series provides single or three phase output power. Used primarily for facility wide AC power delivery or high power test applications. Full power is available at power factors from 0 to 1. FCS systems come in a compact, low center of gravity cabinet on casters that can be moved around easily to different locations. Using a highly efficient pulse width modulation DC/DC converter design, the FCS series delivers more power with higher efficiency than comparable AC power systems.
Refer to L Series section above for controller options.

FCS Series Model Number Selection Table

Model	Output Power	Phase	Current @ 135V A rms	A peak	3 ø Amps
FCS-18[1]	18 kVA	1 or 3	133	375	44.4
FCS-36	36 kVA	1 or 3	266	750	88.8
FCS-54	54 kVA	1 or 3	400	1125	133

Note 1: For lower power, refer to i Series and L Series section

Application Specific Systems



IEC Compliance Testing CTS Series

California Instruments offers several application specific test systems. Notably, the Compliance Test System is a complete turn-key IEC test system for IEC 1000-3-2 harmonics and IEC 1000-3-3 flicker testing available in single and three phase configurations.

AC Motor Testing - MTS Series

MTS Series systems are used for testing AC motors and variable speed (ASD) motor drive controllers. Contact California Instruments for details.

CTS Series Model Number Selection Table

Model	Output Power	Source Model	No of Phases	IEC 1000-4
PACS-1		n/a	1	
1251RP-CTS	1250 VA	1251RP	1	
3001iX-CTS	3000 VA	3001iX	1	11,13,14,28
5001iX-CTS	5000 VA	5001iX	1	11,13,14,28
PACS-3		n/a	3	
15003iX-CTS	15,000 VA	15003iX	3	11,13,14,28

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FOR PERSONAL COMPUTERS, PERIPHERALS AND WORK STATIONS

This attractive new line of Line-Interactive Standby UPS Systems use the latest field-proven circuitry design for maximum reliability. Options include additional run-time capability and advanced RUPS Software.

Model	VA Rating	Run Time	Dimensions
CL-250A	250 VA	5-15 mins.	9.7 x 11 x 2.2
CL-500A	500 VA	5-15 mins.	9.7 x 11 x 2.2
CT-750A	750 VA	5-15 mins.	14 x 3.75 x 6.3
CT-1200A	1200 VA	10-20 mins.	18.1 x 5.6 x 7.5
DESIRE 325	325 VA	5-15 mins.	9.7 x 11 x 2.2
DESIRE 500	500 VA	5-15 mins.	9.7 x 11 x 2.2

PRICE: As low as $85 for 250 VA unit, only $302 for 1200 VA unit (multiple-quantity purchases)

TRUE ON-LINE UPS

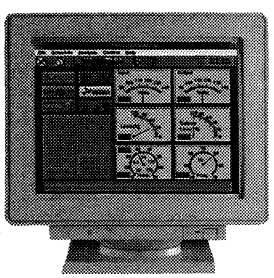
FOR PERSONAL COMPUTERS, PERIPHERALS WORK STATIONS & ELECTRONIC EQUIPMENT.

These high-quality units offer many advanced features at very competitive prices. Options include available rack mount configuration, additional run-time capability, and ruggedization for military applications.

Model	VA Rating	Run Time	Dimensions
CON-1K	1.0 KVA	5-12 mins.	17 x 5.5 x 7.5
CON 1-2K	2.0 KVA	5-12 mins.	19 x 7.3 x 9
CON-3K	3.0 KVA	8-18 mins.	18.1 x 7.5 x 17.7
CON-3.75K	3.75 KVA	15-30 mins.	27 x 9 x 22.75
CON-5K	5.0 KVA	8-25 mins.	27 x 9 x 22.75
CON-6.75K	6.75 KVA	5-12 mins.	13.4 x 18.9 x 33.3
CON-10K	10.0 KVA	10-18 mins.	13.4 x 18.9 x 33.3

PRICE: As low as $715 for multiple quantity purchases (1000 VA)

SMART UPS SOFTWARE - POWER BOSS



"Power Boss" provides complete On-Screen power management to UPS and computer system

- Smart UPS power monitoring systems
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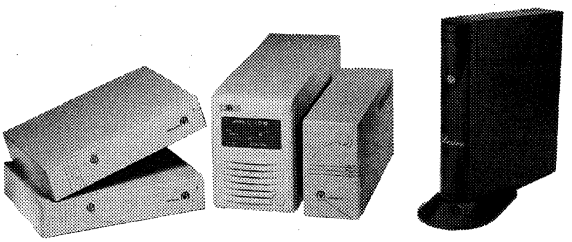
- All history records in memory
- Auto orderly shutdown for computer & UPS
- Multi-server support
- SNMP MIB II support
- Auto file save even without filename preset
- Scheduled switch on/off daily or weekly
- All operating systems available

HIGH QUALITY AT A LOW COST

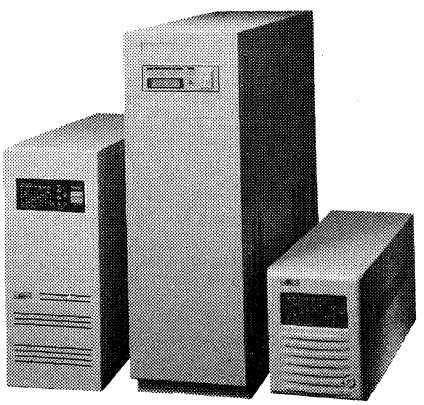
CL-SERIES **CT-SERIES** **DESIRE SERIES**



FEATURES INCLUDE:

- Automatic voltage regulation
- Complete transient protection
- Smart RS232 communication capabilities
- Both visual and audio alarms
- Available in 120 VAC / 60 Hz and 220 VAC / 50 Hz

RELIABLE PURE SINEWAVE OUTPUT



FEATURES INCLUDE:

- True on-line sinewave output
- Complete transient protection
- Smart RS232 communication capabilities
- Advanced microprocessor design
- Solid-state transfer switch
- Available in 120 VAC / 60 Hz and 220 VAC / 50 Hz

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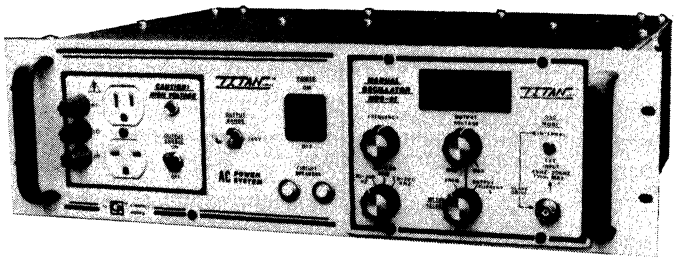

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HIGH PEAK CURRENT UNITS AVAILABLE NOW!

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GENERAL:

- Ideal for operating or testing avionics, synchros, gyros, triac and SCR phase controllers, motors, fans, transducers, shaker tables, transformers, power supplies, relays, AC line-operated equipment for either foreign or domestic use; or any other system requiring a precision AC power source.
- Conveniently designed and small enough for easy use on either bench-top or fixed rack-mount installations.
- 70%-82% efficiency *across the full output voltage range* means low power consumption and cool operation at *any* output level.
- Comprehensive "soft-start" circuitry removes all supply-line and power supply output current and voltage surges.
- Whisper quiet operation.
- High power to weight ratio, results in excellent portability and decreased freight costs.
- Lightest and most efficient AC power source on the market today.
- Latest amplifier technology using "Pulse Width Modulation" (PWM) and patented, thick-film, power hybrid circuitry.

INTERFACE:

- Full digital metering of frequency, voltage, and current.
- Use internal sinewave oscillator or external input source.
- Convenient, front panel mounted 130V/260V voltage range switch, three-way binding posts and standard NEMA AC receptacles.
- Inputs and outputs both completely isolated and floating with respect to ground.

OUTPUT CAPABILITY:

- 165 VA, 500 VA, 1 KVA, 2 KVA, 3 KVA, 4 KVA, 5 KVA, and 6 KVA systems available.
- Use multiple 1 KVA mainframes with single master oscillator for power up to 6 KVA.
- Bandwidth: usable 45 Hz-20 KHz, full output 45 Hz-15 KHz.
- Stable, full output voltage and current without derating into *any* reactive load with power factor from unity to zero, leading or lagging.
- Full-current output at *any* output voltage with *no* confusing derating curves.
- Low sinewave distortion, excellent load and line regulation.
- High peak current rated units available.

PROTECTION:

- Output is completely overload and short-circuit-proof, with automatic and smooth recovery.
- Unit can operate safely and continuously into *any* type of symetrical AC load without derating, overheating, or shutdown.
- In the event of an internal fault, a self-diagnostic fault-isolation system will completely shut the unit down and prevent any catastrophic failures.
- Thermal protection will shut down unit if ventillation is choked off.

SERVICE:

- Totally modular design allows for easy service, if required.
- Immediate Availability.
- One year warranty.

COMPARE OUR SPECS *

MODEL	DESCRIPTION	MINIMUM OUTPUT		SIZE•INCHES			WT. LBS.	*PRICE*
		VOLTS•RMS	AMPS•RMS	H	W	D		
MAC-01	1 KVA MAINFRAME	0→130/260	8.0/4.0	5.25	19	13.5	56	$2,250
MAC-02	500 VA MAINFRAME	0→130/260	4.0/2.0	5.25	19	13.5	38	$1,450
MAC-03	165 VA MAINFRAME	0→130/260	1.4/0.7	5.25	19	13.5	27	$1,050
MOS-01	Precision 20 Hz-20 KHz sinewave oscillator with digital readout of frequency, voltage, and current. Also accepts external inputs and drives additional mainframes through EIM-01.			6.7" x 5.0" FRONT PANEL PLUG-IN			1.0	$ 400
EIM-01	External input module with level control and BNC input. Can slave additional mainframes from MOS-01 or SG-100 oscillators.						.5	$ 70
SG-100	RS-232 Buss, DC-VCO, or manual controlled sine/square wave synthesized oscillator.			5.1	9.3	10.2	3.5	$ 795

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LT SERIES - MD SERIES - HV SERIES

Uninterruptible Power Systems by Controlled Power Company provide 100% power protection for mission critical computer applications. These applications are LAN systems, massive WAN systems, midrange and mainframe computers, all of which have become a focal point of operations. Each of these systems require hardware protection from power line disturbances. Managers of these systems must protect valuable data from utility power loss.

Controlled Power company offers a wide range of power expandable sizes. Each product size has been designed for compatibility and ease of installation with today's computer systems and their environments. Future computer system growth is accommodated through easily installed hardware and software option upgrades.

Controlled Power Company ... Solutions for electrical power problems since 1968.

SPECIFICATIONS

- **Power Output**
  Rated for computer type loads with switch mode power supplies that represent power factor of 0.7

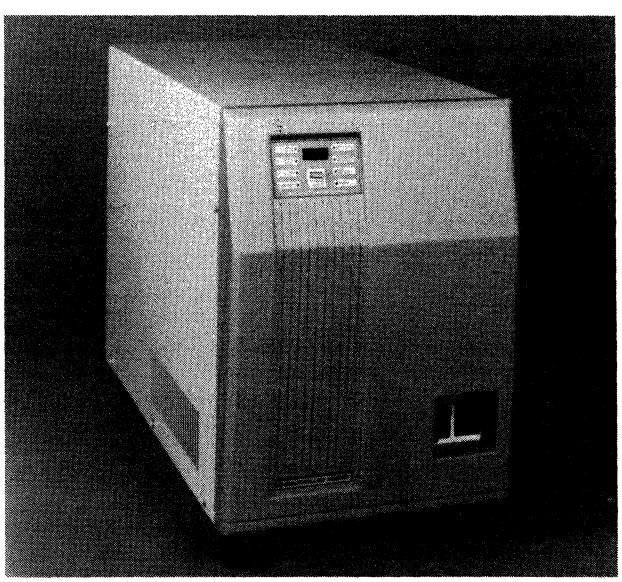
  LT Series - 700 VA to 2.1 KVA,
  MD Series - 3.1 KVA to 7.5 KVA
  HV Series - 7.5 KVA to 25 KVA

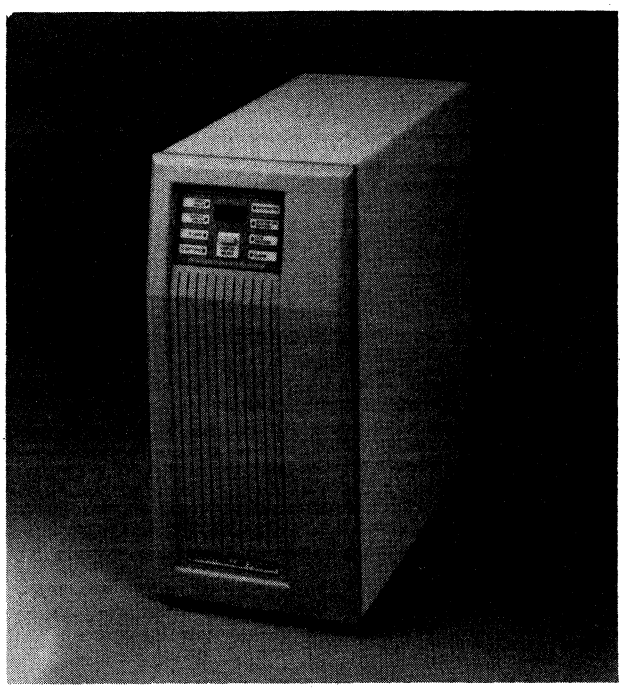
- **Line voltage regulation**
  Output voltage ±3% with input voltage from 0% to +110% of nominal. Uses "Fuzzy Ranging" to optimize usable input line voltage without use of battery power. Range without battery consumption to 61% of nominal input voltage. Fuzzy Ranging saves valuable battery back-up and improves battery life.

- **Load regulation**
  Output voltage ±3% when output is taken from no load to full load

- **Combined line and load regulation**
  Meets Computer Business Equipment Manufacturer's Association (CBEMA) standards under any line or load condition

- **Response to Non-linear loading**
  K factor rated - K 30 or better





- **Lightning and surge protection**
  Exceeds lightning and surge protection tests established by ANSI/IEEE C62.42-45 with more than 3000:1 attenuation

- **Common-mode noise attention:** 120 dB

- **Transverse-mode noise attenuation:** 70 dB

- **Power factor**
  Self correcting to > .95 (approaching unity), meets FAA-G-201e power factor specifications

- **Harmonic attenuation**
  Load generated harmonics are attenuated 400% at the input

- **Communications Interface**
  Status and alarm RS/232 port used for data protection and automatic unattended shutdown. Full duplex ASCII, RS/232 serial port available for remote system status monitoring and customer programming of system operating conditions.

- **Input/Output Voltage**
  LT & MD Series - Input Voltage 120/208/240 VAC at 60 HZ, 220 VAC at 50 HZ. Output voltage 120 or 120/208 or 120/240 VAC at 60 HZ. 220 or 110/220 at 50 HZ

  HV Series - Input Voltage 208/240 VAC at 60 HZ, 220 VAC at 50 HZ. Output Voltage 120/208 and 120/240 at 60 HZ. 220/110 at 50 HZ.

- **Reliability MTBF**
  Total system - 100,000 hours MIL Spec standard 217E
  Transformer - 200,000 hours
  Battery - 5 year projected life, 10 year available

- **Operating temperature**
  0 to 40 degrees celsius

- **Safety**
  UL listed 1778 standard for UPS equipment, CSA certified

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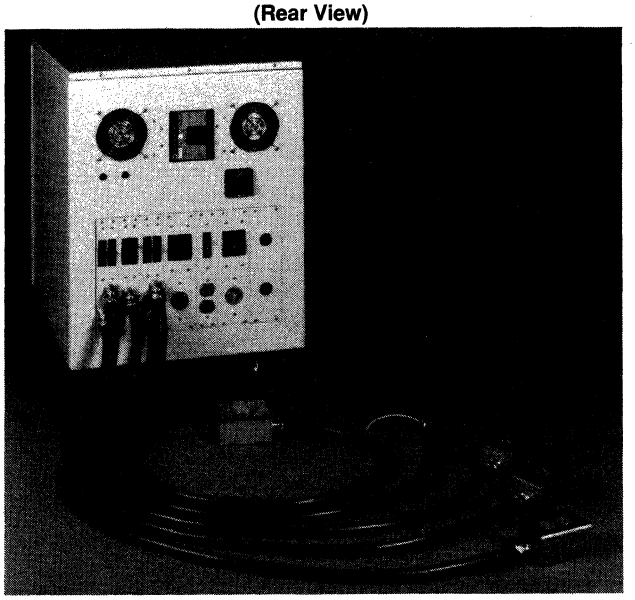
SERIES 700A POWER LINE CONDITIONER
Now available with K factor rating

The Power Processor Power Line Conditioners protect sensitive electronic equipment loads from electrical utility AC power line disturbances. These compact, highly efficient models correct for power surges and sags by automatically regulating output voltage to within ±5.5% quickly and completely within one AC cycle... even when the raw utility sinewave fluctuates +10% to -40%. For protection against transient noise impulses, units include a multi-shielded Max-E-Isolation Transformer with primary transient voltage suppression and secondary mounted electronic noise filter circuits. The Power Processor is available in single and three phase sizes. Units can be configured with output branch circuit distribution and other value added options that increase overall cost effectiveness to install and operate.

kVa	Phase	Output Distribution	Cabinet Dimensions
5, 8 10,15,20 25	Single	Patch Panels	21.5"W x 29"D x 30"H
6,10,15	Three	Patch Panels	21.5"W x 29"D x 30"H
25, 30	Three	Patch Panels	21.5"W x 29"D x 44"H
45, 50 75, 100 125, 150	Three	Hard Wired	45"W x 29"d x 44"H
225, 300, 500	Three	Hard Wired	56"W x 41.5"D x 77"H

Input voltages available are: 208, 240, 480, 600
Output voltage for single phase units: 120/240
Output voltage for three phase units: 208/120 wye

Commercial Style Enclosure (Rear View)



POWER SALES NETWORK
1-800-521-4792
POWER INFORMATION CENTER
1-800-642-9624 FAX 1-800-642-9625

SPECIFICATIONS:

Standard Regulation:

Input Line	Typical Output Line	Maximum Output Line
+10%, -20%	±2.5%	±3%

Optional Extended Regulation Range:

Input Line	Typical Output Line	Maximum Output Line
+10%, -40%	±5.5%	±6%

- **Load Regulation:** -2% maximum from no load to full load
- **Response Time:** 1/4 cycle
- **Correction Time:** 1 cycle for 100% correction
- **Efficiency:** 95% to 97% typical
- **Operating Frequency:** 60 Hertz ±3 Hz, or 50 hertz ± 3 Hz
- **Operating Temperature:** 0° to 40°C
- **Transverse Mode Noise attenuation**
  3 db down to 1000 Hertz, 40 dB per decade to well below 50 dB with resistive load.
- **Common Mode Noise attenuation:** 140 dB
- **Audible Noise:** 40 dB to 50 dB depending on size
- **Technology**
  Microprocessor based, zero current switching, seven tap system
- **Overload Rating**
  500% for one cycle, 200% for 10 seconds
- **Load power factor range**
  0.6 leading to 0.6 lagging
- **Enclosure**
  NEMA Type 1, (industrial or commercial)
- **Safety**
  UL listed 1012 standard for power supplies, CSA certified

OPTIONAL EQUIPMENT

- Regulator bypass switch
- Branch circuit cables with receptacle termination
- Flush mounted output receptacles
- Branch circuit cables with field wired termination
- Over/Under voltage detector with auto or manual restart
- Others

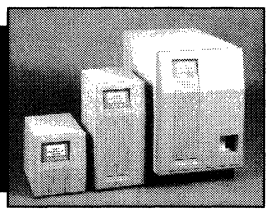
CONTROLLED POWER COMPANY

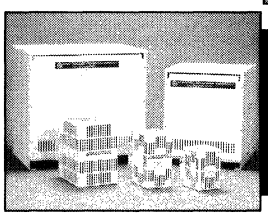
1955 STEPHENSON HIGHWAY, TROY, MICHIGAN 48083 1-248-528-3700 FAX 1-248-528-0411

Power Purifier
Series 800 Power Purification Systems

The Power Purifier is a state of the art ferroresonant isolation transformer. It's all passive electronic design provides unsurpassed reliability and power conditioning performance. The overall function of the Power Purifier is to receive raw, extremely polluted electrical power and purify it for use by sensitive electronic equipment. This highly reliable product is ideal for heavy industrial applications where high power equipment constantly interferes with your buildings electrical system. Use the Power Purifier where isolated, regulated, transient and noise free sinusoidal power is required. Consult factory for NEMA2 applications.

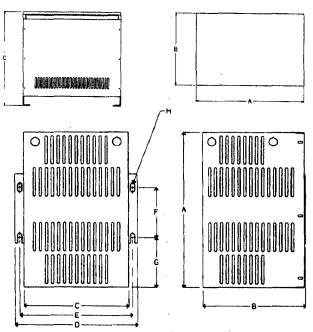
Series 800A
Commercial Applications
Single Phase -
250 VA to 15 KVA





Series 800PI
Industrial Applications
Single Phase -
250 VA to 25 KVA

- ***Line Voltage Regulation:*** *Under normal load conditions, output voltage will maintain constant to within ± 3% conditioning and purification with input voltage variations of +10% to –20%. In addition, usable voltages are available with an input of +10% to –40% with Variable Range Regulation (VRR).*
- ***Load Regulation:*** *The output voltage will maintain itself to within ± 3% with out put load variations of 0 to 100%.*
- ***Efficiency:*** *Full load efficiency is in the order of 92% for standard input and output voltage levels.*
- ***Operating Temperature:*** *–20°C to +40°C.*
- ***Distortion:*** *5% max. at full load.*
- ***Transverse Mode Noise Attenuation:*** *120 dB*
- ***Common Mode Noise Attentuation:*** *140 dB typical.*
- ***Audible Noise:*** *40 dB to 50 dB depending on size.*
- ***Operating Frequency:*** *60 Hertz (50 Hertz Models available).*



Power Purifier
Series 800PI Power Purification Systems - Industrial Applications

MODEL #	POWER RATING VA	*INPUT	*OUTPUT	WEIGHT POUNDS	DIMENSIONS							
					A	B	C	D	E	F	G	H
5DZAX-250-8PI	250	120/208/240/480	120	29	10.5	8	6.75	8.50	7.75	4.13	2.19	.31
5DZZX-500-8PI	500	120/208/240/480	120/208/240	52	14.0	10	7.25	9.00	8.13	5.63	3.06	.38
5DZZX-750-8PI	750	120/208/240/480	120/208/240	60	14.0	10	7.25	9.00	8.13	5.63	3.06	.38
5DZZX-1K-8PI	1000	120/208/240/480	120/208/240	82	14.0	10	7.25	9.00	8.13	5.63	3.06	.38
5DZZX-1.5K-8PI	1500	120/208/240/480	120/208/240	106	16.5	15	10.50	12.75	11.75	3.00	5.19	.44
5DZZX-2K-8PI	2000	120/280/240/480	120/208/240	125	16.5	15	10.50	12.75	11.75	3.88	5.19	.44
5DZZX-2.5K-8PI	2500	120/208/240/480	120/208/240	142	16.5	15	10.50	12.75	11.75	5.25	5.19	.44
5DZZX-3K-8PI	3000	120/208/240/480	120/208/240	157	16.5	15	10.50	12.75	11.75	5.25	5.19	.44
5DZZX-5K-8PI	5000	120/208/240/480	120/208/240	407	23.0	20	28.50					
5DMZX-8K-8PI	8000	208/240/480	120/208/240	465	23.0	20	28.50					
5DMZX-10K-8PI	10,000	208/240/480	120/208/240	507	23.0	20	28.50					
5DMZX-15K-8PI	15,000	208/240/480	120/208/240	830	35.0	25	39.50					
5DMZX-20K-8PI	20,000	208/240/480	120/208/240	950	35.0	25	39.50					
5DMZX-25K-8PI	25,000	208/240/480	120/208/240	1070	35.0	25	39.50					

**600 VAC input available* **220VAC output available*

Power Purifier Series 800A Power Purification Systems - Commercial Applications

MODEL #	VA RATING	WATT RATING	INPUT VOLTAGE	OUTPUT VOLTAGE NOTE 3	INPUT INTERFACE	OUTPUT INTERFACE	DIMENSIONS W x D x H	WEIGHT POUNDS
5AAX-250-8-A	250	250	120	120	5-15P	2-5-20R	8.5 x 12.75 x 9.5	29
5AAX-500-8-A	500	400	120	120	5-15P	4-5-20R	8.5 x 12.75 x 9.5	32
5AAX-700-8-A	700	500	120	120	5-15P	4-5-20R	8.5 x 12.75 x 9.5	35
5AAX-850-8-A	850	600	120	120	5-15P	4-5-20R	8.5 x 12.75 x 9.5	37
5AAX-1K-8-A	1,000	700	120	120	5-15P	4-5-20R	8.5 x 12.75 x 17.5	46
5AAX-1.6K-8-A	1,600	1,200	120	120	5-15P	4-5-20R	8.5 x 12.75 x 17.5	62
5AAX-2.1K-8-A	2,100	1,500	120	120	5-20P	4-5-20R	8.5 x 12.75 x 17.5	65
5AAX-2.5K-8-A	2,500	1,750	120	120	5-30P	4-5-20R	8.5 x 12.75 x 17.5	68
5AZX-3.5K-8-A	3,500	2,450	120	120/240	Note 1	4-5-20R	8.5 x 12.75 x 17.5	72
5MZX-3.5K-8-A	3,500	2,450	208/240	120/240	Note 1	4-5-20R	8.5 x 12.75 x 17.5	73
5MZX-5K-8-A	5,000	3,500	208/240	120/240	HW	Note 2	15 x 23.75 x 22.5	176
5MZX-7.5K-8-A	7,500	5,250	208/240	120/240	HW	Note 2	15 x 23.75 x 22.5	210
5MZX-10K-8-A	10,000	7,000	208/240	120/240	HW	Note 2	15 x 23.75 x 22.5	256
5MZX-15K-8-A	15,000	10,500	208/240	120/240	HW	Note 2	15 x 23.75 x 22.5	314

Note 1: *120V–5-50P. 208/240V–6-20P. HW- Denotes Hard Wired Input cords are 8ft. long.*

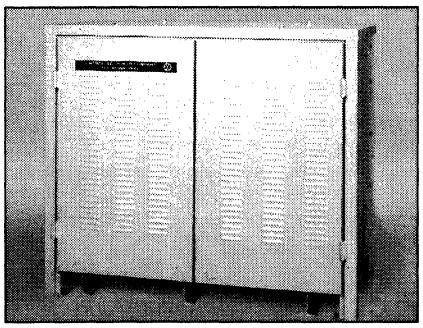
Note 2: *5 panels available for distribution. HW output utilizes 1 panel, other 4 panels can be used for receptacle interface or cabling. Panels available from 5 to 15 KVA.*

Note 3: *Load on 120 volt outputs from 3.5 to 15 KVA must be split, when there is a 120/240 output.*

CONTROLLED POWER COMPANY

1955 STEPHENSON HIGHWAY, TROY, MICHIGAN 48083 1-248-528-3700 FAX 1-248-528-0411

Power Commander
Series 900A Electronic Line Voltage Regulator



The overall function of the Power Commander is to maintain the output line voltage to very tight tolerances when the input voltage varies under or over nominal voltage. All systems are designed and manufactured to assure maximum reliability, flexibility, serviceability and performance.

The Power Commander delivers the most accurately regulated line voltage available to industry. They are manufactured in both single phase and three phase configurations, and are manufactured over a wide range of KVA sizes.

The Power Commander does not step voltage up or down by a large increment (as with a transformer). The output is regulated and is continuously adjustable over a +10% to -10% range.

Features and Benefits

High Reliability: *Exceeds 100,000 hours MTBF. Useful life over 20 years.*

Remote Sensing: *The voltage to be regulated can be sensed at the load to automatically compensate for line and wire losses to the load.*

Excellent Load Regulation: *Output voltage is regulated to within ±0.5%.*

Wide Input Voltage Range: *The output is regulated to within ±1% with input voltage variation of +10% to -25%.*

Filtered Output: *The output of the Power Commander is filtered to free the wave form of excessive harmonic content.*

No Moving Parts: *The Power Commander is electronically and magnetically regulated. There are no moving parts and virtually no preventive maintenance is required.*

Fast Response: *Response starts immediately and is complete in 5 cycles (under worst case conditions).*

Wide Range of Types Available: *The Power Commander is available in single phase and three phase configurations and in 50 Hertz or 60 Hertz models. In addition, a wide range of KVA sizes are available*

Single Phase, 60 Hertz - 15 KVA to 150 KVA

MODEL NUMBER	OUTPUT POWER RATING	NOMINAL INPUT & OUTPUT VOLTAGE (1)	INPUT VOLTAGE RANGE (2)	OUTPUT VOLTAGE ADJUSTABILITY	WEIGHT LBS (3)
3X-15K-9	15KVA	208/480	+10%, -25%	+10% to -10%	600
3X-25K-9	25KVA	208/480	+10%, -25%	+10% to -10%	830
3X-37.5K-9	37.5KVA	208/480	+10%, -25%	+10% to -10%	940
3X-50K-9	50KVA	208/480	+10%, -25%	+10% to -10%	1800
3X-75K-9	75KVA	208/480	+10%, -25%	+10% to -10%	2700
3X-100K-9	100KVA	208/480	+10%, -25%	+10% to -10%	3200
3X-150K-9	150KVA	208/480	+10%, -25%	+10% to -10%	3700

All regulators listed above are 60 Hertz and utilize Class H insulation. 50 Hertz units are available onrequest.
1. All units are hard wired to terminals at both the input and output.
2. The input voltage range is based on the output voltage setting. The output voltage is adjustable +10%, -10% of the rated nominal output by means of an internal potentiometer. Adjustment of voltage from nominal effects the regulation voltage range.
3. Shipping weights are approximate. Actual weights may be higher due to packing, crating or design variation. All dimensions are subject to change & should not be used for construction purposes.

Single Phase, 60 Hertz - 15 KVA to 150 KVA

MODEL NUMBER	OUTPUT POWER RATING	NOMINAL INPUT & OUTPUT VOLTAGE (1)	INPUT VOLTAGE RANGE (2)	OUTPUT VOLTAGE ADJUSTABILITY	WEIGHT LBS (3)
3X-15K-9	15KVA	120/208/277/480	+10%, -25%	+10% to -10%	600
3X-22.5K-9	22.5KVA	120/208/277/480	+10%, -25%	+10% to -10%	750
3X-30K-9	30KVA	120/208/277/480	+10%, -25%	+10% to -10%	900
3X-50K-9	45KVA	120/208/277/480	+10%, -25%	+10% to -10%	1700
3X-75K-9	75KVA	120/208/277/480	+10%, -25%	+10% to -10%	2200
3X-112.5K-9	112.5KVA	120/208/277/480	+10%, -25%	+10% to -10%	2900
3X-150K-9	150KVA	120/208/277/480	+10%, -25%	+10% to -10%	5000
3X-225K-9	225KVA	120/208/277/480	+10%, -25%	+10% to -10%	8000
3X-300K-9	300KVA	120/208/277/480	+10%, -25%	+10% to -10%	9200
3X-450K-9	450KVA	120/208/277/480	+10%, -25%	+10% to -10%	CF

Three Phase Delta Units available, consult factory. All regulators listed above are 60 Hertz and utilize Class H insulation. 50 Hertz units are available on request.
1. Same as Note 1 above.
2. The input voltage range is based on the output voltage setting. The output voltage is adjustable +10%, -20% of the rated nominal output by means of an internal potentiometer. Adjustment of voltage from nominal effects the regulation voltage range.
3. Same as Note 3 above.
CF = Consult Factory. All dimensions are subject to change and should not be used for construction purposes. Certified prints and dimensions furnished on request.
Note: All three phase systems require a neutral feeder conductor. If an input neutral is not available a Series 600 or Series 200 Transformer may be used to generate a neutral.

Specifications

Line Voltage Regulation: *Single Phase - 208V, 480V standard. 120V, 240V, 600V available.*

Three Phase: *208/120V, 480/277V standard. 240V, 600V available.*

Output Voltage: *Output voltage is the same as the input voltage. For step up or down utilize a Controlled Power Company Ultra-K Isolation Transformer.*

Regulation: *±1% for any combination of line variation, load variation, with +10% to -25% input variation.*

Audible Noise: *<60 dBA*

Remote Sensing: *Remote sensing available to compensate for series drop to the load.*

Overload: *Extended overload capability for down stream fault clearing.*

Frequency Range: *57 to 63 Hertz on 60 Hertz models. 48 to 52 Hertz on 50 Hertz models.*

Output Voltage Adjustment Range: *+10% to -10% adjustable with internally located potentiometer.*

Ambient Temperature: *0°C to 40°C. (32°F to 104°F).*

Efficiency: *95% typiclal.*

Power Factor: *Approximately 95% at full load.*

Cooling: *Convection or forced air depending on size.*

Harmonic Content: *5% THD. MAX.*

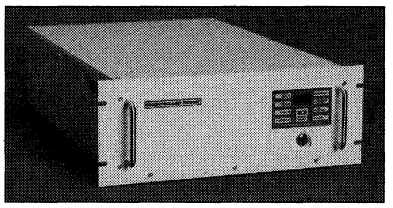
CONTROLLED POWER COMPANY

1955 STEPHENSON HIGHWAY, TROY, MICHIGAN 48083 1-248-528-3700 FAX 1-248-528-0411

LT-R Series Rack-Mount Uninterruptible Power Systems

PRODUCT FUNCTION AND DESCRIPTION

The overall function of the LT-R Series Rack-Mount Uninterruptible Power System (UPS) is to take polluted, fluctuating, and erratic electrical power that exists in many areas today and purify or replace it (in the case of complete power outages) with well regulated computer grade power.



LT-R Series - 700 VA to 2100 VA

The LT-R Series Uninterruptible Power System will maintain electrical power to the critical load from approximately 10 minutes to several hours. The backup time is a function of the amount of battery reserve that is purchased with the system.

PERFORMANCE SPECIFICATIONS

Overload Capability: 125% for ten minutes
Surge Capability: 150% of rated output without need of static bypass
Frequency Stability: ±0.2 Hz
Inner Winding Capacitance: 0.01 picofarads (primary to second coupling)
Common Mode: 120 dB
Transverse Mode: 70 dB (-3 dB at 1 kHz; -20 dB per decade)
Reactive Power Correction: Load at .6 pF corrected to >.95 at input (automatically self-correcting)
Fuzzy Ranging Plus™: Human-like decision making to optimize usable input line voltage without use of batteries. Range without battery consumption to 55% of nominal input voltage.

PRODUCT FEATURES

The product has many features designed to maximize back up time, protect your computer or critical load, and monitor all the key parameters of electrical power including a log of events. A few of the many features are:

- *No break - Continuous Power*
- *100% Power Conditioning All of the Time*
- *Compact Rugged Design*
- *Designed for Linear and Non-Linear Loads*
- *Removes Harmonic Current from Line*
- *Patented "Fuzzy Ranging" Control Extends Battery Life and Back Up Time*
- *High Efficiency*
- *Optional Extended Back Up Time*
- *SNMP (Simple Network Management Protocol) Ready*
- *High Performance "Real Time" Monitoring*
- *Dataguard Option for Automatic Unattended Shutdown of Your Computer*
- *Full Alarm Capability*
- *Full Communication Capability*

MODEL	BATTERY OPTION #	VA	WATTS	*FULL LOAD BATTERY RUNTIME	HALF LOAD BATTERY RUNTIME	UNIT WEIGHT (1)	BTU/HR	AUDIBLE NOISE
LT-R700	AR-120	700	500	17 mins	45 mins	82 lbs	256	45 dB
"	AR-121	700	500	33 mins	1 hr 30 mins	100 lbs	256	45 dB
"	AR-122	700	500	50 mins	2 hr 5 mins	116 lbs	256	45 dB
LT-R850	AR-120	850	600	14 mins	37 mins	82 lbs	307	47 dB
"	AR-121	850	600	26 mins	1 hr 6 mins	100 lbs	307	47 dB
"	AR-122	850	600	38 mins	1 hr 35 mins	116 lbs	307	47 dB
LT-R1000	AR-120	1000	700	11 mins	30 mins	87 lbs	358	49 dB
"	AR-121	1000	700	20 mins	53 mins	105 lbs	358	49 dB
"	AR-122	1000	700	31 mins	1 hr 17 mins	121 lbs	358	49 dB
LT-R1200	AR-121	1200	850	17 mins	45 mins	117 lbs	435	49 dB
"	AR-122	1200	850	21 mins	52 mins	133 lbs	435	49 dB
LT-R1400	AR-121	1400	1000	14 mins	37 mins	117 lbs	512	49 dB
"	AR-122	1400	1000	19 mins	48 mins	133 lbs	512	49 dB
LT-R1600	AR-121	1600	1200	9 mins	24 mins	117 lbs	561	50 dB
"	AR-122	1600	1200	15 mins	37 mins	133 lbs	561	50 dB
LT-R1800	AR-122	1800	1300	13 mins	33 mins	143 lbs	598	50 dB
LT-R2100	AR-122	2100	1500	11 mins	27 mins	143 lbs	670	50 dB

Expandability: The LT-R700 can be upgraded to 850 VA, the LT-R1200 can be upgraded to 1.6 KVA and the LT-R1800 can be upgraded to 2.1 KVA.
**Additional extended back up times available - Consult factory. Cabinet dimensions - 19" wide x 8.75" high x 20" deep. (1) Add approximately 25 lbs. to unit weight for shipping weight.*

Input voltages accepted by the LT-R Series include:

MODEL	INPUT VOLTS	AMPS	INPUT VOLTS	AMPS	INPUT VOLTS	AMPS
LT-R700	120	6	208	3.7	240	3.2
LT-R850	120	8	208	4.5	240	3.9
LT-R1000	120	9	208	5.3	240	4.6
LT-R1200	120	11	208	6.3	240	5.5
LT-R1400	120	12	208	7	240	6
LT-R1600	120	13	208	7.5	240	6.5
LT-R1800	120	14	208	8.1	240	7
LT-R2100	120	15	208	8.7	240	7.5

Output voltages from the LT-R Series include:

MODEL	OUTPUT VOLTS	AMPS	OUTPUT VOLTS	AMPS	OUTPUT VOLTS	AMPS
LT-R700	120	5.8	208	3.4	240	2.9
LT-R850	120	7.1	208	4.1	240	3.5
LT-R1000	120	8.3	208	4.8	240	4.2
LT-R1200	120	10	208	5.8	240	5
LT-R1400	120	11.7	208	6.7	240	5.8
LT-R1600	120	13.3	208	7.7	240	6.7
LT-R1800	120	15	208	8.7	240	7.5
LT-R2100	120	17.5	208	10.1	240	8.8

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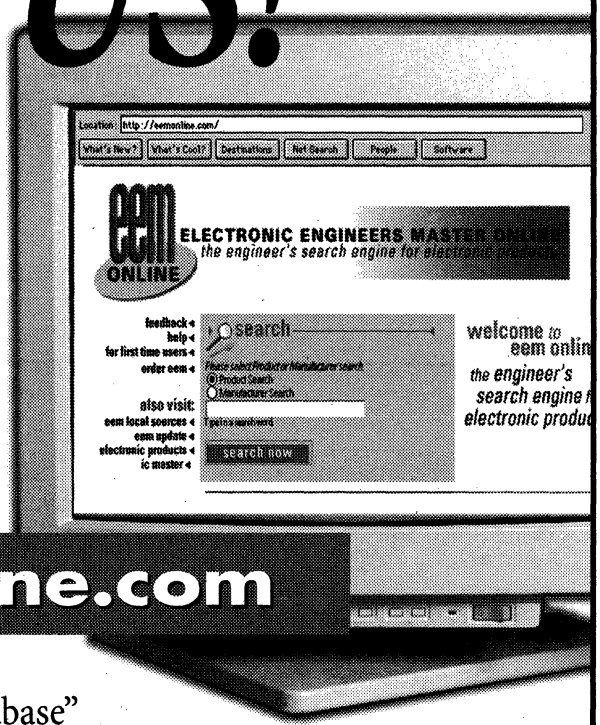

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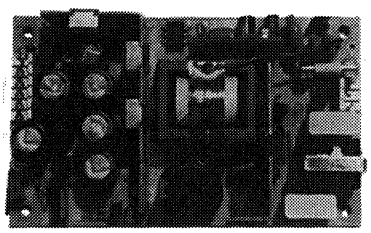
CONVERTER CONCEPTS™

40-60 Watt Small 1, 3 or 4 Output Economical Universal Input Switching Supplies



VLC40 Series

***NEW* 4 Output**

Now Available

Compact Size — 3 x 5 inches

Copper Heat Sinks

High Efficiency

Meet International and Domestic Safety Standards

On-Board EMI Filtering — Meets CISPR22 Level B

Fully Protected — Overvoltage and Short Circuit

Fixed Frequency

A family of cost-effective, rugged, universal input, fixed frequency, single, triple, and quad output, 40 watt, 3 x 5 inch printed circuit board, switching power supplies.

A wide range of output voltages are available. The second output delivers high peak currents for disk drives. All are UL recognized, CSA certified, TUV approved and meet CISPR22 Level B conducted emissions.

Each unit is burned in at elevated temperature and 100 percent tested.

Ideal for:
- *Disk drives*
- *Test equipment*
- *Peripherals*
- *Telecommunications*

■ SPECIFICATIONS ■

Electrical

Input:
Universal, 90 - 250 Vac,
47-440 Hz, and 125 - 350 Vdc.

Mating Connector (J1):
Molex 09-50-3031 with
2478 terminals.
Pin 1 Neutral, Pin 3 Line

Efficiency:
70% typical at full load

Turn-On Surge Current:
20A peak for 1/2 cycle at 250 Vac

Isolation:
Input to output - 4242 Vdc
(isolation components)
Input to earth gnd - 2121 Vdc
Output to chassis - 710 Vdc

Output Power:
40 Watts continuous, natural convection.
60 Watts with 20 CFM air flow.

Operating Frequency:
50kHz±10% fixed.

Hold-up Time:
16 ms typical, full load @ 115 Vac

Ripple & Noise:
1% pk-pk @ max load, 20 mHz bandwidth limit measured with a 10 inch twisted pair terminated with a 10 uf capacitor in parallel with a .1 uf capacitor and with primary and secondary grounds connected.

Short Circuit Protection:
Automatic recovery current limit.

Overvoltage Protection:
135% of max., V1 only.

Load Regulation:
V1 ±2%
V2 ±5%
V3 ±5%

Grounding: .250 in spade lug (J4)

Environmental

Operating Temperature Rating:
0°C to +40°C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space, moving air is recommended.

Storage Temperature:
-25°C to +85°C

Temperature Coefficient:
0.04%/°C

EMI:
Meets CISPR22 Level B

Warranty 1 year

Mechanical

Size:
5.0 in x 3.0 in x 1.25 in
(127mm x 76.2mm x 33mm)

Weight:
0.6 Lb. (0.27 Kgm)

Safety Approvals

UL1950, IEC950, CSA C22.2 No. 234 Level 3, TUV EN60950. Test Conditions: 100-240Vac, 47-63 Hz, 25°C Ambient

Ordering Information

Model Number	Output																			
	V1					V2					V3					V4				
	Volts	Amps				Volts	Amps				Volts	Amps				Volts	Amps			
		Min.	Max.	w/20 cfm	Peak		Min.	Max.	w/20 cfm	Peak		Min.	Max.	w/20 cfm	Peak		Min.	Max.	w/20 cfm	Peak
VLC40K3C33	+5	1	6	8	8															
VLC40K3F33	+12	0.3	3	4	4															
VLC40K3G33	+15	0.25	2.5	3.3	3.3															
VLC40K3J33	+24	0.15	1.5	2	2															
VLC40K3L33	+48	0.1	1.0	1.25	1.25															
VLC40K3CFT33	+5.1	0.5	3	5	7	+12	0.2	2	2	3	-12	0	0.5	0.5	0.5					
VLC40K3CFT33ZZD	+5.1	0.5	4	6	7	+12	0.0	0.5	0.5	0.5	-12	0	0.5	0.5	0.5					
VLC40K3CFR33	+5.1	0.5	3	5	7	+12	0.2	2	2	3	-5	0	0.5	0.5	0.5					
VLC40K3CGU33	+5.1	0.5	3	5	7	+15	0.2	2	2	3	-15	0	0.5	0.5	0.5					
VLC40K3CGU33ZZD	+5.1	0.5	4	6	7	+15	0.0	0.5	0.5	0.5	-15	0	0.5	0.5	0.5					
VLC40K3CFJR33	+5	0.9	3	5	7	+12	0.4	2.6	2.6	2.6	+24	0	1	1	1	-5	0	0.3	0.25	0.25

Peak output current duration less than 30 seconds with duty cycle less than 10%.
Total output power not to exceed 40W in convection or 60W with 20 cfm air flow.
Models with ZZD suffix have post regulated V2 and V3. Others have post regulated V3.

Other Output Voltages Available On Request

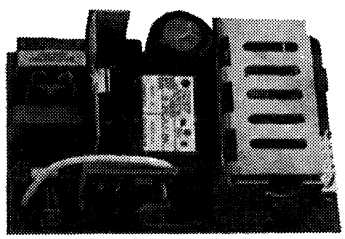
Output Connector (J2) Pin Assignments
(Mating connector — Molex 09-50-3061 with 2478 crimp terminals)

	V1	V2	V3	V4	Return
Single	1, 2, 3				4, 5, 6
Triple	2, 3	1	6		4, 5
Quad	2	1	5	6	3,4

CONVERTER CONCEPTS • 100 Industrial Parkway, Pardeeville, Wisconsin 53954 • Phone: (608) 429-3000 • FAX: (608) 429-9241

CONVERTER CONCEPTS™

60-80 Watt Small 1, 2 or 3 Output Economical Universal Input Switching Supplies



VLC60 Series

One, Two and Three Outputs

Compact Size — 3 x 5 inches

Copper Heat Sinks

High Efficiency

Meet International and Domestic Safety Standards

On-Board EMI Filtering — Meets CISPR22 Level B

Fully Protected — Overvoltage and Short Circuit

Fixed Frequency

A family of cost-effective, rugged, universal input, fixed frequency, single, double and triple output, 60 watt, 3 x 5 inch printed circuit board, switching power supplies.

A wide range of output voltages are available. The second output delivers high peak currents for disk drives. All are UL recognized, CSA certified, TUV approved and meet CISPR22 Level B conducted emissions.

Each unit is burned in at elevated temperature and 100 percent tested.

Ideal for:
•Disk drives •Test equipment
•Peripherals •Telecommunications

■ SPECIFICATIONS ■

Electrical

Input:
Universal, 90 - 250 Vac,
47-440 Hz, single phase
and 125 - 350 Vdc.

Mating Connector (J1):
Molex 09-50-3031 with
2478 terminals.
Pin 1 Neutral, Pin 3 Line

Efficiency:
70% typical at full load

Turn-On Surge Current:
20A peak for 1/2 cycle at 250 Vac

Isolation:
Input to output - 4242 Vdc
(isolation components)
Input to earth gnd - 2121 Vdc
Output to chassis - 710 Vdc

Output Power:
60 Watts continuous, natural convection.
80 Watts with 20 CFM air flow.

Operating Frequency:
50kHz±10% fixed.

Hold-up Time:
16 ms typical, full load @ 115 Vac

Ripple & Noise:
1% pk-pk @ max load, 20 mHz bandwidth limit measured with a 10 inch twisted pair terminated with a 10 uf capacitor in parallel with a .1 uf capacitor.

Short Circuit Protection:
Automatic recovery current limit.

Overvoltage Protection:
135% of max., V1 only.

Load Regulation:
V1 ±2%
V2 ±5%
V3 ±5%

Grounding:
.250 in spade lug (J4)

Environmental

Operating Temperature Rating:
0°C to +40°C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space, moving air is recommended.

Storage Temperature:
-25°C to +85°C

Temperature Coefficient:
0.04%/°C

EMI:
Meets FCC conducted level B

Warranty

1 year

Mechanical

Size:
5.0 in x 3.0 in x 1.5 in
(127mm x 76.2mm x 33mm)

Weight:
0.75 Lb. (0.34 Kgm)

Safety Approvals

UL1950, IEC950, CSA C22.2 No. 234 Level 3, TUV EN60950. Test Conditions: 100-240Vac, 47-63 Hz, 25°C Ambient

Other Output Voltages Available On Request

Ordering Information

Model Number	Output														
	V1					V2					V3				
	Volts	Amps				Volts	Amps				Volts	Amps			
		Min.	Max.	w/20 cfm	Peak		Min.	Max.	w/20 cfm	Peak		Min.	Max.	w/20 cfm	Peak
VLC60K3C33	+5	1.2	12	16	20										
VLC60K3F33	+12	0.5	5	6.6	8.3										
VLC60K3J33	+24	0.25	2.5	3.3	4.2										
VLC60K3L33	+48	0.15	1.5	1.8	2										
VLC60K3CF33	+5	1	4	6	8	+12	0.3	3.5	4.5	8					
VLC60K3CFT33	+5.1	1	6	8	10	+12	0.3	2.2	3	6	-12	0	0.5	0.5	1.5
VLC60K3CTF33ZZD	+5.1	1	6	8	10	+12	0.1	1.2	1.8	3.7	-12	0.1	1.2	1.8	3.7
VLC60K3CFR33	+5.1	1	6	8	10	+12	0.3	2.2	3	6	-5	0	0.5	0.5	1.5

Peak output current duration less than 30 seconds with duty cycle less than 10%.
Total output power not to exceed 60W in convection or 80W with 20 cfm air flow.
Models with ZZD suffix have post regulated V2 and V3. Others have post regulated V3.

Output Connector (J2) Pin Assignments

(Mating connector — Molex 09-50-3061 with 2478 crimp terminals)

	V1	V2	V3	Return
Single	1, 2, 3			4, 5, 6
Triple	2, 3	1	6	4, 5

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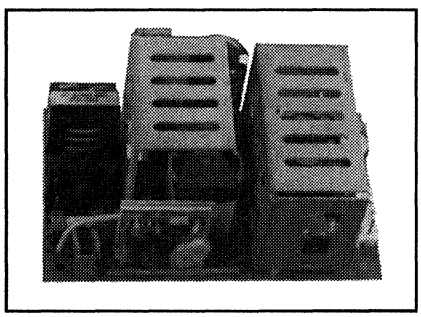
CONVERTER CONCEPTS™

80-100 Watt Small 1, 2 or 3 Output Economical Universal Input Switching Supplies



VLC80 Series

One, Two and Three Outputs

Compact Size — 3 x 5 inches

Copper Heat Sinks

High Efficiency

Meet International and Domestic Safety Standards

On-Board EMI Filtering — Meet CISPR 22

Fully Protected — Overvoltage and Short Circuit

Fixed Frequency

A family of cost-effective, rugged, universal input, fixed frequency, single, double and triple output, 80 watt, 3 x 5 inch printed circuit board, switching power supplies.

A wide range of output voltages are available. The second output delivers high peak currents for disk drives. All are UL recognized, CSA certified, TUV approved and meet CISPR22 Level B conducted emissions.

Each unit is burned in at elevated temperature and 100 percent tested.

Ideal for:
•Disk drives •Test equipment
•Peripherals •Telecommunications

■ SPECIFICATIONS ■

Electrical

Input:
Universal, 90 - 250 Vac,
47-440 Hz, and 125 - 350 Vdc.

Mating Connector (J1):
Molex 09-50-3031 with
2478 terminals. Pin 1 Neutral, Pin 3 Line

Efficiency:
70% typical at full load

Turn-On Surge Current:
20A peak for 1/2 cycle at 250 Vac

Isolation:
Input to output - 4242 Vdc
(isolation components)
Input to earth gnd - 2121 Vdc
Output to chassis - 710 Vdc

Output Power:
80 Watts continuous, natural convection.
100 Watts with 20 CFM air flow.

Operating Frequency:
50kHz±10% fixed.

Hold-up Time:
16 ms typical, full load @ 115 Vac

Ripple & Noise:
1% pk-pk @ max load, 20 mHz bandwidth limit measured with a 10 inch twisted pair terminated with a 10 uf capacitor in parallel with a .1 uf capacitor.

Short Circuit Protection:
Automatic recovery current limit.

Overvoltage Protection:
135% of max., V1 only.

Load Regulation:
V1 ±2%
V2 ±5%
V3 ±5%

Grounding:
.250 in spade lug (J4)

Environmental

Operating Temperature Rating:
0°C to +40°C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space, moving air is recommended.

Storage Temperature:
-25°C to +85°C

Temperature Coefficient:
0.04%/°C

EMI:
CISPR 22

Warranty 1 year

Mechanical

Size:
5.0 in x 3.0 in x 2.15 in
(127mm x 76.2mm x 33mm)

Weight:
0.75 Lb. (0.34 Kgm)

Safety Approvals

UL1950, IEC950, cUL, TUV EN60950.
Test Conditions: 100-240Vac, 47-63 Hz, 25°C Ambient
(Pending)

Other Output Voltages Available On Request

Ordering Information

Model Number	Output														
	V1					V2					V3				
	Volts	Amps				Volts	Amps				Volts	Amps			
		Min.	Max.	w/20 cfm	Peak		Min.	Max.	w/20 cfm	Peak		Min.	Max.	w/20 cfm	Peak
VLC80K3F33	+12	1.3	6.7	8.3	10										
VLC80K3J33	+24	.7	3.2	4.2	5.2										
VLC80K3L33	+48	.3	1.7	2.1	2.6										
VLC80KCF33	+5	1.3	6	8	9.6	+12	0.5	4.5	8	9					
VLC80K3CFT33	+5.1	1.3	8	10	13	+12	0.5	3.0	6	8	-12	0	0.5	0.5	1.5
VLC80K3CFT33ZZD	+5.1	1.3	8	10	13	+12	0.1	1.2	1.8	3.7	-12	0.1	1.2	1.8	3.7
VLC80K3CFR33	+5.1	1.3	8	10	13	+12	0.5	3.0	6	8	-5	0	0.5	0.5	1.5

Peak output current duration less than 30 seconds with duty cycle less than 10%.
Total output power not to exceed 80W in convection or 100W with 20 cfm air flow.
Models with ZZD suffix have post regulated V2 and V3. Others have post regulated V3.

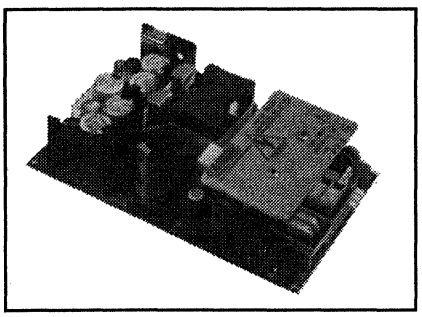
Output Connector (J2) Pin Assignments
(Mating connector — Molex 09-50-3061 with 2478 crimp terminals)

	V1	V2	V3	Return
Single	1, 2, 3			4, 5, 6
Triple	2, 3	1	6	4, 5

CONVERTER CONCEPTS • 100 Industrial Parkway, Pardeeville, Wisconsin 53954 • Phone: (608) 429-3000 • FAX: (608) 429-9241

CONVERTER CONCEPTS™

30 Watt Small 1, 3 or 4 Output Medical Universal Input Switching Supplies



MD30 Series

One to Four Outputs

Meet International and Domestic Medical Saftey Standards

On-Board CISPR and FCC Level B Filtering

Less than 30 Microamps Chassis Leakage Current

Compact Size — 3 x 5 inches, Fixed Frequency

Short Circuit, Overcurrent Protection and Overvoltage Protection

Power Fail Detection Optional

Surface Mount and MOSFET Technology

A family of single, triple and quad output, 30 watt, open frame, universal input switching power supplies with medical safety approval for UL patient care and IEC 601 non-patient connected applications.

Each unit is burned in at elevated temperature and 100 percent tested. All MD30 models meet the FCC and CISPR 11 Level B conducted emission limits.

The MD30 family is manufactured with surface mount technology and uses MOSFET transistors for switching. All have excellent regulation and are suited to a wide range of applications.

■ SPECIFICATIONS ■

Electrical

Input:
Universal, 90 - 264 Vac,
47-63 Hz
and 120 - 350 Vdc.

Mating Connector (J1):
Molex 09-50-3031 with
2478 terminals. Pin 1 Neutral, Pin 3 Line

Efficiency:
70% typical

Turn-On Surge Current:
20A max (230 Vac cold start)

Isolation:
Input to output - 4000 Vac
(isolation components)
Input to chassis - 1500 Vac
Output to chassis - 710 Vdc

Power Fail Detect (option):
5 mA current sink capability. Fault asserted low.

Output Power:
30 Watts continuous, natural convection.

Operating Frequency:
72kHz±10% fixed.

Turn-On Overshoot:<1%

Start Delay:
600 mSec max.

Hold-up Time:
10 mSec full load @ 115 Vac

Ripple & Noise:
2% pk-pk @ max load, 20 mHz bandwidth limit.

Short Circuit &
Overload Protection:
All outputs current limited.

Overvoltage Protection:
135% of max, V1 only.

Load Regulation:
V1 ±1% 3% load to full load
V2 ±5% 20% load to full load
V3 ±3% 0% load to full load
V4* ±3% 0% load to full load
**Models ending in "L" or "Z" have V4 jumpered to V2 output.*

Chassis Leakage Current:
Less than 30 microamps.

Grounding:
J5-Earth ground with .250 inch spade lug.

Ordering Information and Pin Assignment

Model Number	Output							
	V1		V2		V3		V4	
	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps
MD30A3C33	+5.1	5						
MD30A3F33	+12	2.5						
MD30A3G33	+15	2						
MD30A3J33	+24	1.25						
MD30A3CFR33	+5.1	5	+12	2	-5	.5		
MD30A3CFT33	+5.1	5	+12	2	-12	.5		
MD30A3CGU33	+5.1	5	+15	2	-15	.5		
MD30A3CFR33L	+5.1	5	+12	.5	-5	.5		
MD30A3CFT33L	+5.1	5	+12	.5	-12	.5		
MD30A3CGU33L	+5.1	5	+15	.5	-15	.5		
MD30A3CFTR33	+5.1	5	+12	2	-12	.5	-5	0.5
MD30A3CJTF33	+5.1	5	+24	1	-12	.5	+12	0.5
MD30A3CJUG33	+5.1	5	+24	1	-15	.5	+15	0.5

Total output power not to exceed 30W in natural convection. Power Fail detect is optional, add the letter A to the right of the model numbers for numbers ending in 33. ie: "MD30A3C33A." Model numbers ending in L, replace the last digit with Z for power fail option. Models with last digit of L or Z have post regulated V2. All models have post regulated V3 or V4.

OUTPUT CONNECTOR (J50)
PIN ASSIGNMENTS
(Mating Connector — Molex 08-50-3081)
Power Fail Option is on pin 8 when ordered.

	V1	V2	V3	V4	Return
Single	4, 5, 6				2, 3
Triple	4, 5	6	1		2, 3
Quad	4, 5	6	1	7	2, 3

Environmental

Temperature Rating:
0 to +50°C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space, moving air is recommended.

Temperature Coefficient: 0.02%/°C
Storage Temperature: -40 to +85°C

EMI:

Conducted Noise	EN55022/11, FCC, VDE0871	Level B
Radiated RF Immunity	ENV50140	Level 3
Electrical Fast Transients	EN61000-4-4	Level 3
Surge Susceptiblity	EN61000-4-5	Level 3
Conducted RF Immunity	ENV50141	Level 3

Warranty: 1 year

Mechanical

Size: 5 in x 3 in x 1.4 in
(127mm x 76.2mm x 35.6mm)
Weight: 0.6 Lb. (.29 kg)

Safety Approvals

UL544, IEC601-1, CSA C22.2 No. 234 Test Conditions: 100-240Vac ± 10%, 50/60 Hz, 25°C Ambient

Life Support Policy

These products are not recommended for use in life support application wherein such use may directly threaten life or injury due to component failure or malfunction. Users of these products in life support applications assume all risks of such use and indemnify Converter Concepts, Inc. against all damages from such use.

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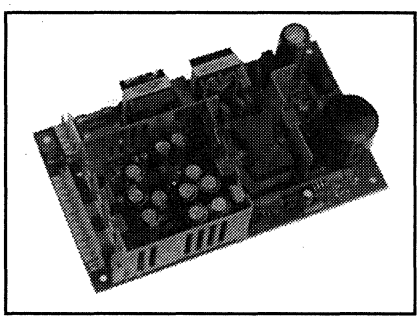
CONVERTER CONCEPTS™

80 Watt Small 1, 3 or 4 Output Medical Universal Input Switching Supplies



MD80 Series

One to Four Outputs

Meet International and Domestic Medical Saftey Standards

On-Board CISPR and FCC Level B Filtering

Compact Size, Choices of: 3.85" x 6.7" or 4.25" x 7.0"

Short Circuit, Overcurrent Protection and Overvoltage Protection

Power Fail Detection Optional

Surface Mount and MOSFET Technology

A family of single, triple and quad output, 80 watt, open frame, universal input switching power supplies with medical safety approval for UL patient care and IEC 601 non-patient connected applications.

Each unit is burned in at elevated temperature and 100 percent tested. All MD80 models meet the FCC and CISPR 11 Level B conducted emission limits.

The MD80 family is manufactured with surface mount technology and uses MOSFET transistors for switching. All have excellent regulation and are suited to a wide range of applications.

■ SPECIFICATIONS ■

Electrical

Input:
Universal, 90 - 264 Vac, 47-63 Hz, single phase and 120 - 350 Vdc.

Mating Connector (J1):
Molex 09-50-3051 with Pin 1 Gnd, Pin 3, Neutral, Pin 5 Line

Efficiency:
70% typical

Turn-On Surge Current:
20A max (230 Vac cold start)

Isolation:
Input to output - 4000 Vac (isolation components)
Input to chassis - 1500 Vac
Output to chassis - 710 Vdc

Power Fail Detect (option):
5 mA current sink capability. Fault asserted low.

Output Power:
80 Watts continuous, natural convection.

Operating Frequency:
100kHz±10% fixed.

Turn-On Overshoot:<1%

Start Delay:
600 mSec max.

Hold-up Time:
10 mSec full load @ 115 Vac

Ripple & Noise:
2% pk-pk @ max load, 20 mHz bandwidth limit.

Short Circuit Protection:
Automatic recovery current limit.

Overvoltage Protection:
135% of max, V1 only.

Load Regulation:
V1 ±1% 3% load to full load
V2 ±5% 20% load to full load
V2* ±2% 0% load to full load
V3 ±2% 0% load to full load
V4 ±2% 0% load to full load
**model numbers ending in "L"*

Environmental

Temperature Rating:
0 to +50°C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space, moving air is recommended.

Temperature Coefficient: 0.02%/°C
Storage Temperature: -40 to +85°C

EMI:

Conducted Noise	EN55022/11, FCC, VDE0871	Level B
Radiated RF Immunity	ENV50140	Level 3
Electrical Fast Transients	EN61000-4-4	Level 3
Surge Susceptiblity	EN61000-4-5	Level 3
Conducted RF Immunity	ENV50141	Level 3

Warranty 1 year

Mechanical

Size: 3.85"x6.7"x1.5", 4.25"x7.0"x1.5" (70mm x 98mm x 38mm)
Weight: 1.1 Lb. (.5 kg)

Safety Approvals

cUL2601-1, TUV, IEC601-1, CSA C22.2 No. 234 Test Conditions: 100-240Vac ± 10%, 47-63 Hz, 25°C Ambient

Life Support Policy

These products are not recommended for use in life support application wherein such use may directly threaten life or injury due to component failure or malfunction. Users of these products in life support applications assume all risks of such use and indemnify Converter Concepts, Inc. against all damages from such use.

Ordering Information and Pin Assignment

Model Number	Output											
	V1			V2			V3			V4		
	Volts	Amps	Pk	Volts	Amps	Pk	Volts	Amps	PK	Volts	Amps	Pk
MD80A3C33	+5.1	16	20									
MD80A3F33	+12	7	9									
MD80A3G33	+15	5.5	7									
MD80A3J33	+24	3.5	4.5									
MD80A3CFR33	+5.1	12	16	+12	3.0	5.0	-5	1.0	1.2			
MD80A3CFT33	+5.1	12	16	+12	3.0	5.0	-12	1.0	1.2			
MD80A3CGU33	+5.1	12	16	+15	3.0	5.0	-15	1.0	1.2			
MD80A3CFR33L	+5.1	12	16	+12	1.0	1.2	-5	1.0	1.2			
MD80A3CFT33L	+5.1	12	16	+12	1.0	1.2	-12	1.0	1.2			
MD80A3CGU33L	+5.1	12	16	+15	1.0	1.2	-15	1.0	1.2			
MD80A3CFTR33	+5.1	12	16	+12	3.0	5.0	-12	1.0	1.2	-5	1.0	1.2
MD80A3CJTF33	+5.1	12	16	+24	2.0	3.0	-12	1.0	1.2	+12	1.0	1.2
MD80A3CJUG33	+5.1	12	16	+24	2.0	3.0	-15	1.0	1.2	+15	1.0	1.2

Peak output current duration less than 20 seconds with a max duty cycle of 10%. Total output power not to exceed 80W in natural convection. Power Fail detect is optional, add the letter A to the right of the model numbers for numbers ending in 33. ie: "MD80A3C33A." Model numbers ending in L, replace the last digit with Z for power fail option. Models with last digit of L or Z have post regulated V2. All models have post regulated V3 or V4.

OUTPUT CONNECTOR (J50) PIN ASSIGNMENTS
(Mating Connector — Molex 09-50-3131)
Power Fail Option is on pin 10 when ordered

	V1	V2	V3	V4	Return
Single	1, 2, 3, 4				5, 6, 7, 8, 9
Triple	1, 2, 3	8, 9	11		4, 5, 6, 7
Quad	1, 2, 3	8, 9	11	13	4, 5, 6, 7

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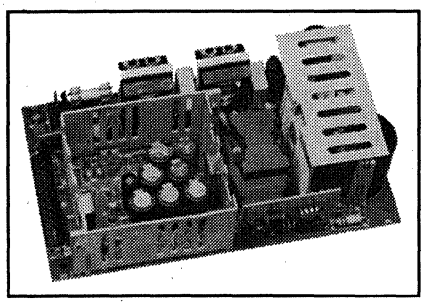
CONVERTER CONCEPTS™

100 Watt Small Single Output Medical Universal Input Switching Supplies



MD100 Series

Single Output Configurations

Meet International and Domestic Medical Saftey Standards

On-Board CISPR and FCC Level B Filtering

Compact Size — 3.85 x 6.7 inches, Fixed Frequency

Short Circuit, Overcurrent Protection and Overvoltage Protection

Power Fail Detection Optional

Surface Mount and MOSFET Technology

A family of single output, 100 watt, open frame, universal input switching power supplies with medical safety approval for UL patient care and IEC 601 non-patient connected applications.

Each unit is burned in at elevated temperature and 100 percent tested. All MD100 models meet the FCC and CISPR 11 Level B conducted emission limit.

The MD100 family is manufactured with surface mount technology and uses MOSFET transistors for switching. All have excellent regulation and are suited to a wide range of applications.

■ SPECIFICATIONS ■

Electrical

Input:
Universal, 90 - 264 Vac,
47-63 Hz, single phase
and 120 - 350 Vdc.

Mating Connector (J1):
Molex 09-50-3051 with
Pin 1 Gnd, Pin 3, Neutral, Pin 5 Line

Efficiency:
70% typical

Turn-On Surge Current:
20A max (230 Vac cold start)

Isolation:
Input to output - 4000 Vac
(isolation components)
Input to chassis - 1500 Vac
Output to chassis - 710 Vdc

Power Fail Detect (option):
5 mA current sink capability. Fault asserted low.

Output Power:
100 Watts continuous, natural convection.
120 Watts w/20 CFM airflow.

Operating Frequency:
100kHz±10% fixed.

Turn-On Overshoot:<1%

Start Delay:
600 mSec max.

Hold-up Time:
10 mSec full load @ 115 Vac

Ripple & Noise:
2% pk-pk @ max load, 20
mHz bandwidth limit.

Short Circuit Protection:
Automatic recovery current limit.

Overvoltage Protection:
135% of max, V1 only.

Load Regulation:
V1 ±1% 3% load to full load
**model numbers ending in "L"*

Other Output Voltages Available On Request

Environmental

Temperature Rating:
0 to +50°C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space, moving air is recommended.

Temperature Coefficient: 0.02%/°C
Storage Temperature: -40 to +85°C

EMI:
Meets FCC and CISPR 11 conducted level B emissions.

Warranty 1 year

Mechanical

Size: 3.85 in x 6.7 in x 1.5 in
(70mm x 98mm x 38mm)
Weight: 1.1 Lb. (.5 kg)

Safety Approvals

UL2601-1, UL1950, IEC601-1,, CSA C22.2 No. 234 Test Conditions: 100-240Vac ± 10%, 47-63 Hz, 25°C Ambient

Life Support Policy

These products are not recommended for use in life support application wherein such use may directly threaten life or injury due to component failure or malfunction. Users of these products in life support applications assume all risks of such use and indemnify Converter Concepts, Inc. against all damages from such use.

Ordering Information and Pin Assignment

Model Number	Output											
	V1			V2			V3			V4		
	Volts	Amps	Pk	Volts	Amps	Pk	Volts	Amps	PK	Volts	Amps	Pk
MD100A3F33	+12	8.3	13									
MD100A3G33	+15	6.6.	8									
MD100A3J33	+24	4.2	5									
MD100A3L33	+48	2.0	2.5									

Peak output current duration less than 30 seconds with a max duty cycle of 10%.
Total output power not to exceed 100W in natural convection.

OUTPUT CONNECTOR (J50) PIN ASSIGNMENTS
(Mating Connector — Molex 09-50-3113) Power Fail Option is on pin 10 when ordered

	V1	V2	V3	V4	Return
Single	1, 2, 3, 4				5, 6, 7, 8, 9

CONVERTER CONCEPTS • 100 Industrial Parkway, Pardeeville, Wisconsin 53954 • Phone: (608) 429-3000 • FAX: (608) 429-9241

CONVERTER CONCEPTS™

For over 20 years, Converter Concepts has featured universal input as an integral part of each AC-DC power supply we have manufactured. In addition to founding the universal input technology, Converter Concepts was at the advent of utilizing SMT in the power supply industry to insure repeatability in the manufacturing process.

SWITCHING POWER SUPPLIES SELECTION GUIDE

SERIES	VL SERIES				VLC SERIES			MD SERIES			BC SERIES
WATTS	10	40	50	80	40	60	80	30	80	100	40
UNIVERSAL INPUT	●	●	●	●	●	●	●	●	●	●	●
INPUT VOLTAGE:											
90-250 AC 100-350 DC					●	●	●	●	●	●	●
85-264 AC 120-365 DC	●	●	●	●							
10-40 DC→DC											
20-60 DC→DC	●										
NUMBER OF OUTPUTS:											
1	●	●		●	●	●	●	●	●	●	
2						●	●				●
3		●	●	●	●	●	●	●	●	●	
4			●	●	●			●	●	●	
PACKAGE:											
OPEN FRAME											
ENCLOSED MODULE											
PC BOARD	●	●	●	●	●	●	●	●	●	●	●
SAFETY APPROVALS:											
UL		●	●	●	●	●	●	●	●	●	●*
CSA		●	●	●	●	●	●	●	●	●	●*
TUV		●	●	●	●	●	●	●	●	●	●*
FEATURES:	Features the application of surface mount technology in a low-cost PC board construction. Designed for high-volume applications requiring safety approvals and rigid EMI specifications. *VL Products feature a 1 year warranty.				Fixed frequency, low profile series in an economical 3" X 5" pc card package. Each product offers 20 watts of additional power with 20 cfm of available airflow.			Features compliance to UL2601-1, IEC601-1, and CSA22.2 #234. Offers powerfail detection and protection from overload, short circuit and overcurrent. Conducts less than 200 µA of chassis leakage.			Temperature compensated, 3 state battery charger and 18V bulk battery charger. *Approvals pending.

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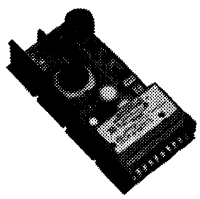
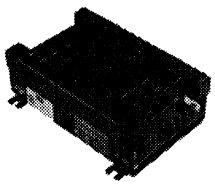
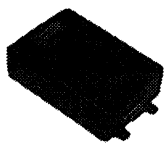
CONVERTER CONCEPTS™

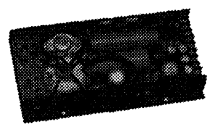
Converter Concepts strives to be at the forefront of technology in both design and assembly to provide each customer with the best technological solution for every power supply requirement they have.

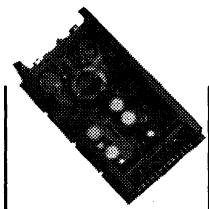
The power supplies listed below meet the demands of most design parameters. In applications that have specific performance requirements, Converter Concepts' engineers can design a power supply to meet your exact needs.











VI SERIES	ST SERIES	XT SERIES	VT/VX SERIES					VF SERIES	
120	25	25	15	25	50	75	100	65	100
●	●	●	●	●	●	●	●	●	●
●	●		●	●	●	●	●	●	●
		●							
			●	●	●				
			●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
●		●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
●							●	●	●
●	●		●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
	●	●		●	●	●			
	●	●							
	●	●							
Features output power capability up to 150 watts. Many output models available with many options possible. Excellent mounting scheme for either open frame or enclosed package.	Features power fail detection, main output remote sense; and protection against overload, short circuit and overcurrent. Conducts less than 30 µA of chassis leakage.	External, ultra-small design delivers improved line and load regulation, overcurrent/overvoltage protection plus surface mount technology. *XT Products feature a 1 year warranty.	This versatile product is easily modified to meet unique customer specifications. DC to DC models available in addition to Converter Concepts' universal AC input models. Rugged packaging in either open frame or enclosed package gives the VT/VX series maximum performance with a demonstrated MTBF in excess of 150,000 hrs. Many options available.					Features include a UPS (fail safe) system that allows operation from an AC power source or a DC power source. The VF also includes an integral battery charger. The VF product is a must if information retention is important during brown out of power line failures.	

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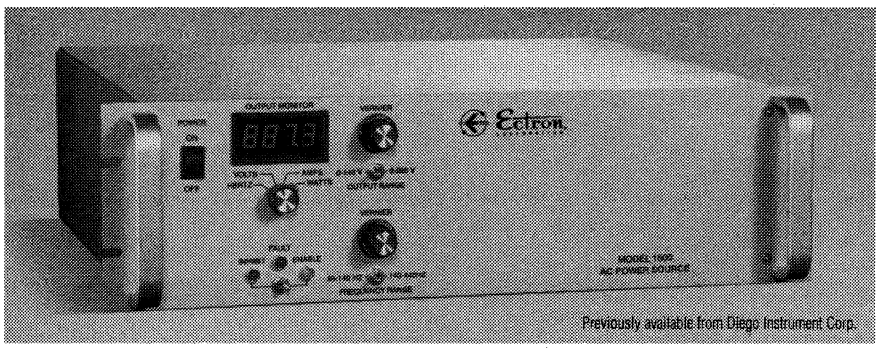
The Ideal AC Power Source for AC Power Testing



Model 1500 AC Power Source

with Load Power Analyzer

1500 VA, 3000 VA or 4500 VA

0 to 280 V ac Output Voltage

45 to 440 Hz Output Frequency

1, 2, and 3 phase models

FEATURES:

- **Stable, Transient-free, Sine-wave Power**
- **Output of 1500 VA or 3000 VA (Models 1500 and 3000)**
- **Adjustable 0 to 280 V ac Output Voltage**
- **Adjustable 45 to 440 Hz Output Frequency**
- **Transformer Input to Output Isolation to 200 V**
- **Input Power from 105 to 240 V ac, 45 to 440 Hz**
- **Maintains Input Power Factor >0.95**
- **Full Current into Any Reactive Load**
- **Built-in High-accuracy Measurements: Voltage, Current, Frequency, True Power**
- **Light Weight—Only 10 kg (22 lb) for 1500 VA**

APPLICATIONS:

- **Tests 50-Hz, 100-V-ac to 240-V-ac Equipment for Export**
- **Tests 400-Hz Avionics and Naval Equipment**
- **Provides Stable Power When Using Portable Generators**
- **Light Weight for Portable Uses**
- **Powers Systems When Frequency Conversion is Required**
- **Powers Systems Without Drawing Excessive Harmonic Currents**
- **Load Analyzer Permits Quick Look Analysis**
- **Powers Reactive Loads: Motors, Light Ballasts, Electromagnetic Survey Coils**
- **Makes Possible Adjustable RPM AC Motors**
- **Can Be Used for Flicker Testing**

The 1500 Series AC Power Source is ideal for testing equipment requiring input power that differs from available power sources.

With excellent frequency stability and regulation, low distortion and wide voltage and frequency ranges, the 1500 Series meets most single-phase power requirements in a compact lightweight instrument.

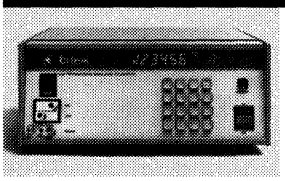
Advanced switch-mode technology dramatically reduces bulk and weight and effectively isolates the unit under test.

The accurate built-in measurement capability eliminates the need for several additional measurement instruments including current transformers, watt meters, etc., and allows continuous monitoring of test parameters.

Output isolation means that the unit under test can function independently of input-related grounds.

The **Model 3000,** essentially two Model 1500's in parallel, has the same voltage and frequency ranges, but provides double the output current and power. It includes a single set of controls, metering, and output terminals. The Model 3000 offers the same performance, size, and weight advantages as that of the Model 1500. Two- and three-phase models available. Also remote control of voltage and frequency.

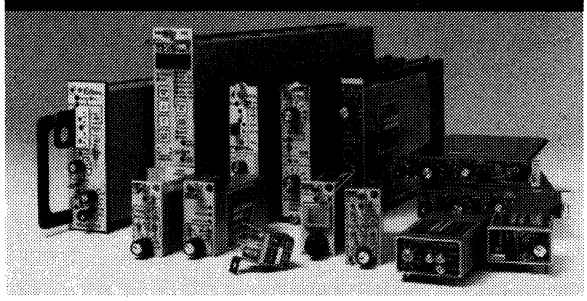
Thermocouple Simulator/Calibrators



- **Calibrate up to 10 T/C Types**
- **IEEE-488 or RS-232 Interfaces**
- **<1 µV Conformity to NIST (ITS-90)**
- **<0.05Ω Output Impedance**
- **Key in Temperature in C or F; any Reference Temperature**

Ectron thermocouple simulators produce an emf on their output terminals exactly duplicating the output of an actual thermocouple heated to the selected temperature. Simply interconnect the simulator to the unit under test using thermocouple wire, and perform the calibration. No ice baths, lookup tables or other auxiliary equipment is required. **Model 1120.**

Transducer Conditioner-Amplifiers

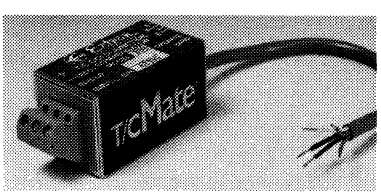


Specialists in low-level signal instrumentation, Ectron offers the industry's most comprehensive line of precision instrumentation amplifiers and transducer signal conditioners. See the product descriptions in this catalog in section 1100, page D.1009.

T/CMate™ Thermocouple Cold Junction Compensator

- **Precise Compensation for type E, J, K , and T thermocouples**
- **Use any instrumentation amplifier • No batteries required**
- **Signal isolated from power source**

Eliminate long-distance thermocouple wire. Power is derived from any amplifier's excitation source, or any other available 5 V to 15 V supply.
Models 200 and 201.



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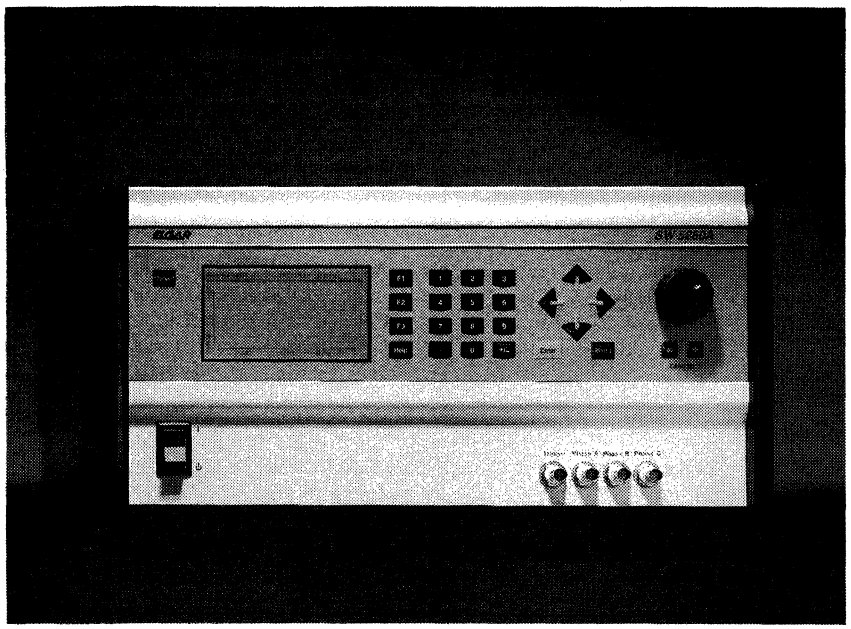
SW Series AC Power Sources



Real World Test Power
The SmartWave™ AC power source has three separate arbitrary waveform generators that allow users to create independent, complex waveforms on all three phases simultaneously. Meet demanding test requirements such as high DC content (up to 312V) and low distortion (THD 0.25% to 100 Hz) with the highest power density in the industry. At only 8 3/4 inches high and 127 pounds for 5250VA, the SW 5250 delivers the most power in the smallest package.

Powerful Waveform Creation
The SmartWave comes with a library of 50 store and recall front panel setups that include all waveform parameters, 50 factory supplied waveshapes, 50 user created waveshapes and a library of up to 1000 sequence programming segments. The SW can create fractional or multi-cycle dropouts, spikes, surges, sags and distorted waveforms for simulating power line disturbances and testing regulatory standards.

Easy to Use
A backlit graphics LCD display allows quick confirmation of waveforms when created or edited from the front panel. Front panel BNC's provide waveform reference outputs for scope viewing.

SPECIFICATIONS

Input
Input Voltage Ranges: Factory configured 187 to 264 VRMS, 3ϕ L-L (3 wire) or 342 to 457 VRMS, 3ϕ L-L (4 wire). A chassis ground is also required.

Input Power Factor: .6 (.99 with input PFC option).

Input Frequency Range: 47 to 63 Hz.

Efficiency: 70%, min., at full load.

Ride Through: 3 msec, min.; 10 msec, min., with PFC option.

Output
Power Factor of Load: 0 lagging to 0 leading.

AC or DC Output Voltage: 0 to 156V RMS L-N range 1; 0 to 312 VRMS L-N range 2.

Output Current Per Phase: 13A to 135V in 156V range; 6.5A to 270V in 312V range (1750 VA max.).

Crest Factor: 4.0 (peak output current to RMS output current).

Output Frequency Range: DC or 40 Hz to 5 kHz. For output frequencies greater than 1 kHz, the max. slew rate allowed is 1 kHz per second.

Output Power: 1750 VA: 1ϕ, 3500VA: 1ϕ or 2ϕ, 5250 VA: 1ϕ or 3ϕ.

Max. Total Harmonic Distortion (Full Linear Load or No Load): 0.25% max., 40 to 100 Hz; 0.5% max. to 500 Hz; and 1% max. to 1 kHz plus 1%/kHz to 5 kHz.

AC Noise Level: 60 dB RMS below full output voltage.

Amplitude Stability With Remote Sense: ±0.1% of full scale over 24 hours at constant line, load and temperature.

Load Regulation: ±0.025% of full scale voltage for a full resistive load to no load; above 1 kHz, add ±0.01%/kHz.

Line Regulation (DC, or 40 Hz to 5 kHz): ±0.025% of full scale for a ±10% input line change.

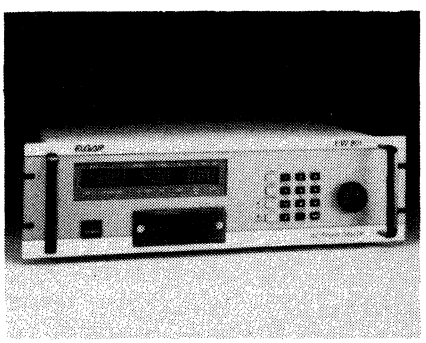
EW Series AC Power Sources

Programmable AC Power Sources
Elgar's new EasyWave EW371 and EW801 power sources use state-of-the-art pulse width power modulation technology to deliver clean, instrument grade AC power achieving a new level in price/performance. These sources offer full rated power for any output voltage from 0 to 300VAC, at frequencies from 45 to 500Hz.

High Speed Measurement
The EW371/801 AC power sources use advanced DSP circuitry to offer precise high speed measurement of true RMS voltage, true RMS current, true power, frequency, power factor and current crest factor.

Front Panel Computer Control
The EW371/801 AC power sources are easy to operate from the front panel keypad, or from the optional remote controller via IEEE-488, RS 232C or Analog Programming. This interface is a plug-in card that quickly changes the unit to a computer controlled system power source.

Designed with a self diagnostic routine and protected against over-voltage, under-voltage over-power, over-current, over-temperature and fan failures, the instruments offer quality and reliability for even the most demanding applications in production testing, R&D design characterization and QA verification.



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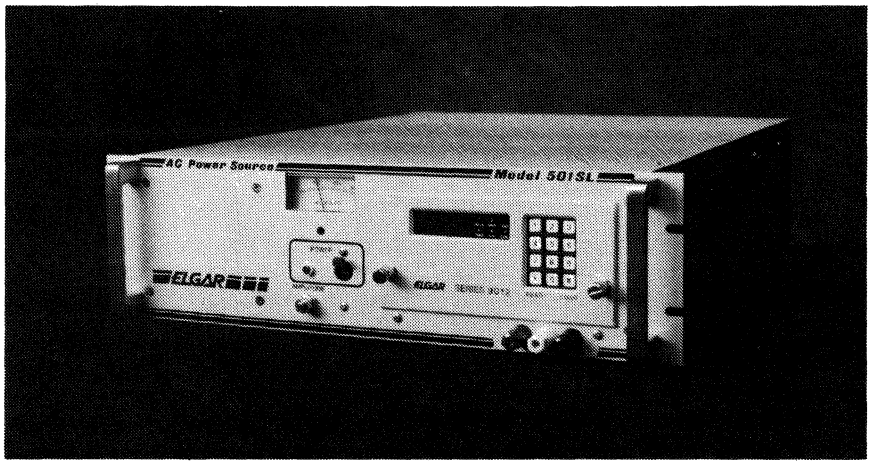
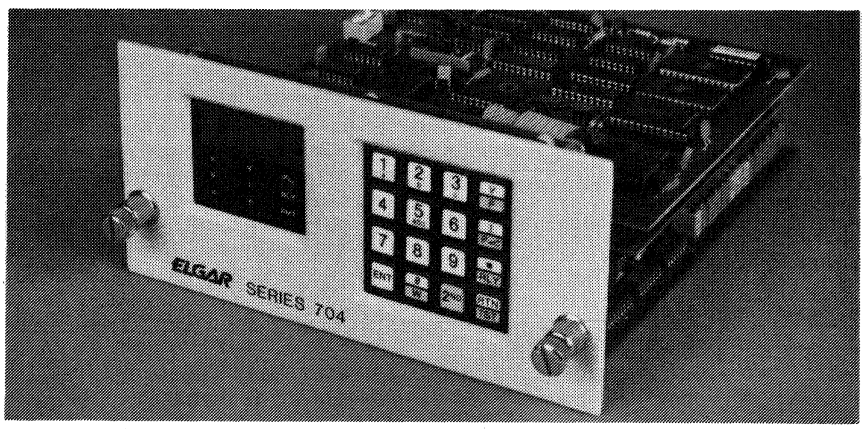
SL and B Series AC Power Sources



The SL and B Series precision AC power sources are designed for linear loads and can be driven over their full voltage and frequency ranges by fixed, variable or programmable plug-in oscillators (or from an external source). They save critical panel space and money by providing up to 50% more power density than most competitive linear models. They are ideal for general purpose test applications as well as ATE system avionics testing. Two year warranty.

- Power range: 120 VA to 36 kVA
- Full rated VA from 85% of full scale to full scale
- 45 Hz-5kHz at full rated power
- Continuous duty at up to 150% rated capacity
- Low harmonic distortion
- Wide frequency range

Plug-in Programmers



Programmable Oscillators

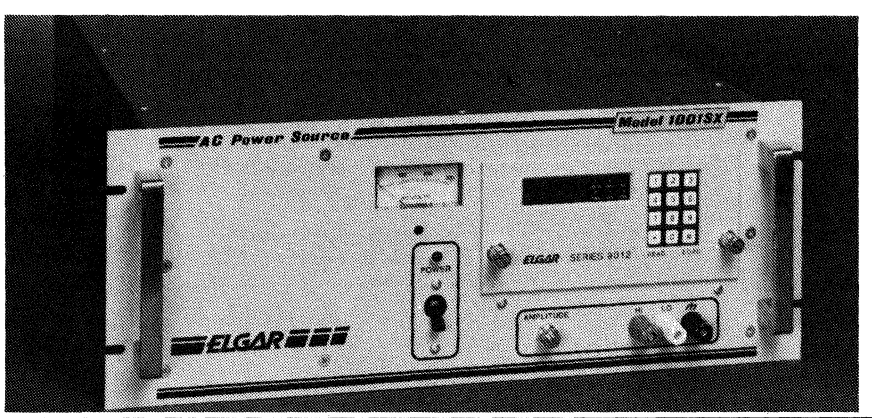
Plug-in Programmable oscillators (PIP's) GPIB provide the interface between a computer and any Elgar SL, SX and B AC power source. They are available for programming frequency, voltage amplitude, and phase angle in multi-phase systems. Elgar's PIP's are microprocessor controlled and offer more power options than ever before. Elgar's Atlas Based Language Extension (ABLE) makes programming simple via IEEE-488 (GPIB). Most PIP models provide keypad and LED read-out for convenient local control. And with Elgar's PIP, rack space is cut to a bare minimum since it is designed as a plug-in component for AC power sources.

PIP704 Transient Generator

The PIP704 Plug-In Programmable Transient Generator is designed to meet the MIL-STD-704 (revisions A through D) "Aircraft Electrical Power Characteristics" test requirements for 400Hz power. It's also an effective tool for Bu-Ships 1399 testing and for general purpose testing that requires AC transient generation.

The PIP704 can be programmed and monitored locally or remotely for simultaneous or independent transients including 704D ramps, voltage surges/sags, frequency deviation, voltage phase differentiation and waveform distortion in any single-phase or in all three phases. Standard frequency range is 45Hz to 1 KHz with voltage drop-outs from 1 millisecond to 222.2 seconds.

SX Series AC Power Sources



Elgar's SX Series linear AC power sources drive non-linear, capacitive input filter rectifier loads. They are ideal for testing modern switch-mode DC power supplies. Key characteristics are high peak current capability and low input impedance. They are designed for bench-top testing and automated DC power supply test systems. Two year warranty.

- Power range: 500 VA to 5.25 kVA
- Up to 3.5:1 crest factor
- Programmable range changing relays
- 45 Hz to 1kHz at full rated power
- Low effective output impedance

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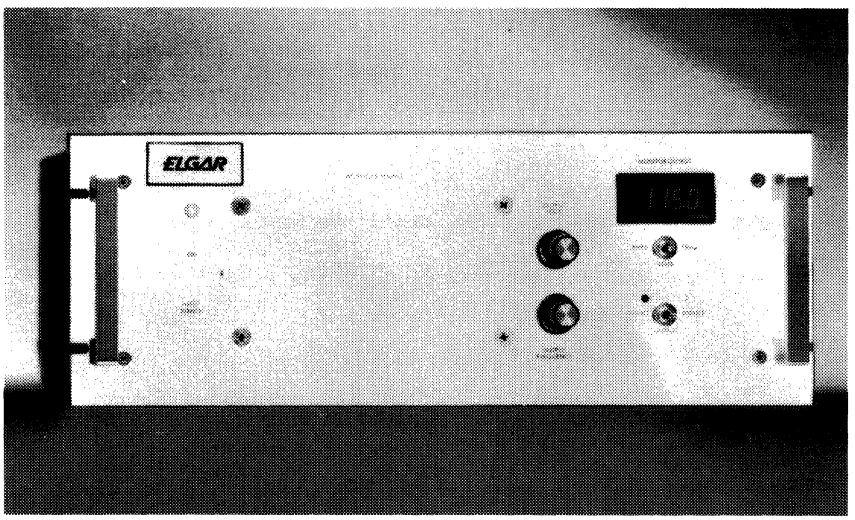
EL Series AC Frequency Changers



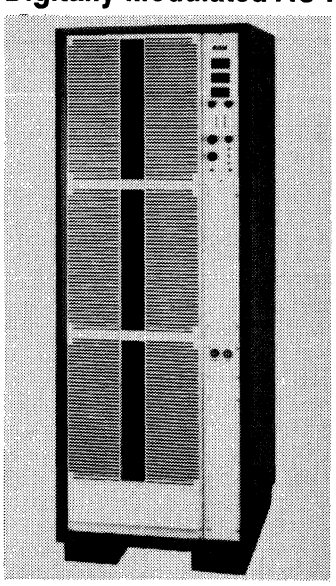
The EL Series allows you to meet smaller power conversion applications that do not require critical test and measurement standards.

The EL Series utilizes switching technology. These frequency changers are specially designed to power electronic equipment, motors and other high current-consuming loads.

The output of all models is transformer isolated. The frequency is either fixed or continuously variable and the output voltage is adjustable from 0-130VAC or 0-260VAC.

- 1.2KVA
- Peak current to 3.0 X RMS
- Zero to unity power factor
- 200 microseconds response time for 100% load changes
- Soft start circuit prevents power line disruptions

Digitally Modulated AC Power Systems



Elgar/Ling Digitally Modulated AC (DMAC) power systems with linear specifications offer unmatched efficiency and flexibility in a wide range of switching AC applications. They can be used for upgrading or replacing motor generators and their quiet operation means they can be located next to test stands or in control rooms without disturbing operators.

Based on proven switch mode technology, the DMAC II series power systems are cost effective alternatives to either motor/generator sets or bulk power linear transistor power supplies.

An Elgar Plug-In Programmer can be installed in a DMAC II to furnish full IEEE-488 listener/talker capabilities and allow complete control of voltage on any phase, frequency or phase angle.

DMAC II's provide effective line conditioning, eliminating the need for added equipment to achieve a stable, constant voltage and frequency output.

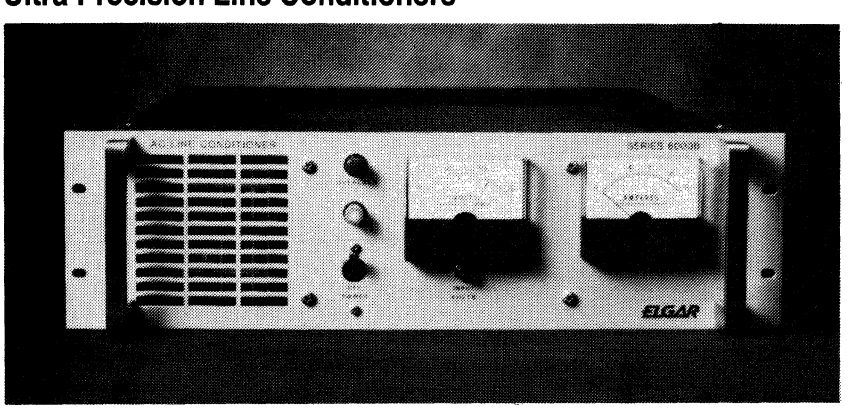
Input power factor correction yields minimal losses since both kVA and kW are virtually identical at the output for any load.

Modular construction produces a low MTTR and an extremely wide range of single and three-phase systems from 12 to 480 kVA. DMAC II's have the output purity standard normally found in a linear supply of less than 0.5% THD.

DMAC II's drive any load from zero to unity PF and can provide uninterruptible power when ordered with optional battery backup.

With higher efficiency at all load levels, DMAC II's use less commercial power and generate less heat, resulting in significant operating cost savings.

Ultra Precision Line Conditioners



Elgar's Ultra Precision AC Line Conditioners provide precise, clean AC power to critical loads by eliminating high-speed AC line and load transients and distortion as well as providing precise regulation. These versatile instruments have response times 5,000 times faster than the fastest conventional AC line regulators and line isolation of 70 to 100dB, far superior to mere isolation transformers.

Front panel controls include meters to monitor input and output voltages and output load current, an overload indicator and an input circuit breaker. 60 and 50 Hz versions are available.

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GPS1000 Global Power Supply

SPECIFICATIONS

OUTPUT

Maximum Output Rating: 1 kVA

Output Voltage: 117 VAC±2%

Output Frequency: 60 Hz±1%, Crystal Controlled

RMS Current: 8.33 amps

Peak Current: 3.0x RMS current

Line and Load Regulation: 2%

Response Time: 200 microseconds

Harmonic Distortion: Less than 4% into a full linear load

Power Factor: 0 lead to 0 lag

Efficiency: 80%

Output Protection: Peak current limiting, RMS overcurrent shutdown, thermal shutdown

INPUT

Input Voltage: 85 to 140 VAC and 170 to 280 VAC.

Input Frequency: 45 to 450 Hz

Input Protection: Overvoltage shutdown

GENERAL

Operating Temperature: 0° to 55°C

Storage Temperature: -40° to 70°C

Weight: 44 lbs.

Dimension: 10.5"H x 8.5"W x 17.5"L

Outlets: 3

PRODUCT OVERVIEW

Elgar's Global Power Supply (GPS1000) is a compact, portable 1 kVA AC power source ideal for converting aircraft, international or generator power to clean 117 VAC, 60 Hz U.S. power. This portable AC power source accepts input power from virtually anywhere in the world. It protects against input surges, spikes and noise, and provides full power during brownouts. Optional input power adapters are available for immediate power connections anywhere in the world. The output is via conventional U.S. style outlets. **Note: No battery backup.**

FEATURES & BENEFITS

Universal Input

The GPS1000 automatically selects between the two input ranges of 85 to 140 VAC and 170 to 280 VAC, while accepting any frequency from 45 to 450 Hz.

Power Conditioning

The GPS1000 runs cool, quiet and is 80% efficient. It conditions input surges and provides full power during brownouts.

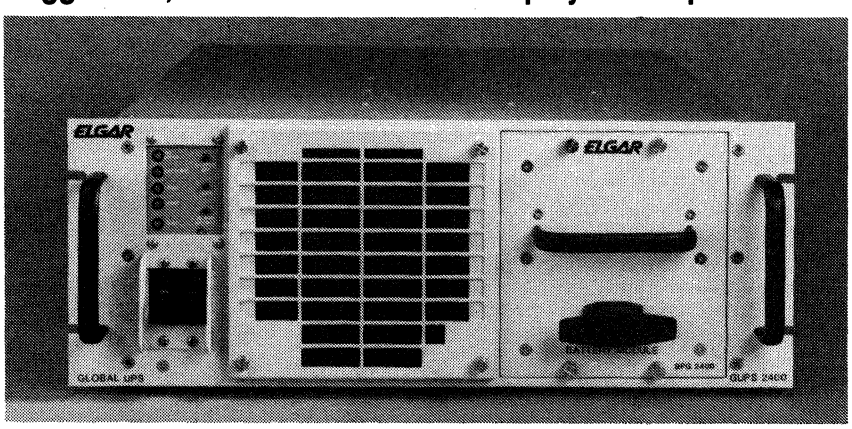
Small Size/Portable

The GPS1000 weighs only 44 lbs. and is housed in a rugged, easy to use "plug-in and go" carrying case.

International Power Adaptor Plugs

There are eight optional adaptor cables avaiable for continental Europe, Australia, United Kingdom, Denmark, Israel, Italy, India and Switzerland.

Ruggedized, Global UPS's for Field Deployed Computer Based Systems

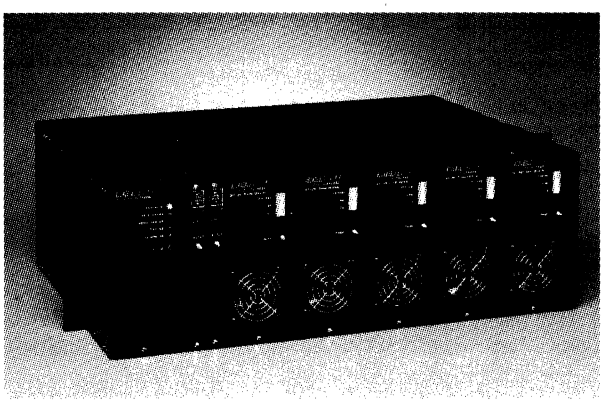


Elgar's Global UPS (GUPS) provides a rugged, reliable solution to power problems encountered by remote and globally deployed transportable computer based systems. It features small size and light weight. The GUPS was specifically designed for military C⁴I tactical computer requirements and is a standard in the oil exploration industry.

- **Universal input.** Automatically selects input range without operator intervention. 80-280 VAC with power factor correction on GUPS 1250AD.
- **Universal output.** Switchable 115 VAC/60 Hz or 230 VAC/50 Hz available on GUPS 2400U.
- **Rugged.** Meets MIL-STD-810E, Method 514.4 and Method 516.4.

Specifications	GUPS 1250A/AD	GUPS 2400A	GUPS 2400AD	GUPS 2400U
Maximum output rating	1.2kVA/1000W	2.4kVA/1920W	2.4kVA/1920W	2.4kVA/1920W
Output voltage	115 VAC ±2%	115 VAC ±2%	115 VAC ±2%	115VAC ±2% or 230V ±2%
Output frequency	60 Hz ±0.1%	60 Hz ±0.1%	60 Hz ±0.1%	60 Hz or 50 Hz ±0.1%
Input frequency	45 to 450 Hz	45 to 450 Hz	45 to 450 Hz	45 to 450 Hz
Input voltage	**AC:** 80 to 280 VAC A & AD **DC:** 22 to 32 VDC AD only	85 to 140 VAC or 170 to 280 VAC	**AC:** 85 to 140 VAC or 170 to 280 VAC **DC:** 20 to 32 VDC	85 to 140 VAC or 170 to 280 VAC
Battery type	Top panel removal battery module	Front panel removable battery module	Separate external battery chassis	Front panel removable battery module
Battery backup time	15 minutes backup w/1250 VA load, 0.8 PF @ 25°C	5 minutes backup w/2400 VA load, 0.8 PF @ 25°C	10 minutes backup w/2400 VA load, 0.8 PF @ 25°C	5 minutes backup w/2400 VA load, 0.8 PF @ 25°C
Optional external battery packs available	No	Yes. For total of 18 min. at full rated load dual pack	External battery is required for 10 min. at full rated load dual pack	Yes. For total of 18 minutes at full rated load dual pack
Weight	100 lbs. AD 93 lbs. A	78 lbs without battery module. Removable internal battery module is 48 lbs; total 126 lbs.	Main chassis 95 lbs.; battery chassis 106 lbs; total 201 lbs.	83 lbs. without battery module. Removable internal module is 48 lbs; total is 131 lbs.
Dimensions	7"H x 19"W x 21"L	7"H x 19"W x 21"L	Two chassis, ea. 7"H x 19"W x 21"L	7"H x 19"W x 21"L

PURE POWER



SINE WAVE N + 1 REDUNDANT INVERTERS

- ***Hot-insertable modules***
- ***Expandable to 20 modules and beyond***
- ***N + 1 redundant***
- ***Compact and lightweight***

SPECIFICATIONS

Output Power:	1000 Watt Modules
Input Voltages:	12 Vdc to 108 Vdc
Efficiency:	80 to 90%
Output Voltage:	117.5 or 235 Vac
Output Frequency:	50, 60 or 400 Hz
Distortion:	<1.5%
Regulation:	<0.5%
Size:	7" H x 3.18" W x 15" D
Weight:	7 lbs.
Protection Circuitry:	Over and under voltage, thermal, output short, input polarity

Introducing the world's first truly redundant modular inverter system.

EXELTECH hot-insertable, true sine wave inverter modules can be replaced while the inverter remains on line, providing the ultimate in system reliability.

These modules are available in 500- and 1,000-watt versions, allowing effective configurations ranging from 500W to 20kW continuous output.

System output voltage is precisely regulated over its wide input voltage range and complete output power spectrum. Models are available for all standard battery systems. Custom models can be designed to meet your specific input voltage requirements.

EXELTECH also manufactures the P Series, a complete line of stand-alone inverter products which incorporate the same advanced technology found in the modular systems.

For more information about EXELTECH true sine wave power inverters, call 800-886-4683.

EXELTECH

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Fort Worth, Texas 76118-7101
817-595-4969 or 800-886-4683
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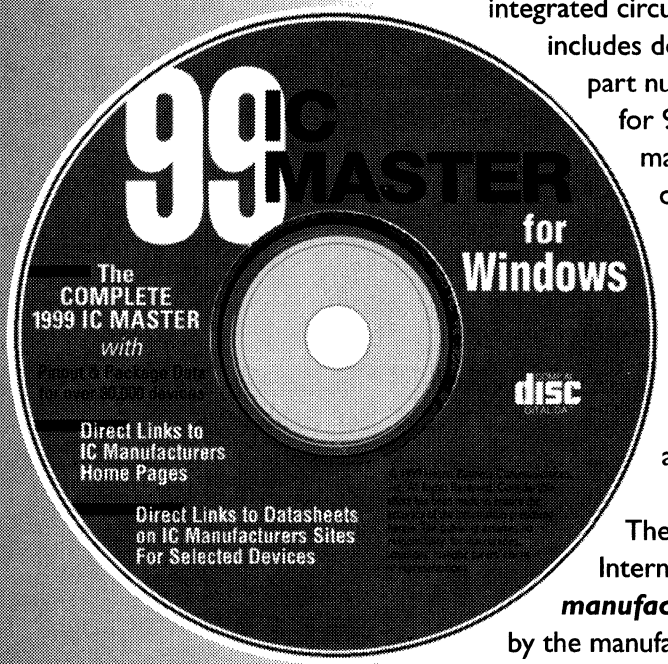

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The CD-ROM search program can launch your Internet browser and ***link*** you directly ***to the manufacturer's own website.*** And, for devices selected by the manufacturer, ***link*** you directly ***to the actual datasheets*** for the device on the manufacturer's website.

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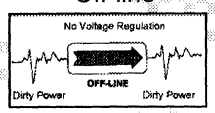
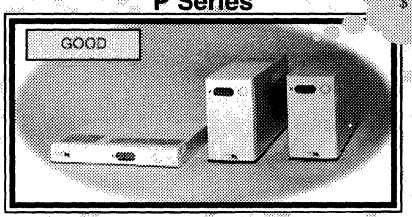
FALCON® Electric has been a manufacturer of advanced UPS products to many of the world's largest and most prestigious companies since 1988. Our products have established reliability benchmarks so high, all branches of the military, NASA, telephone companies, postal service and oil companies demand them. Through the years, our products have continually been rated over the competition in testing performed by PC Magazine, PC Week LAN Times, Communications Week, Resellers News and many other publications. *Hundreds of thousands of our units are in use throughout the world.* You have known us through our private trademarks such as ITT VIP Executive, EPE, Chloride, NEC and Fiskars, but will continue to know us as FALCON® Electric. Unlike other UPS manufacturers, we offer a full line of solutions Off-line, Line interactive and true On-line topologies. So we can sell you just what you need. Others–who don't make all types–will claim you need only the type they happen to make. It's time the Falcon® nameplate got the recognition long since accorded the hardware itself. To lubricate this process, we've cooked up some extremely attractive offers.

250VA-750VA
Off-line

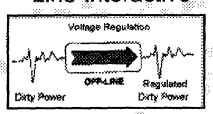


- **Economical Off-line Computer Backup**
- **Stylish, Compact & Light Weight**
- **Built-in Surge Protection**
- **LCD Display**
- **Rugged Inverter Construction**
- **High Efficiency**
- **Reliable SMT Construction**
- **Optional RS232**

P Series 250VA $79*

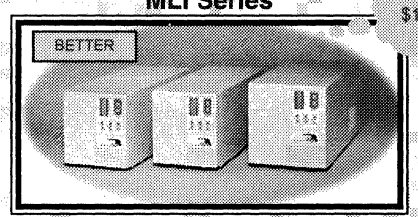


500VA-1KVA
Line-Interactive



- **High Performane Line-Interactive Design**
- **Microprocessor Control**
- **Boost and Buck Output Regulation**
- **Hot Swap Battery**
- **Fast Recharge**
- **DC Cold Start & Auto Start**
- **Fax, Modem, Network Surge Protection**
- **Internal SNMP Slot**
- **Intelligent RS-232 Commnications**
- **Win 95 Shutdown Software**

MLI Series 500VA $185

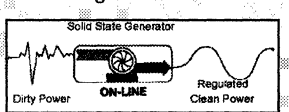


* Minimum quantity 10 pieces

SG Series 1KVA $490*

- **True Regenerative On-Line Design**
- **Power Factor Correction**
- **RS232 Communications**
- **Built-in Surge Protection**
- **Microprocessor Control & Communications**
- **Compact size, lightweight**
- **Wide input voltage window**
- **High Efficiency**
- **Over crest ratio indicator**
- **Generator Compatifility Option**
- **Optional internal SNMP Agent**
- **Site Wiring Fault indicator**
- **Green Mode Operation**

600VA-6KVA
True Regenerative On-line



We offer both domestic and European voltages. Most models support intelligent RS-232 communications, optional monitoring and shutdown software, as well as direct Local Area Network connectivity through optional SNMP/HTTP adapters. We also manufacture frequency converters and precision utility voltage regulators. In continued support of our O.E.M. customers, our products are offered in board level kits as well. Whether you need a complete product or to package a UPS into your present design, FALCON® Electric will respond to your requirement with the most effective–and *cost-effective–solution.*

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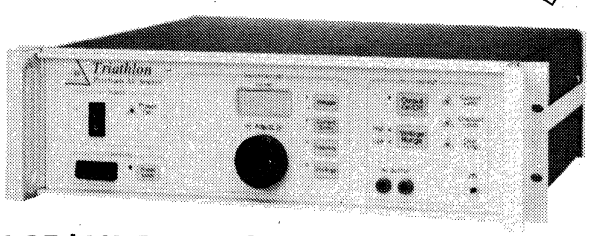
Triathlon Precision AC Power Source

What's New From Georator



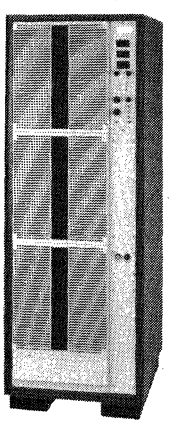
1.35 kVA Power Source Bench or Rack Mount MODEL 901-1401

Our most popular rack mountable single-phase power source. Available with isolated or non-isolated output. All TRIATHLON models come with these standard features: 100% digital control system, integral soft start for load protection, electronic overload/short circuit protection, crystal referenced synthesized sine wave.

Specifications:
Power rating: 1.35 kVA
Input voltage: 115 or 115/230, 1ø
Output frequency: 45 to 500 Hz
Output voltage: 1ø (L-N), 0-135 or 0-270
THD: 0.5% maximum
Options: 400 Hz input • RS-232 interface • IEEE-488 interface • Remote control and monitoring.

Triathlon Precision AC Power Source Rack Series

What's New From Georator



12.0 to 240 kVA Power Sources Rack Series MODELS 901-321 to 442

Rack constructed models range from 12.0 to 240 kVA. Output power may be increased utilizing our Multi-Unit Power Link option.

Specifications:
Power rating: 12 to 240 kVA
Input: 230V 1ø or 120/208, 277/480V 3ø
Output frequency: 45 to 500 Hz
Output voltage: 1ø (L-N) 0-135 or 0-270
• 3ø (L-N) 0-135 or 0-305
THD: 0.75% maximum
• IEC 555 & CE Mark Test

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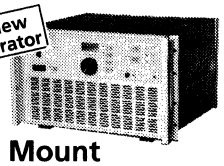
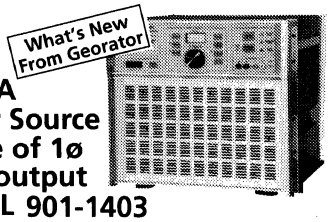


2.7 kVA Power Source Bench or Rack Mount MODEL 901-1402

Twice the power of our Model 1401, unit has 230 volt input and isolated output. All TRIATHLON models come with these standard features: Full 4 digit display and 1/10th volts, amps, hertz resolution, current limit control options, panel lock, .01% frequency regulation.

Specifications:

Power rating: 2.7 kVA
Input: 230V 1ø
Output frequency: 45 to 500 Hz
Output voltage: 1ø (L-N), 0-135 or 0-270
THD: 0.5% maximum
Options: 400 Hz input • RS-232 interface • IEEE-488 interface • Remote control and monitoring.

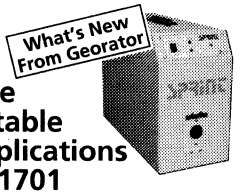


4.0 kVA Power Source Choice of 1ø or 3ø output MODEL 901-1403

The 1403 is our most powerful bench top. Models with 3ø capabilities. From a 1ø or 3ø input, provides 1, 3, or switchable "Select-A-Phase" output. Control of 3 output phases is user configurable between simultaneous or independent.

Specifications:

Power rating: 4.0 kVA
Input: 230V 1ø or 120/208V 3ø
Output frequency: 45 to 500 Hz
Output voltage: 1ø (L-N) 0-135 or 0-270 • 3ø (L-N) 0-135 or 0-305
THD: 0.5% maximum
Options: 400 Hz input • Output Select-A-Phase • RS-232 interface • IEEE-488 interface • Remote control and monitoring.



Power Source 1.25kVA Portable or Bench Applications MODEL 901-1701

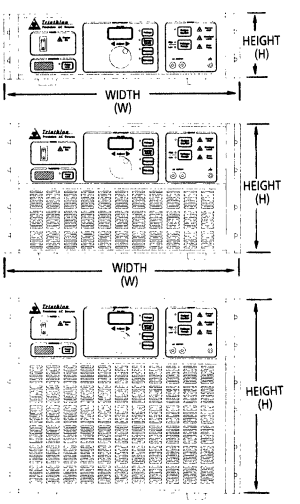
Test your export product anywhere. Choose the output frequency and voltage you need to emulate power from any country. Simply plug SPRINT into any single phase AC outlet. Easy transport between test applica-tions, only 43 pounds. Engineering exceeds UL, and CSA safety codes. It's the world's most reliable, durable converter for use in the lab, test room, or field.

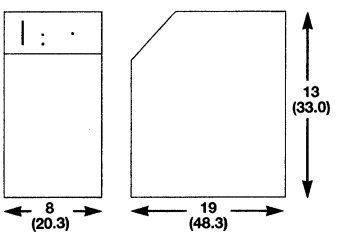
Specifications:

Power rating: 1.25 kVA
Input voltage: 115 or 230, 1ø
Output frequency: 50, 60, 400, or 420
Output voltage: 100, 110, 115, 120, or 220, 230, 240 • THD: 0.5% maximum
Weight (lbs): 43
Size (inches): 8W x 19D x 13H
Option: User specified international receptacle.

PRODUCT DATA TABLE

OUTPUT					INPUT			Dimensions (in.)			Weight	Outline Drawings
Model	KVA	Voltage	Frequency	ø	Voltage	Frequency	ø	L	W	H	(lbs)	
SERIES 901												
901-1401-1	1.35	0-135/270	45-500	1	115/230	50-400	1	16	17	5.25	60	
901-1401-2	1.35	0-135/270	45-500	1	115	50-400	1	16	17	5.25	43	
901-1402-1	2.7	0-135/270	45-500	1	230	50-400	1	16	17	10.5	112	
901-1402-2	2.7	0-135/270	45-500	1	115	50-400	1	16	17	10.5	112	
901-1403-1	4.0	0-135/270	45-500	1	230	50-60	1	16	17	15.75	168	
901-1403-2	4.0	0-135/305	45-500	3	230	50-60	1	16	17	15.75	170	
901-1403-3	4.0	0-135/305	45-500	3	120/208	50-60	3	16	17	15.75	172	
901-1403-4	4.0	0-135/305	45-500	1/3	230	50-60	1	16	17	15.75	173	
901-1403-5	4.0	0-135/305	45-500	1/3	120/208	50-60	3	16	17	15.75	173	
901-1701	1.25	FIXED	FIXED	1	115 or 230	FIXED	1	19	8	13	54	





Dimensions: in.(cm)

NOTES: 1) Representative sampling only. For Models 901-1404 thru 901-1408, call for specific model numbers.
2) 400 Hz input optionally available for all 50-60 Hz input models.
3) All voltages are L-N.

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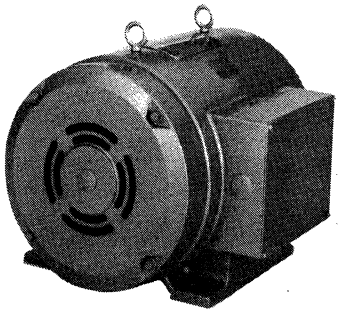


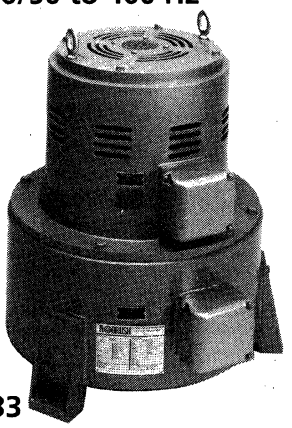
SERIES 30

Provides a clean, reliable source of nominal 400 Hz power. Inherent regulation provides excellent voltage and frequency stability. Exceptional MTBF with minimal maintenance. Compact and quiet.

Specifications

Power Ratings: 150 VA to 3 kVA
Motor Type Induction
Alternator Type: Permanent magnet excitation
Waveform: THD less than 4
Warranty: **5 years**

60 to 400/50 to 400 Hz



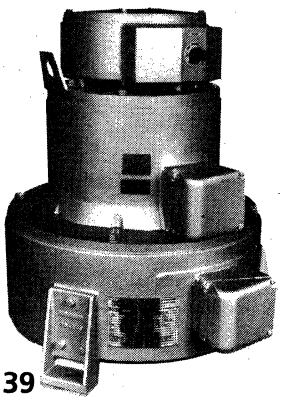
SERIES 33

Provides a clean, reliable source of nominal 400 Hz power. Inherent regulation provides excellent voltage and frequency stability. Exceptional MTBF with minimal maintenance. Quiet operation. Exact 400 Hz Models also available.

Specifications

Power Ratings: 2.5 to 20 kVA
Motor Type: Induction
Alternator Type: Permanent magnet excitation
Waveform: THD less than 4
Warranty: **5 years**

400 Hz, Voltage Regulated



SERIES 39

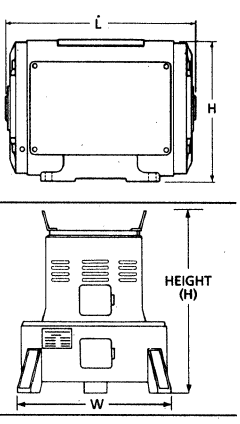
Supplies a clean, regulated source of nominal 400 Hz power. All units include a voltage regulator which maintains output at ±1% from NL to FL. Models are available with exact 400 Hz output.

Specifications

Power Ratings: 3 to 18.75 kVA
Motor Type: Induction or Synduction
Alternator Type: Permanent magnet excitation
Waveform: THD less than 4
Warranty: **5 years**

PRODUCT DATA TABLE

Model	OUTPUT KVA	Full Load (Voltage)	ø	INPUT Voltage	ø	Full Load (Amperes)	Motor HP	Dimensions (in.) L	W	H	Weight (lbs)	Outline Drawings
SERIES 30												
30-001	0.25	115	1	115/230	1	8.2/4.1	1/2	11	10	8	40	
30-002	0.5	115	1	115/230	1	10/5	3/4	11	10	8	50	
30-003	1.0	115	1	115/230	1	24/12	1 1/2	15	14	12	120	
30-026	1.5	115/200	3	115/230	1	34/17	2 1/4	15	14	12	130	
30-006	0.75	115/200	3	220/440	3	5.2/2.6	1 1/10	11	10	8	50	
30-008	3.0	115/200	3	220/440	3	14.2/7.1	4 1/2	15	14	12	150	
SERIES 33												
33-001	2.5	115	1	220/440	3	15.2/7.6	5	—	20	21	200	
33-003	5.0	115	1	220/440	3	21.1/10.5	7.5	—	20	21	245	
33-004	5.0	115/200	3	220/440	3	21.1/10.5	7.5	—	20	21	215	
33-005	7.5	115/200	3	220/440	3	36/18	12	—	20	22	265	
33-006	10.0	115/200	3	220/440	3	40/20	15	—	20	22	280	
33-154	20.0	115/200	3	220/440	3	78/39	30	—	24	27	500	
SERIES 39												
39-002	5	115	1	220/440	3	21.1/10.5	7.5	—	22	20	290	
39-001	5	120/208	3	220/440	3	30/15	7.5	—	22	20	280	
39-004	6.5	120/208	3	220/440	3	30/15	10	—	22	20	305	
39-015	15	120/208	3	220/440	3	68/34	25	—	30	26	530	



NOTES: 1) Representative sampling only.
2) Non-standard I/O voltages available.
3) 50 Hz input models available.
4) Permanent Magnet Alternators and Rotor/Stator Components also available.

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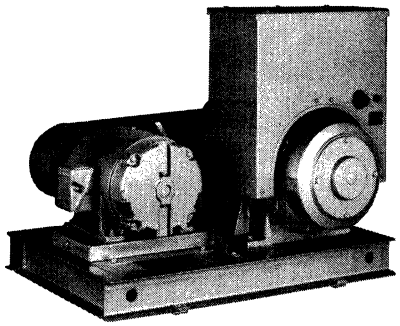


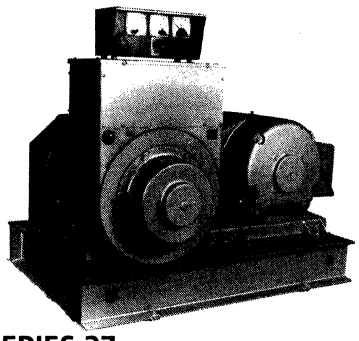
SERIES 37

Designed for applications requiring higher output ratings of 400 Hz power. Provides accurate, reliable power and complete isolation from voltage fluctuations, switching transients, and line noise.

Specifications

Power Ratings: 25 to 200 KVA
Motor Type: High efficiency induction
Alternator Type: Synchronous rotating rectifier with voltage regulator mounted.
Waveform: THD less than 3%

50 to 60/60 to 50 Hz



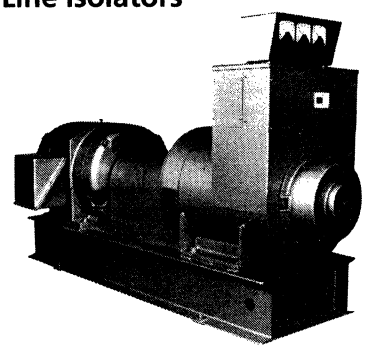
SERIES 37

Provides accurate and stable output power, as well as complete isolation from switching transients, voltage fluctuations, and line noise. Units allow for compatibility between U.S. and International power standards.

Specifications

Power Ratings: 2.5 to 200 KVA
Motor Type: High efficiency induction (Synduction optional on 2.5 to 25 KVA)
Alternator Type: Synchronous rotating rectifier with voltage regulator mounted.
Waveform: THD less than 5%

Line Isolators



SERIES 37

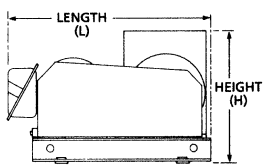
Provides complete isolation between the load and input power, eliminating voltage fluctuations, switching transients and line noise. Maintains approx. 100 milliseconds of ride-through during power outages.

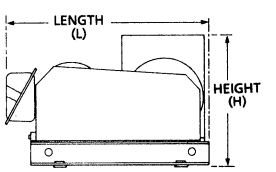
Specifications

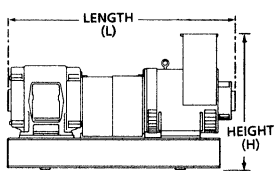
Power Ratings: 2.5 to 200 KVA
Motor Type: High efficiency induction (Synduction optional on 2.5 to 25 KVA)
Alternator Type: Synchronous rotating rectifier with voltage regulator mounted.
Waveform: THD less than 5%

PRODUCT DATA TABLE

OUTPUT				INPUT				Dimensions (in.)			Weight	Outline
Model	KVA	Full Load (Voltage)	Phase	Voltage	Phase	Full Load (Amperes)	Motor HP	L	W	H	(lbs)	Drawings
SERIES 37/400 Hz												
37-600	25	115/200	3	230/460	3	94/47	40	42	30	33	1050	
37-601	37.5	115/200	3	230/460	3	142/71	60	54	39	34	1700	
37-602	50	115/200	3	230/460	3	176/88	75	56	42	34	1800	
37-604	75	115/200	3	230/460	3	232/116	100	59	45	41	2650	
37-605	100	115/200	3	460	3	138	125	60	48	41	3000	
37-606	125	115/200	3	460	3	174	150	60	48	41	3300	
SERIES 37/50-60, 60-50 Hz												
37-500	2.5	115/230	1	230/460	3	14.4/7.2	5	36	24	24	490	
37-510	6.25	115/230	1	230/460	3	36/18	10	37	25	31	700	
37-521	12.5	220/380	3	230/460	3	48/24	20	40	28	33	850	
37-540	25	115/230	1	230/460	3	94/47	40	42	30	33	1050	
37-550	37.5	220/380	3	230/460	3	118.4/59.2	60	54	39	34	1700	
37-560	62.5	220/380	3	230/460	3	232/116	100	56	45	36	2650	
37-561	75	220/380	3	230/460	3	232/116	100	59	45	41	2650	
37-573	125	220/380	3	460	3	174	150	60	45	41	3000	
SERIES 37 Line Isolators												
37-504	2.5	115/230	1	230/460	3	14.4/7.2	5	44	18	22	360	
37-515	6.25	120/208	3	230/460	3	36/18	10	44	19	34	650	
37-524	12.5	115/230	1	230/460	3	48/24	20	52	20	34	850	
37-544	25	115/230	1	230/460	3	94/47	40	56	24	34	1100	
37-554	37.5	120/208	3	230/460	3	118.4/59.2	60	66	27	31	1550	
37-555	50	120/208	3	230/460	3	176/88	75	67	27	31	1595	
37-565	75	120/208	3	230/460	3	232/116	100	77	30	36	2350	
37-575	125	120/208	3	460	3	174	150	76	35	44	2950	







NOTES: 1) Representative sampling only.
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3) 50 Hz input models available.

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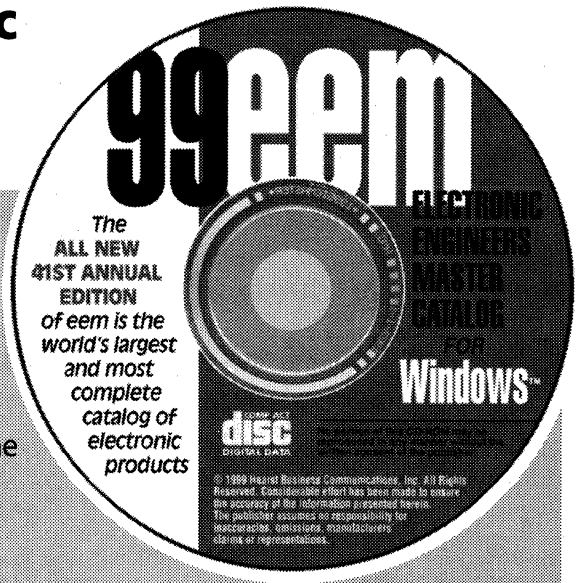

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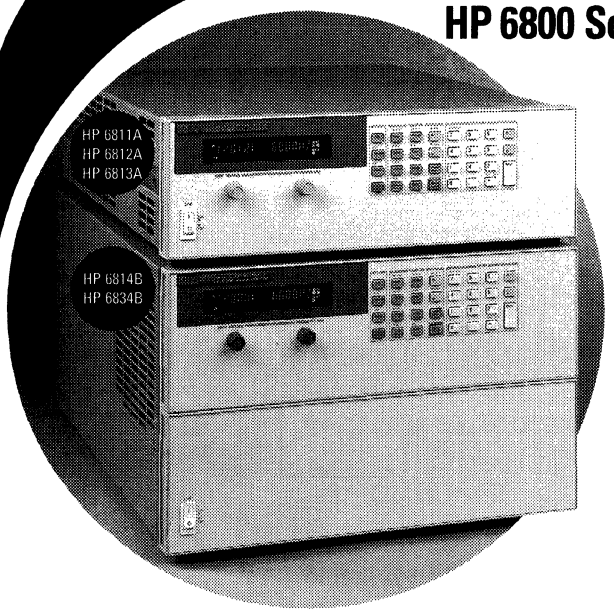

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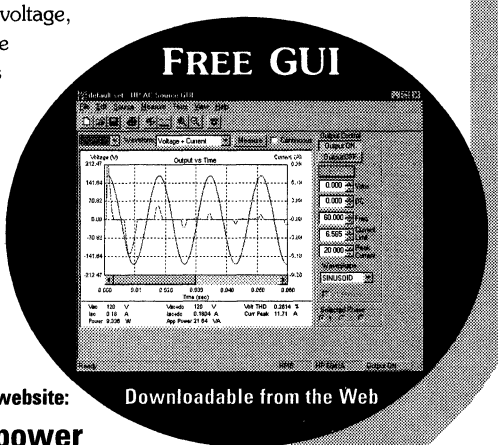
- Built-in HP-IB & RS232 interfaces
- MIL-STD 704 & RTCA-D0160 Tests
- Extensive protection to prevent load damage
- Elgar Compatibility Mode in firmware PIP E9012
- HP VEE & National Instruments LabVIEW drivers available

Specifications Table

Model	6811A	6812A	6813A	6814B	6834B
Phases	1	1	1	1	1/3
Power	375VA	750VA	1750VA	3000VA	4500VA
Frequency	dc; 45 Hz to 1 kHz	dc; 45 Hz to 1 kHz	dc; 45 Hz to 1 kHz	45 Hz to 5 kHz	45 Hz to 5 kHz
Max rms voltage	300V	300V	300V	300V High Rng	300V High Rng
Max rms current	3.25A	6.5A	13A	10A High Rng 20A Low Rng	15A/5A High Rng 30A/10A Low Rng
Max Peak current	40A	40A	80A	40A High Rng 80A Low Rng	60A/20A High Rng 120A/40A Low Rng
Crest Factor	12	6	6	4	4
dc voltage	+/- 425V	+/- 425V	+/- 425V	N/A	N/A
dc current	2.5A	5A	10A	N/A	N/A
Dimensions	5.25" H x 16.75"W x 22.6" D (132.6mm) x (425.5mm) x (574.7mm)			10.5" H x 16.75"W x 23.7" D (266.7mm) x (425.5mm) x (602mm)	
Weight	62 lb (28.2 kg)	62 lb (28.2 kg)	72 lb (32.7 kg)	175 lb (79.5 kg)	193 lb (87.7 kg)
Price	$5,500	$7,040	$9,960	$11,730	$14,180

More and more engineers are choosing the HP 6800 series because they're *easy to operate* from the front panel and *easy to program* from a computer using the *free GUI* or your own software. These ac power source/analyzers use *high performance*, state of the art DSP processing and shunt technology for accurately generating and measuring ac power. It is fast and easy to generate both clean and distorted ac power for product testing.

In addition to overcurrent, overvoltage, overpower and overtemperature protection, the HP 6800 series offers output disconnect relays and remote inhibit capability to protect the device under test. Backed by a *three-year warranty* and a worldwide support network, these products offer *proven reliability* and flexibility.



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To download the demo from our website:
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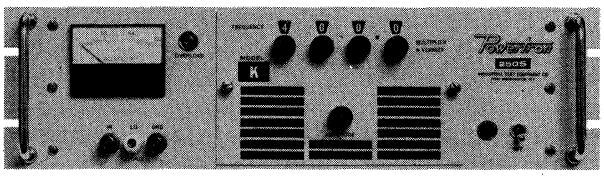
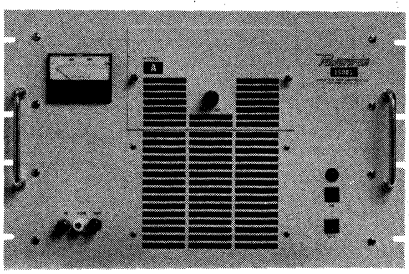
Powertron® 10Hz to 1MHz AC Voltage Sources



5.25"



12.25"

GENERAL SPECIFICATIONS:

(request catalog for complete specifications)

(linear circuitry) stackable for 2 or 3 phase use

Output: Fully isolated by transformer

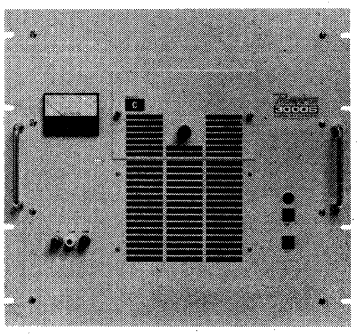
Distortion: 0.5% typical

Load Regulation: Adjustable to zero

Line Regulation: 0.1%

External signal and synch inputs provided

Input Power: 120V/240V single phase or 3 phase 208V/480V



17.5"

MODEL	WATTS	RACK HT.	FREQUENCY	VOLTAGE RANGE (Zero to:)
80S	80	5.25"	20Hz to 100kHz	8.5, 17, 30, 38, 60, 67, 75, 90, 130, 190, 260
250S	250	5.25"	20Hz to 100kHz	8.5, 17, 30, 38, 60, 67, 75, 90, 130, 190, 260
250A	250	7"	10Hz-1MHz	22.5V. Up to 6000V (41mA) or 1.2V (200A) With Optional Output Transformer
500A	500	7"	10Hz-1MHz	22.5V. Up to 6000V (82mA) or 1.5V (300A) With Optional Output Transformer
500S	500	5.25"	45Hz to 100kHz	8.5, 17, 30, 38, 60, 67, 75, 90, 130, 190, 260
1500S	1,500	12.25"	45Hz to 100kHz	65, 130 & 260
3000S	3,000	17.50	45Hz to 100kHz	65, 130 & 260

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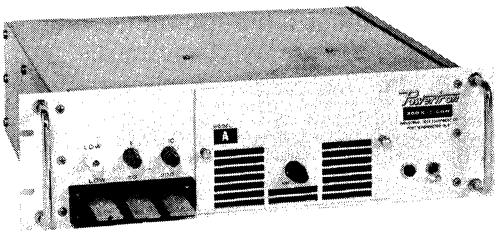
INDUSTRIAL TEST EQUIPMENT COMPANY, INC.

Powertron® AC Current Sources

Constant Current AC Supplies

In addition to constant voltage sources, a full line of constant current sources is available. The inherent ability of these units to maintain a preset current through a load whose impedance may vary makes them ideally suited for the testing of ammeters, wattmeters, relays circuit breakers, current transformers and other current sensitive devices. These sources may be driven by the plug-in oscillators. All units are protected for open load circuit conditions.



GENERAL SPECIFICATIONS:

Output Frequency: Determined by plug-in oscillator.

Current Regulation: ±1% for loads ranging from short circuit to maximum rated load impedance.

Output Distortion: Less than 1%

Constant current sources may be used with similar outputs in parallel when it is desired to increase the current capacity. Constant current supplies may also be sued for 3ϕ wye connected load applications. As the standard output transformers may not always provide the optimum current range and compliance voltage special output transformers may be supplied to meet user requirements.

Model	Current Range Amps	Max. Compliance Voltage	Impedance Range Ohms
250S-1-CR	0-0.5 0-1 0-1.5 0-3.3 0-7.5 0-15	200 100 70 30 13 7	0-400 0-100 0-45 0-9 0-1.7 0-.45
500S-1-CR	0-1 0-2 0-3 0-6.5 0-15 0-30	200 100 70 30 13 7	0-200 0-50 0-23 0-4.5 0-.85 0-.23
1000S-1-CR	0-2 0-4 0-8	200 100 50	0-100 0-25 0-6
1500S-1-CR	0-3 0-6 0-12	200 100 50	0-66 0-16.5 0-4
3000S-1-CR	0-6 0-12 0-24	200 100 50	0-33 0-8.7 0-2
250S-1-CRH	0-1 0-10 0-50 0-200	100 10 2 0.5	0-100 0-1 0-.04 0-.0025
1000S-1-CRH	0-1 0-10 0-100 0-400	400 40 4 1	0-400 0-4 0-.04 0-.0025
1500S-1-CRH	1500A Maximum, Ranges to be specified on purchase order		
3000S-1-CRH			

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Powertron®

Audio Generators

Model 5900

The Model 5900 is a high power general purpose audio generator. The circuit consists of a low distortion oscillator, a driver amplifier and a bipolar class AB1 power amplifier with an output transformer. The output transformer has three taps to allow utilization of the full power over a wide range of voltages. A frequency counter and output voltmeter are built in. Electronic overload protection is provided that limits the power into a short circuit to a safe value.

SPECIFICATIONS

Output:	Low Range	.0 to 8.5V @ 8.2A
	Middle Range	.0 to 38V @ 1.8A
	High Range	.0 to 130V @ .53A
		.0—260V on request
Power:	Max	.70VA
	Continuous	.50VA
Frequency:	Low Range	.45 to 2KHz
	High Range	.2K to 19.99KHz
Distortion:		.0.3% typ.
Power Requirements:		.120V 50 to 400Hz
Dimensions (inches):		.12 1/4 x 5 1/4 x 12 1/2
Weight:		.23 lbs.

Model 5900A & 5900C

Model 5900A is a fixed frequency, 400Hz, version of the Model 5900. Model 5900C allows you to pick your own fixed frequency.

SPECIFICATIONS

Frequency Accuracy:	Model 5900A	.0.1%
	Model 5900C	.0.1%
Distortion:	Model 5900A	.0.1%
	Model 5900C	.0.1%

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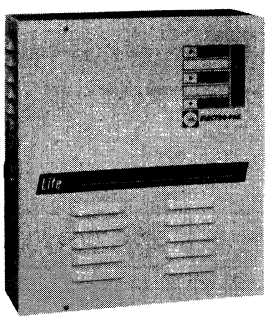


LIFELINE® UPS Systems provide on-line AC power, offering protection from power outages, line noise and voltage fluctuations which cause data losses. Applications include uninterruptible power for microcomputers, communication systems, security systems, telecommunications.

MODEL 9300057

600VA UPS SUITABLE FOR PROVIDING UNINTERRUPTIBLE POWER AND FIRE PROTECTIVE SIGNALING SERVICE TO NFPA 72 SYSTEMS.

AC Input: 120VAC, 8AAC, 60Hz
AC Output: 120VAC, 5AAC 60Hz
Battery: 48VDC 55AH
Back-Up Times:
4 Hours at 2.5AAC Output
2 Hours at 5.0AAC Output

UL LISTED
FIRE ALARM
POWER SUPPLY UNIT

Product Category UTRZ
Standard UL1481

Power Rating	OUTPUT Voltage AC	Current Load	Battery Back-Up Time ①	Battery Voltage	Line Voltage	INPUT Phase	Approx. Weight (Lbs.)	Size (Inches) H x W x D	UPS Model Number
LIFELINE® I and II On-line UPS, Sine wave output. *U.S. Patents 3,229,111 & 3,991,319*									
200 VA	120	1.6 AMPS	7 Min.	12	120	1	62	20 X 16 X 6.5	M95-200
600 VA	120	5.0	15	48	120	1	140	24 X 20 X 11.5	M95-600

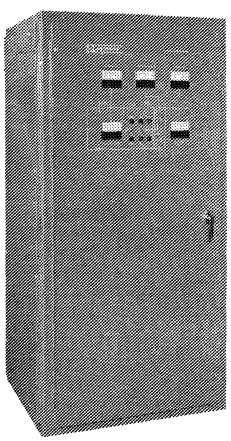
① At full load, Unity Power Factor (200W, 600W)

Additional hours of run time can be achieved with external batteries, and/or charges.

ELECTRO-PAC®, UNINTERRUPTIBLE POWER

Power Rating	OUTPUT (1Ø) Voltage AC①	Current Full Load	INPUT Battery Voltage②	Line Voltage	Phase	Approx. Weight (Lbs.)	Size (Inches) H x W x D	UPS Model Number
5.0 kVA	120	42 AMPS	120	240	1	1,400	75 X 36 X 30	UP5.0E 120-3-1-CDLTW
7.5 kVA	120	63 AMPS	120	240	1	1,750	75 X 36 X 30	UP7.5E 120-3-1-CDLTW
10 kVA	120	83 AMPS	120	240	3	2,150	75 X 48 X 30	UP10.0E 120-5-1-CDLTW
15 kVA	120	125 AMPS	120	240	3	2,900	75 X 66 X 30	UP15.0E 120-5-1-CDLTW
20 kVA	120	167 AMPS	120	480	3	3,500	75 X 72 X 30	UP20.0E 120-6-1-CDLTW

① All models also available with 240 Volt output. ② Battery back-up time specified by customer.



ELECTRO-PAC®, INVERTERS

FEATURES

- Ferroresonant Design
- Solid State Control Circuitry
- AC Output Ammeter and Voltmeter
- Front Accessibility
- Short Circuit Protected
- DC Circuit Breaker

ELECTRICAL SPECIFICATIONS

DC Voltage Input: 48 VDC, 120 VDC
AC Voltage Output: 120 VAC, 240 VAC, 120/240 VAC
Frequency: 50 or 60Hz +/- 1.0%
Cooling: Convection or Forced Air
Magnetics: Class "H" Insulation
Rating: 500VA - 20KVA Floor Mount
500VA, 1KVA, 2KVA Rack Mount

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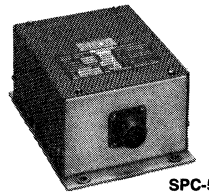
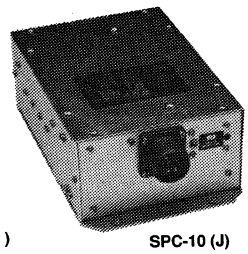
AIRBORNE TSO'D 400 Hz STATIC INVERTER

KGS ELECTRONICS static inverters utilize solid state circuitry to convert 28 VDC to 115 VAC, 400 Hz sine wave power. Design features include sine to sine or square to sine wave power conversion permitting lightweight and reliable operation.



SPC-5 ( )



SPC-10 (J)

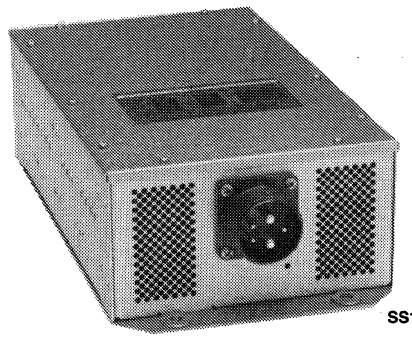
GENERAL SPECIFICATIONS

Input Voltage:	20 to 32 VDC
Output Voltage:	115 VAC and/or 26 VAC
Phase/Waveform:	Single/Sine Wave
Frequency:	400 Hz ± 1%
Ampl. Distortion:	Less than 7% (3% typical)
Power Factor:	0.8 to – 0.95
Input Overvoltage:	Operates up to 37 VDC input while supplying full rated VA output power. Output voltage under this condition is 115 VAC + 5%, – 7%
Input Transient:	Withstands transients of 88 volts lasting 1 millisecond on the 28 VDC input line
Overload & Short-Circuit Protection:	Withstands transient damage or degradation load exceeding 150% of rated output to an output dead short. Inverter delivers rated output on removal of above condition
Altitude:	45,000 ft.
Temperature:	– 65°F to + 160°F (– 55°C to + 71°C)
Humidity:	Tested to greater than 95% for 10 days, temperature was cycled between 75°F to 160°F
Environmental:	Meets RTCA Paper DO-160 Env. Cat. D2BREXXXXSXBBBA

MODEL	OUTPUT VOLTAGE VAC/VAC	OUTPUT POWER VA 115/26/5	INPUT CURRENT ADC	EFFICIENCY PERCENT TYPICAL	FEATURES	WEIGHT LBS. (KG.)	SIZE (INCH) W x L x H
SPC-5( )	115/26	50/30	2.6	67 to 72	PWM to SINE	3.0 (1.3)	4.1 x 6.5 x 2.7
SPC-5(B)	115/26	50/30	2.7	67 to 72	Fault Monitor	3.1 (1.4)	4.1 x 6.5 x 2.7
SPC-10( )	115/26	100/60	4.8	75 to 78	PWM to SINE	5.2 (2.4)	4.5 x 8.3 x 3.5
SPC-10(J)	115/26	250/150	10.6	82 min.	Phase Lock/FM	5.1 (2.3)	5.0 x 8.3 x 2.8
SPC-10(H)	115/26	350/150	16	80	PWM to SINE	5.5 (2.5)	4.5 x 8.3 x 3.5
SPC-38(B)	115/26	375/75	16	84	PWM to SINE	8.0 (3.6)	6.0 x 11.0 x 3.2
SC-50	115/26	500/100	20.7	87	PWM to SINE	4.9 (2.22)	6.34 x 9.5 x 3.4
SPC-60(A)	115/26	600/125	31	70	SINE to SINE	14.0 (6.4)	7.7 x 12.0 x 4.0
SPC-60(E)	115/26	750/150	38	70	SINE to SINE	14.2 (6.5)	7.7 x 12.0 x 4.0
SPC-75(B)	115/26/5	750/150/30	32	83	PWM to SINE	14.0 (6.4)	8.0 x 12.0 x 4.0

AIRBORNE TSO'D 60 Hz/50 Hz STATIC INVERTER

These inverters provide 60 Hz power for the operation of video and audio entertainment systems, computers, galley appliances and EMS (Emergency Medical) applications on aircraft that have 28 volt DC electrical systems. Some of these inverters can be paralleled for higher output.



SS100

GENERAL SPECIFICATIONS

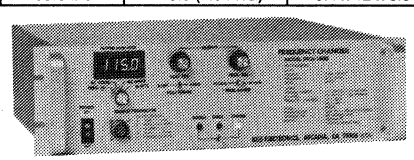
Input voltage:	1. 28 VDC ± 2 Volts, 14 VDC for SPS-316 2. Withstands 88 Volt Transient for 1 millisecond
Power Factor:	0.8 to 1.0
Amplitude Distortion:	Less than 7%
Wave Form:	Sine
Phase:	Single
Short-Circuit:	Withstand for 1 minute or longer
Temperature:	– 65°F to + 160°F (– 55°C to + 70°C)
Altitude:	45,000 ft.

MODEL	OUTPUT				INPUT		WEIGHT LBS. (KG.)	SIZE (INCH) W x L x H
	VOLTAGE	POWER VA	WAVESHAPE	FREQ. Hz	VOLTS	AMPS		
SPS-206	115 VAC	200	SINE	60 ± 1	28 VDC	10.5 DC	14.5 (6.6 Kg)	7.75 x 12 x 4
SPS-3052	230 VAC	270	SINE	50 ± 1	28 VDC	15.8 DC	18.0 (8.2 Kg)	7.75 x 12 x 4
SPS-316	115 VAC	300	SINE	60 ± 1	14 VDC	32.0 DC	18.0 (8.2 Kg)	7.75 x 12 x 4
SS-50	115 VAC	500	SINE	60 ± 1	28 VDC	22.0 DC	4.3 (1.95 Kg)	6.4 x 9.5 x 3.5
SS-100	115 VAC	1000	SINE	60 ± 1	28 VDC	42.0 DC	7.4 (3.36 Kg)	6.4 x 12 x 3.5
SB120	230 VAC	1200	SINE	50 ± 1	28 VDC.	50.0 DC	7.4 (3.6KG)	6.4 x 12 x 3.5
SS120	115 VAC	1200	SINE	60 ± 1	28 VDC	50.0 DC	7.4 (3.6KG)	6.4 x 12 x 3.5
SS200	115 VAC	2000	SINE	60 ± 1	28 VDC	83.0 DC	15.5 (7.04 KG)	6.4 x 12 x 3.5

AIRBORNE TSO'D POWER CONVERTERS & FREQUENCY CHANGERS

KGS Electronics FAA approved, lightweight power converters convert 115Vac 400Hz three phase to 115Vac 60Hz single phase output. The HS series frequency converters are designed for use in aircraft to supply 60Hz output to operate computers, video entertainment systems, galley equipment and EMS applications.

KGS Electronics solid state frequency changers convert 115/230Vac 50/60Hz to 115Vac 400Hz single phase output. The SPC-series frequency changers are designed for bench testing avionics, radars, compasses, gyros, synchros, gauges, etc.

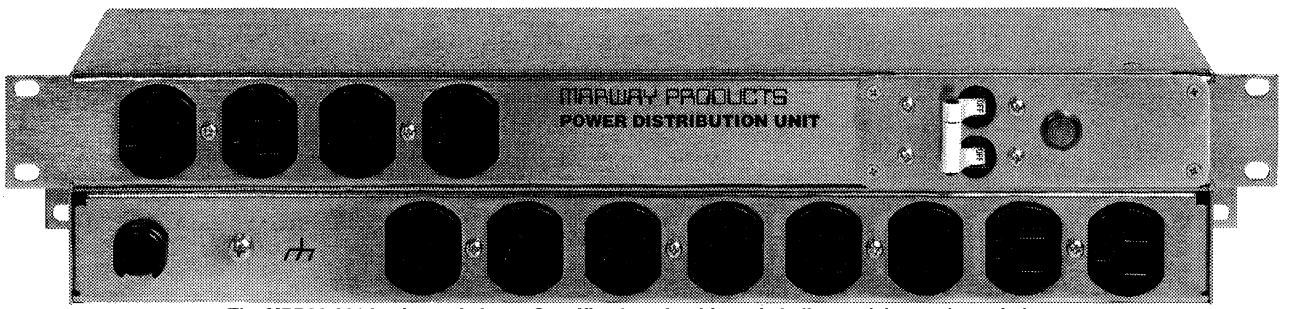


SPC6-1500

MODEL	* INPUT	OUTPUT VOLTAGE / VA	OUTPUT FREQUENCY	SIZE (INCH) W x L x H	WEIGHT (LBS.)
HS50	115 VAC 400 Hz 3Ø	115 VAC/500 VA	60Hz ±1	6.4 x 9.5 x 3.5	4.4
HS100	115 VAC 400 Hz 3Ø	115 VAC/1000 VA	60Hz ±1	6.4 x 12 x 3.5	7.5
HS200	115 VAC 400 Hz 3Ø	115 VAC/2000 VA	60Hz ±1	6.5 x 14 x 6.2	15.5
HS351	115 VAC 400 Hz 3Ø	115 VAC/3500 VA	60Hz ±1	8.1 x 18 x 6.26	26.5
SPC-6-1500	115 VAC 50 to 60 Hz	115 VAC/1000 VA (ADJ. 0-260 VAC)	50-440 Hz	19 x 17 x 5.25	22
*SPC-6-1000-3pH	115 VAC 50 to 60 Hz	120/208 L-L/1000 VA	400 Hz ± 20	19 x 13 x 7	36

*For 115/230 VAC, 50/60 Hz DUAL INPUT MODEL, ADD SUFFIX TO "C". EXAMPLE SPC-6-750C.

COMPUTER POWER SOURCES



The MPD80-001 is pictured above. Specifications for this and similar models are shown below.

SINGLE PHASE POWER UNITS

Marway provides a convenient solution for power to computer racks. The models on this page save rack space – they are only 1 ¾ inches high – and are available in widely used electrical ratings. The Marway Power Unit provides a single point of entry for AC power to the rack. On most models EMI filtering, transient suppression and overload protection support the entire rack. Outlets furnish AC to each system component on the rack. On some models, remote ON/OFF control allows system power up from a single system switch on the rack or in the room. Most models are available for immediate shipment. All are UL recognized and CSA or CUL certified.

SPECIFICATIONS FOR MARWAY POWER UNIT MODELS

MODEL NUMBER	Electrical Rating Volts-Phase-Amps Hertz	Size HxWxD Weight	Power Protection EMI/RFI Filter Varistor Circuit Breaker	Outlets NEMA Type Front-Back Switched	Remote On/Off	Power Cord Cord Length Cord Gauge/Wires NEMA Plug Type	Agencies	Available Immediate Shipment
MPD 80-001	120V1ø12A 50-60 Hz	1 ¾ x 19 x 4 ½" 9#	20A Yes 2P15A	5-15R 4F-8B 12	No	9' 14/3 5-15P	UL CUL	Yes
MPD 80-002	120V1ø16A 50-60 Hz	1 ¾ x 19 x 4 ½" 9#	20A Yes 2P20A	5-15R 4F-8B 12	No	10' 12/3 LP-20P	UL CUL	Yes
MPD 80-003	120V1ø24A 50-60 Hz	1 ¾ x 19 x 4 ½" 9#	30A Yes (2)2P15A	5-15R 4F-8B 12	No	10' 10/3 LP-30P	UL CUL	Yes
MPD 90	120V1ø12A 50-60 Hz	1 ¾ x 19 x 4 ½" 8#	None None None	5-15R 4F-8B 12	No	9' 14/3 5-15P	UL CSA	Yes
MPD 90-002	120V1ø16A 50-60 Hz	1 ¾ x 19 x 4 ½" 8#	None None 2P20A	5-15R 4F-8B 12	No	10' 12/3 LP-20P	UL CSA	Yes
MPD 90-003	120V1ø24A 50-60 Hz	1 ¾ x 19 x 4 ½" 8#	None None (2)2P15A	5-15R 4F-8B 12	No	10' 10/3 LP-30P	UL CSA	Yes
MPD 100R	120V1ø12A 50-60 Hz	1 ¾ x 19 x 8" 9#	20A Yes 2P15A	5-15R 2F-6B 6	Yes	9' 14/3 5-15P	UL CSA CE	Yes
MPD 100R-002	120V1ø16A 50-60 Hz	1 ¾ x 19 x 8" 10#	20A Yes 2P20A	5-15R 2F-6B 6	Yes	10' 12/3 LP-20P	UL CSA	Yes
MPD 100R-003	120V1ø24A 50-60 Hz	1 ¾ x 19 x 8" 12#	30A Yes (2)2P15A	5-15R 2F-6B 6	Yes	10' 10/3 LP-30P	UL CSA	Yes
MPD 200	230V1ø12A 50-60 Hz	1 ¾ x 19 x 8" 9#	20A Yes 2P15A	6-15R 2F-6B 8	No	9' 14/3 6-15P	UL CUL	Yes
MPD 200-002	230V1ø16A 50-60 Hz	1 ¾ x 19 x 8" 10#	20A Yes 2P20A	6-15R 2F-6B 8	No	10' 10/3 L6-20P	UL CUL	Yes
MPD 200-003	230V1ø24A 50-60 Hz	1 ¾ x 19 x 8" 12#	30A Yes 2P25A	6-20R 2F-6B 8	No	10' 10/3 L6-30P	UL CUL	Yes

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POWER SYSTEMS

FOR CONVENIENCE, MANY STANDARD MODELS ARE AVAILABLE FOR NEXT-DAY SHIPMENT TO ESTABLISHED CUSTOMERS.

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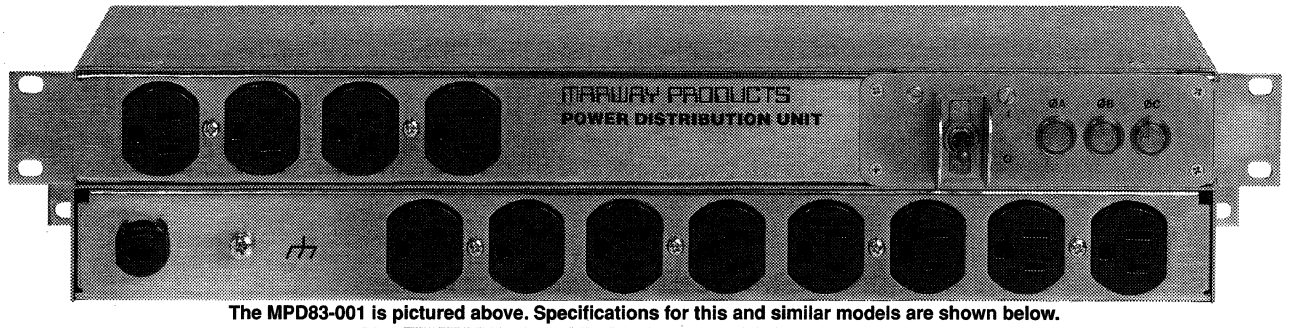


The MPD83-001 is pictured above. Specifications for this and similar models are shown below.

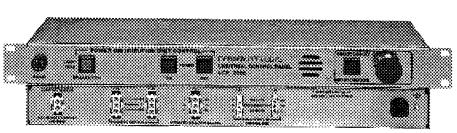
THREE PHASE POWER UNITS

Some of Marway's most widely used 3-Phase models are highlighted here. All take in 3-Phase power as input and break it down to single phase AC power useable on computer racks. The models are only 1 ¾ inches tall, to save rack space. Models at electrical ratings commonly required by rack builders are available. All offer power protection: EMI filtering, transient suppression and overload protection. Some models have remote control convenience. All are available for immediate shipment. And all are UL recognized and CSA or CUL certified.

SPECIFICATIONS FOR MARWAY POWER UNIT MODELS

MODEL NUMBER	Electrical Rating Volts-Phase-Amps Hertz	Size HxWxD Weight	Power Protection EMI/RFI Filter Varistor Circuit Breaker	Outlets NEMA Type Front-Back Switched	Remote On/Off	Power Cord Cord Length Cord Gauge/Wires NEMA Plug Type	Agencies	Available Immediate Shipment
MPD 83-001	120/208V3ø12A/ø 50-60 Hz	1 ¾ x 19 x 4 ½" 12#	20A Yes 3P15A	5-15R 4F-8B 12	No	15' 12/5 L21-20P	UL CUL	Yes
MPD 83-002	120/208V3ø16A/ø 50-60 Hz	1 ¾ x 19 x 4 ½" 14#	20A Yes 3P20A	5-15R 4F-8B 12	No	15' 12/5 L21-20P	UL CUL	Yes
MPD 103-003	120/208V3ø24A/ø 50-60 Hz	1 ¾ x 19 x 8" 21#	(2)20A Yes (2)3P15A	5-15R 2F-10B 12	No	15' 10/3 L21-30P	UL CUL	Yes
MPD 103R-001	120/208V3ø12A/ø 50-60 Hz	1 ¾ x 19 x 8" 12#	20A Yes 2P15A	5-15R 4F-8B 12	Yes	9' 14/3 5-15P	UL CUL	Yes
MPD 103R-002	120/208V3ø16A/ø 50-60 Hz	1 ¾ x 19 x 8" 14#	20A Yes 2P20A	5-15R 4F-8B 12	Yes	10' 12/3 LP-20P	UL CUL	Yes
MPD 103R-003	120/208V3ø24A/ø 50-60 Hz	1 ¾ x 19 x 8" 21#	30A Yes (2)2P15A	5-15R 4F-8B 12	Yes	10' 10/3 LP-30P	UL CUL	Yes

UNIVERSAL CONTROL PANEL

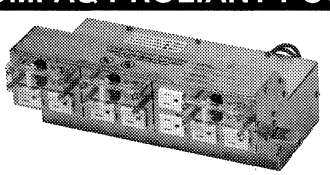


UCP-3000 – COMPLETE POWER CONTROL FOR YOUR SYSTEM. Compatible with any Marway 120 volt single-phase power distribution unit which has the remote ON/OFF feature.

FUNCTIONS:

- System Power Breaker On Indicator
- Control Panel Lamp/Alarm Horn Test
- Power ON/OFF Control & Indicator
- Emergency Power Off Control
- EPO Indication and Reset
- EPO Alarm Horn (Optional)

COMPAQ PROLIANT POWER



The MPD 411013-002 is designed to power the Compaq Proliant cabinet or tower. The unit must be installed by an electrician locally on site, in order to accommodate the flexible power offerings available. The unit can take in 100 to 250 volt single phase, or 208 to 400 volt 3-phase input power. It will yield 20, 40 or 60 amps. NEMA outlets distribute power to rack components. The model is UL and CUL recognized, and is available for immediate shipment.

SEE INTERNATIONAL MODELS ON NEXT PAGE.

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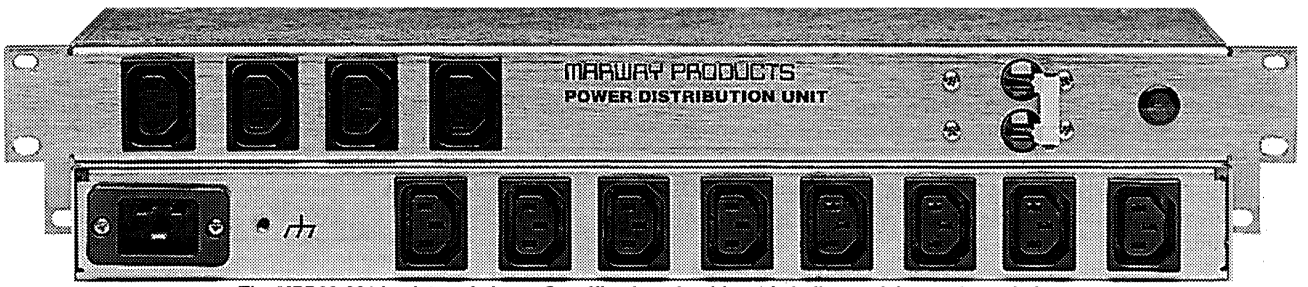
INTERNATIONAL POWER EQUIPMENT



The MPD82-001 is pictured above. Specifications for this and similar models are shown below.

INTERNATIONAL POWER DISTRIBUTION

The Marway power models shown here were designed for American OEM's marketing computer rackmount product internationally. The models accommodate local power. Most do not come with a power cord but instead have an IEC connector for use with a power cord with an IEC connector on one end and a plug for the country of intended use on the other. Such power cords are available from Marway for many countries. The models come in a variety of electrical ratings to meet the needs of most rack builders. All of the models are small in size – a space saving 1 ¾ inches tall – to conserve valuable rack space. All of the models offer circuit breaker protection, and many provide EMI filtering and transient protection as well. All of the models have IEC receptacles to distribute power to the rack, and one (the MPD100R-IEC) has remote ON/OFF control. All of the models are TUV approved and CE marked. All are available for immediate shipment.

SPECIFICATIONS FOR MARWAY POWER UNIT MODELS

MODEL NUMBER	Electrical Rating Volts-Phase-Amps Hertz	Size HxWxD Weight	Power Protection EMI/RFI Filter Varistor Circuit Breaker	Outlets NEMA Type Front-Back Switched	Remote On/Off	Power Cord Cord Length Cord Gauge/Wires NEMA Plug Type	Agencies	Available Immediate Shipment
MPD 82-001	230V1ø12A 50-60 Hz	1 ¾ x 19 x 4 ½" 10#	20A Yes 2P15A	IEC 320-10A 4F-8B 12	No	No Cord IEC Input NA	TUV CE	Yes
MPD 82-002	230V1ø16A 50-60 Hz	1 ¾ x 19 x 4 ½" 10#	20A Yes 2P20A	IEC 320-10A 4F-8B 12	No	No Cord IEC Input NA	TUV CE	Yes
MPD 90 IEC	120V1ø12A 50-60 Hz	1 ¾ x 19 x 4 ½" 8#	None None 2P15A	IEC 320-10A 4F-8B 12	No	No Cord IEC Input NA	TUV CE	Yes
MPD 92 IEC	230V1ø12A 50-60 Hz	1 ¾ x 19 x 4 ½" 8#	None None 2P15A	IEC 320-10A 4F-8B 12	No	No Cord IEC Input NA	TUV CE	Yes
MPD 92 IEC-002	230V1ø16A 50-60 Hz	1 ¾ x 19 x 4 ½" 8#	None None 2P20A	IEC 320-10A 4F-8B 12	No	No Cord IEC Input NA	TUV CE	Yes
MPD 92 IEC-003	230V1ø24A 50-60 Hz	1 ¾ x 19 x 4 ½" 8#	None None 2P15A	IEC 320-10A 4F-8B 12	No	15' 10/3 HAR Non-Term	TUV CE	Yes
MPD 100 IEC	115 or 230V1ø16A 50-60 Hz	1 ¾ x 19 x 8" 10#	20A Yes 2P20A	IEC 320-10A 2F-8B 10	No	No Cord IEC Input NA	UL CSA TUV	Yes
MPD 100R IEC	115 or 230V1ø16A 50-60 Hz	1 ¾ x 19 x 8" 12#	20A Yes 2P20A	IEC 320-10A 2F-6B 8	Yes	No Cord IEC Input NA	UL CSA TUV	Yes

SEE DOMESTIC MODELS ON PREVIOUS TWO PAGES.

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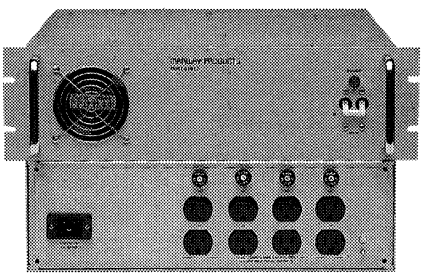
COMPUTER POWER SOURCES

TRANSFORM AND DISTRIBUTE POWER

The MPD-41912 steps down local AC power of 220 or 230 volts obtained on site in another country to 115 volt AC power suitable for use by typical American-made computer equipment, and distributes the power to components in the rack. The unit has an IEC input receptacle on the back, ready for a 16 amp power cord for input power, with an IEC connector on one end and the plug for the country of intended use on the other.

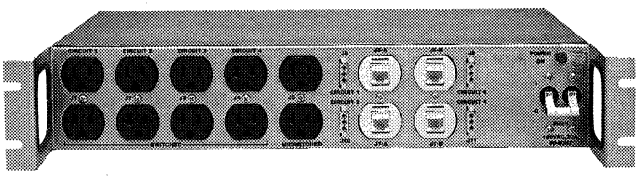


MPD-41912

- Rating is 230V 1ø Input with 115V 1ø Output at 16A
- 8 NEMA 5-15R Outlets on Back
- IEC 320 Input Receptacle on Back
- Size is 5 ¼ x 19 x 16 inches Flush Mount

KEYBOARD CONTROL

The MPD 125-028 provides power control for your computer system from a computer keyboard. Up to 4-duplex outlets may be switched from a computer keyboard, even from a remote location through use of a modem, to permit control of a computer system from a distant office.



MPD-125-028

- Rating is 120V 1ø 24A
- Remote ON/OFF Control for 4-duplex Outlets on Front, via Computer Keyboard
- Unswitched 2 Outlets on Front for Ancillary Equipment
- Size is 3 ½ x 19 x 6 inches Recessed

RACKMOUNT UPS SYSTEMS

Marway offers a compact sized uninteruptable power supply (UPS) for rackmount installation, requiring only 1 ¾ inches of rack space. The models are designed for the common situation where space is limited but a UPS is needed.

The UPS will keep a file server operating through a power failure of several minutes duration. The UPS provides battery backup in case of blackout on the incoming power line.

UPS7210700 FRONT

UPS7210700 REAR

Marway UPS models are available at electrical ratings commonly required by rack builders. See chart below. The UPS units are available for immediate shipment. The models are UL and CUL recognized.

SPECIFICATIONS FOR MARWAY POWER UNIT MODELS

MODEL NUMBER	Electrical Rating Volts-Phase-Amps Hertz	Run Time at Full Load	Size HxWxD	NEMA Outlets	Agencies	Available Immediate Shipment
7210700	115V1ø6A 50-60 Hz	5 Minutes	1 ¾ x 19 x 26"	5-15R	UL CUL	Yes
7210900	115V1ø8A 50-60 Hz	5 Minutes	1 ¾ x 19 x 26"	5-15R	UL CUL	Yes
7211100	115V1ø10A 50-60 Hz	5 Minutes	1 ¾ x 19 x 26"	5-15R	UL CUL	Yes
7211400	115V1ø12A 50-60 Hz	5 Minutes	1 ¾ x 19 x 26"	5-15R	UL CUL	Yes

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UNINTERRUPTIBLE POWER SYSTEM SINGLE & THREE PHASE

Nova GALAXY™ Series 1-20 kVA UPS

- MILITARY / SHELTER
- COMMUNICATIONS
- INDUSTRIAL / COMMERCIAL

True On-Line rugged UPS Systems for demanding shock, vibration, humidity and EMI environments
Can meet MIL-STD-810C, MIL-STD-1399, MIL-S-901, MIL-STD-1472 & MIL-STD-461D optionally.
-Military applications include HMMWV, UAV, Shipboard, Submarine, and Mobile Power Units-

OPTIONS

- **Ruggedization Against High Shock, Vibration, & Humidity**
- **Three Phase Models Available**
- **MS Connectors**
- **400 Hz Input and/or Output**
- **Chassis Slide Guides**
- **Solid State Transfer Switch (Standard on some models)**
- **Premium 10 Year Life Batteries**
- **RS-232 Interface Port**
- **Custom Paint**

INPUT

Voltage (specify): 120,208,220,240 VAC 1Ø/3Ø
Automatic: 120,220,240 VAC
Frequency: 60 Hz, 50 Hz, 400 Hz
Automatic: 47-63 Hz
Connections: Various styles available

OUTPUT

Voltage (specify): 120,208,220,240 VAC 1Ø
Frequency: 50, 60 Hz (Optional: Switchable)
Voltage Regulation: ±1% no load to full load
Frequency Regulation:
±0.5% no load to full load (free running)
Power Factor: 0.7 lead to 0.7 lag
Harmonic Distortion: 5% THD
Efficiency at full load: 75% AC-AC Typical
Sync & Phase Lock Range: +3 Hz Typical
Overload: 125% for 10 minutes
1000% for one cycle
(via optional static transfer switch)

ENVIRONMENTAL SPECIFICATIONS

Operating Temp. Range: -20°C to +50°C
Storage Temp. Range: -40° to +60°C
Humidity: to 95% non-condensing
Elevation: 15,000 ft. (4.572m) operating;
40,000 ft. (12.192m) non operating
Audible Noise: Less than 55 dbA at 5ft
Transportation & Handling: Can meet MIL-STD-810C

PROTECTIVE FEATURES

Circuit Breakers: Battery Charger Input
Battery Input
Low Battery Shut off
Overload / Thermal Protected
Input Under/Overvoltage Protection
Audible Alarm with Silence Switch

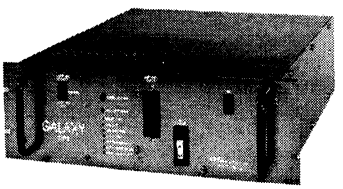
FRONT PANEL DIAGNOSTICS / ALARMS

System Status (Green/Red)
Utility Off (Red) — UPS Overload (Red)
UPS Off (Red) — Over Temp. (Red)
Low Battery (Red) — Load On Utility (Red)
Logic Fault (Red) — (with SST Option)
Alarm Contacts: Standard
RS 232: Optional

BATTERY

1 kVA, 1.5 kVA, AND 2 kVA
Internal, sealed, service-free, user replaceable batteries with 5 year lifetime.
3 –20 kVA
External Battery Pack - Consult Factory.

1 kVA, 1.5 kVA AND 2 kVA UPS

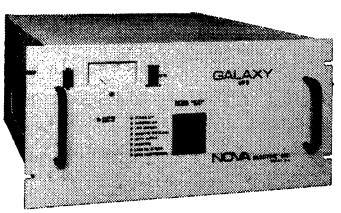


UPS Contains Internal Battery

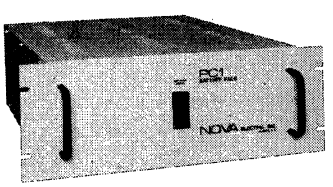
UPS Dimensions: 5.25"H x 19"W x 22.25"D*

* Depth dimensions do not include protrusions on front and rear panels.

3 kVA & 5 kVA UPS



3-5 kVA UPS – No Internal Batteries
3 kVA Unit Dim. 8.75"H x 19"W x 21.25"D*
5 kVA Unit Dim. 8.75"H x 19"W x 23.25"D*



External Battery Pack – Any Run Time to 24 Hours Available
7"H x 19"W x 20.75"D*

* Depth dimensions do not include protrusions on front and rear panels.

PARTIAL MODEL SELECTION	KVA	INPUT	OUTPUT	UPS LBS	BATTERY	RUN TIME	BAT LBS
GRSL11-1K60-120-120	1	120 VAC	120 VAC	90	INTERNAL	15 MIN.	INT
GRSL11-1K50-220-220	1	220 VAC	220 VAC	90	INTERNAL	15 MIN.	INT
GRSL11-1K60-120/240A-120	1	120/240 Auto	120 VAC	109	INTERNAL	15 MIN.	INT
GRSL11-1.5K60-120-120	1.5	120 VAC	120 VAC	100	INTERNAL	10 MIN.	INT
GRSL11-1.5K50-220-220	1.5	220 VAC	220 VAC	100	INTERNAL	10 MIN.	INT
GRSL11-1.5K60-120/240A-120	1.5	120/240 Auto	120 VAC	119	INTERNAL	10 MIN.	INT
GRSL11-2K60-120-120	2	120 VAC	120 VAC	110	INTERNAL	5 MIN.	INT
GRSL11-2K50-220-220	2	220 VAC	220 VAC	110	INTERNAL	5 MIN.	INT
GRSL11-2K60-120/240A-120	2	120/240 Auto	120 VAC	129	INTERNAL	5 MIN.	INT
GRS11-3K60-120-120	3	120 VAC	120 VAC	150	PC3K-84	10 MIN.	125
GRS11-3K50-220-220	3	220 VAC	220 VAC	150	PC3K-156	22 MIN.	188
GRS11-3K60-120/208Y-120	3	120/208 VAC	120 VAC	150	PC3K-168	27 MIN.	225
GRS11-5K60-120-120	5	120 VAC	120 VAC	215	PC5K-84-2	10 MIN.	225
GRS11-5K50-220-220	5	220 VAC	220 VAC	200	PC5K-156	11 MIN.	188
GRS11-5K60-120/208Y-120	5	120/208 VAC	120 VAC	200	PC5K-168	12 MIN.	225
GRSL11-8K3/6-120/208-120/208	8	120/208 VAC	120/208 VAC	225	PC8K-192	10 MIN.	230

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ISO 9002
A5269

SOLID STATE 50 HZ 60 HZ 400HZ FREQUENCY CONVERTERS SINGLE & THREE PHASE

Nova 100 VA-300 kVA Solid State Frequency Converters

- Three-Phase
- Single-Phase
- 50, 60, 400 Hz

High-Reliability Frequency Converters for demanding shock, vibration, humidity and EMI environments
Can meet MIL-STD-810C, MIL-STD-1399, MIL-STD-1472 & MIL-STD-461D optionally.
-Military applications include HMMWV, UAV, Shipboard, Submarine, and Mobile Power Units-

INPUT

Voltage (specify): Most standard voltages available in 1Ø and 3Ø configurations.
Frequency: 60 Hz, 50 Hz, and 400 Hz
Starting Current Surge: Limited per MIL-M-4803D (3Ø FC-Series)
Phase Rotation: Any (3Ø Units)
Input Circuit Protection: Circuit Breaker / Fuses, Transient Suppressors

OUTPUT

Power Ratings: 100 VA – 300 kVA
Voltage (specify): Any standard voltage
Frequency: 60 Hz, 50 Hz, and 400 Hz
Frequency Regulation: ±0.5% (Crystal available)
Frequency Transients: None
Voltage Regulation: ±1.5%
Dynamic Voltage Regulation: ±10%
Total Harmonic Distortion: 3% Typical, 5% Max
Overload: 120% Typical (Consult factory for specifics)
Efficiency: 85-95%, depending on model
Power Factor: 0.7 lead to 0.7 lag
Output Circuit Protection: Current Limit, Short Circuit Protection, Thermal Protection, and Semiconductor Protection

ENVIRONMENTAL SPECIFICATIONS

Operating Temp. Range: -20°C to +50°C
Humidity: 95% non-condensing
Elevation: 10,000 ft. typical
Audible Noise: 65 dBA at 5ft typical
Cooling: Forced Air
MTBF: 30,000 hours
MTTR: Less than 30 minutes

NOTE: The specifications above are generalized for all of the Frequency Converters shown below. Please consult individual data sheets for exact specifications.

APPLICATIONS

- Military Vehicles and Shelters
- Communications Systems
- Cellular Sites
- Aircraft Power
- European Power / Export Testing
- U.S. Power Abroad
- Railroad Signaling Power
- Power Conditioning & Frequency Stabilization

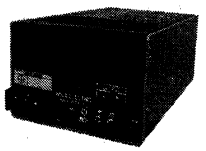
INSTRUMENTATION AND INDICATORS

- Output voltmeter (with phase selector switch on 3Ø output models)
- Output ammeter (with phase selector switch on 3Ø output models)
- Input and output power on lamps
- Fault lamp (some models)
- Start button (3Ø models only)
- Stop / Reset button (3Ø models only)
- Self-diagnostics (3Ø models only)

PARTIAL LISTING OF AVAILABLE OPTIONS

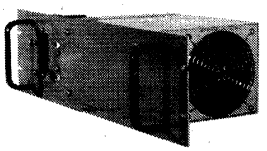
- 19", 23", or 24" Panel Mount on CLFC and IGLFC Models
- Custom Enclosures
- Frequency Meter
- Elapsed Time Meter
- Ruggedization against shock and vibration to MIL-STD-810
- Alarm Contact Closures
- Remote Start/Stop Control
- Custom Output Frequencies
- Custom Paint
- Output Circuit Breaker
- Crystal Frequency Control

COMPACT LIGHTWEIGHT CLFC-SERIES



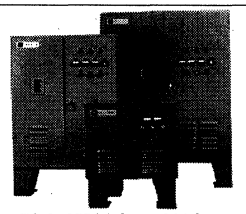
100 VA Model CLFC1050-120-220 shown
F/C Dimensions: 2.7"H x 4.5"W x7.75"D / 2.5 lbs.

ADVANCED MODULAR IGLFC-SERIES



1 kVA Model IGLFC1K50-120-220 shown with optional 19" rack-mounting panel
F/C Dimensions: 5.25"H x 19"W x 8.83"D / 10 lbs.

HEAVY DUTY 3Ø FC-SERIES



-FC-SERIES 5 kVA -300 kVA-
400 Hz Three-Phase Models Available

1Ø MODELS[5]	kVA	I/O VOLTAGE	F/C LBS	Dimensions H"xW"xD"
CLFC1050	0.1	Any standard I/O voltage available for all 1Ø Phase models shown. Three-Phase input available on most models shown (required above 3 kVA).	2.5	2.7x4.5x7.75
IGLFC5050	0.5		8.5	5x7.25x8.83
IGLFC1K50	1		8.5	5x7.25x8.83
IGLFC1.5K50	1.5		11	5x8.5x10
GSFC2K50	2		85	5.25x19x22.25
GSFC3K50	3		180	8.75x19x22
GSFC5K50	5		200	8.75x19x24
GSFC7.5K	7.5		425	30x36x17
GSFC10K50	10		450	30x36x17
GSFC15K50	15		525	30x36x17
GSFC20K50	20		C/F	C/F
GSFC30K50	30		C/F	C/F

3Ø MODELS[5]	kVA	I/O VOLTAGE	FREQ. (Hz)	F/C LBS	Dimensions[2] H"xW"xD"	ENCLOSURE[3]
IGLFC2K3/4	2	120/208 VAC, 220/380 VAC, 277/480 VAC, and other I/O voltages Available for all Three-Phase Models shown	50 Hz, 60 Hz, 400 Hz Input / Output Available for all Three-Phase Models shown	45	5.25x19x24	Consult Factory
FC5K3/5	5			360	54x36x16	NEMA 3-R WALL/FLOOR MOUNT
FC7.5K3/5	7.5			380	54x36x16	
FC10K3/5	10			665	60x36x16	
FC15K3/5	15			835	60x36x16	
FC20K3/5	20			980	72x48x17	NEMA-12 FLOOR-MOUNT
FC30K3/5	30			1090	72x48x17	
FC40K3/5	40			1525	84x60x17	
MKFC50K3/5	50			1700	65x49.5x29.5	Consult Factory
MKFC60K3/5	60			1720	65x49.5x29.5	
MKFC80K3/5	80			1975	65x49.5x29.5	
MKFC100K3/5	100			2290	65x49.5x29.5	
MKFC120K3/5	120			2600	65x49.5x29.5	
MKFC150K3/5	150			2900	65x49.5x29.5	
MKFC200K3/5	200			3900	65x81x29.5	
MKFC250K3/5	250			4500	65x81x29.5	
MKFC300K3/5	300			4650	65x81x29.5	

Notes:
1. When ordering, choose model series, output power rating, output frequency, input voltage, and output voltage (in order) to form Nova part number.Example: Model IGLFC1K50-120-220 is an IGL-Series F/C with an input of 120 VAC, 60 Hz and an output of 220 VAC, 50 Hz, 1 kVA.
2. Height measurements for Three-Phase units include floor-mounting feet. If wall-mount enclosure is desired, specify and delete 24" from height shown above (B models).
3. Many types of enclosures are available. Please consult the factory for details.
4. All weighs shown above are approximate. Please consult the factory for details.
5. Charts above depict partial model selection. Additional models available. Consult the factory for details.

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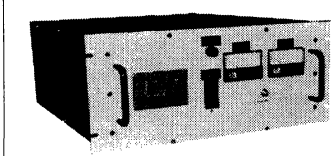
SOLID STATE SINE WAVE INVERTERS SINGLE & THREE PHASE

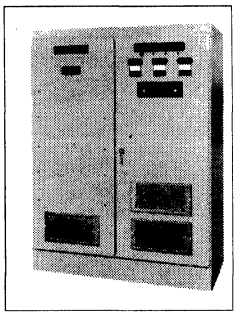
Nova Solid State Single & Three Phase Sine Wave Inverters

- **Pure Sine Wave Output**
- **120 VA – 60 kVA**
- **50 Hz • 60 Hz • 400 Hz**
- **Rugged to survive shock, vibration and high humidity.**



APPLICATIONS

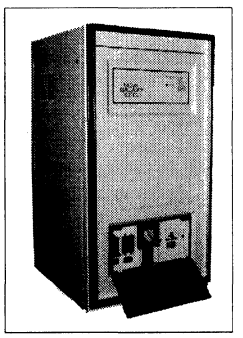
This family of rugged inverters is intended for industrial applications in severe or military environments. Units are available in rack mount, cabinet or custom configurations. Nova Inverters are extremely reliable, featuring MTBF in excess of 50,000 hours and typical service life of 35 years.



DC Operating Ranges		Typical
Nominal	Operating Range	INTENDED USES
12	11-16 VDC	Automotive Testing
24	22-32 VDC	Communications
36	30-42 VDC	Transit Systems
48	42-56 VDC	Telecommunications
72	62-84 VDC	Rapid Transit
120	105-150 VDC	Electric Utilities
240	210-280 VDC	Steel Industry
600	500-750 VDC	Mass Transit

AVAILABLE OPTIONS

- **19" Panels**
- **Custom Meters**
- **Custom Inputs**
- **Custom Outputs**
- **Transient Filters**
- **Transfer Switches**
- **Ruggedization**



MODEL	Output (kVA)	Input (VDC)	Max Input Amps	Efficiency % (approx.)	Output Voltage[1] (Volts)	Output Current (Amps)	Forced Air Cooled	Input Circuit Breaker Standard	Weight (Lbs.) (Approx.)	Dimensions		
										Height (in)	Width (in)	Depth (in)
1260-12	.125	12	17.9	65	120	1.0	No	No	20	5.25	6.00	9.75
1260-48	.125	48	3.8	75	120	1.0	No	No	20	5.25	6.50	9.75
1260-120	.125	120	1.4	78	120	1.0	No	No	20	5.25	6.50	9.75
2560-12	.25	12	36.0	65	120	2.1	No	Yes	38	6.875	9.00	13.25
2560-24	.25	24	16.0	68	120	2.1	No	Yes	37	6.875	9.00	13.25
2560-48	.25	48	7.7	75	120	2.1	No	Yes	37	6.875	9.00	13.25
5060-12	0.5	12	70.0	65	120	4.2	No	No	70	6.87	11.25	14.25
G5060-240	0.5	240	2.2	88	120	4.2	No	Yes	88	5.25	16.60	14.00
GH5060-240	0.5	240	2.2	88	120	4.2	No	Yes	80	24.00	20.72	7.16
GS1K60-120	1	120	11.5	76	120	8.4	Yes	No	87	5.25	19.00	21.00
G1K60-240	1	240	5.4	88	120	8.4	No	Yes	95	5.25	16.60	14.00
GH1K60-240	1	240	5.4	88	120	8.4	No	Yes	95	24.00	20.72	7.16
GH1K60-600	1	600	2.5	90	120	8.4	No	Yes	100	30.00	24.70	9.16
GS2K60-120	2	120	22.5	85	120	16.7	C/F	Yes	110	5.25	19.00	23.00
GS2K60-240	2	240	10.8	88	120	16.7	C/F	Yes	120	8.75	19.00	23.00
GH2K60-240	2	240	10.8	88	120	16.7	No	Yes	170	30.00	25.70	9.20
GS2.5K60-120	2.5	120	28.0	85	120	21.0	C/F	Yes	100	5.25	19.00	23.00
GS3K60-120	3	120	34.0	85	120	25	Yes	Yes	130	8.75	19.00	23.00
G3K60-240	3	240	17.0	88	120	25	Yes	No	130	8.75	19.00	23.00
GS5K60-120	5	120	53.0	85	120	42	Yes	Yes	140	8.75	19.00	23.00
G5K60-240	5	240	27.00	88	120	42	Yes	No	140	8.75	19.00	23.00
GH5K60-240	5	240	27.00	88	120	42	No	Yes	190	30.00	26.30	11.20
GH5K60-600	5	600	12.5	90	120	42	No	No	200	30.00	26.30	11.20
GS7.5K60-120	7.5	120	81.0	85	120	62	Yes	Yes	175	36.00	24.00	17.20
GS7.5K60-240	7.5	240	40.00	88	120	62	Yes	Yes	200	36.00	24.00	17.00
GS10K60-120	10	120	103.00	85	120	84	Yes	Yes	260	36.00	24.00	17.20
GS10K60-240	10	240	53.00	88	120	84	Yes	Yes	260	36.00	24.00	17.20
GS15K60-120	15	120	162.00	84	120	125	Yes	Yes	350	42.00	30.00	21.20
GS15K60-240	15	240	80.00	88	120	125	Yes	Yes	350	42.00	30.00	21.20
GS20K60-240	20	240	108	88	120	166	Yes	Yes	C/F	54.00	36.00	21.2
GS20K60-600	20	600	50	90	120	166	Yes	No	900	72.00	36.00	23.00
GS25K60-240	25	240	135	88	120	208	Yes	Yes	C/F	54.00	36.00	21.2
GS25K60-600	25	600	C/F	C/F	120	C/F	C/F	C/F	C/F	C/F	C/F	C/F
GS30K60-240	30	240	C/F	C/F	120	C/F	C/F	C/F	C/F	C/F	C/F	C/F

NOTES

1. Any standard output voltage available on most models shown.
2. All models starting with the "GH" prefix are housed in heavy-duty Hoffman enclosures. Consult factory for details.
3. The chart above depicts a partial model selection. More models are available. Consult factory for details.
4. Specifications are subject to change without notice.

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ISO 9002 A5269

SINE WAVE COMPACT LIGHTWEIGHT DC-AC INVERTERS

Nova Lightweight Compact Sine Wave DC-AC Inverters

- 120 VA 60 kVA
- 1Ø & 3Ø Designs
- 50, 60, & 400 Hz

Lightweight, High-Reliability Inverters for demanding shock, vibration, humidity and EMI environments
Units utilize advanced high-frequency PWM topology for significant size and weight savings.
-Military applications include HMMWV, UAV, Shipboard, Submarine, and Mobile Power Units-

INPUT

Nominal Input Voltage*: 24, 36, or 48 VDC std. 120 and 155 VDC opt.
* Other ranges (including 12 VDC) available on some models. Please consult the factory for details.

OUTPUT

Power Ratings: 120 VA – 60 kVA
Voltage (specify): Any standard voltage available
Voltage Regulation: ±1.5% No Load to Full Load
Frequency: 50 Hz, 60 Hz, and 400 Hz
Frequency Regulation: ±0.5% No load to Full Load
Dynamic Voltage Regulation: ±10%
Total Harmonic Distortion: 5% THD
Overload: 125% for 10 Minutes
Efficiency: 80-85%, AC-AC Typical
Power Factor: 0.7 lead to 0.7 lag
Connections: Input via studs, Output via Terminal Block or Outlets
Sync. & Phase Lock Range: ±3% Typical

ENVIRONMENTAL SPECIFICATIONS

Operating Temp. Range: -20°C to +50°C
Humidity: 95% non-condensing
Elevation: 15,000 ft. (4,572m) operating
40,000 ft. (12,192m) non-operating
Audible Noise: less than 55 dBA at 5ft typical
MTBF: In excess of 50,000 hours
Typical Service Life: 25 Years

NOTE: The specifications above are generalized for all of the Inverters shown. Consult individual data sheets for exact specs.

APPLICATIONS

- Military Vehicles and Shelters
- Electric Utilities and Substations
- Communications Systems
- OEM Applications
- Process Control
- Security Systems
- Cellular Sites
- Rapid and Mass Transit
- Aircraft Power
- AC Power from Station Battery
- Automotive Testing
- TV and Radio Vans

PARTIAL LISTING OF AVAILABLE OPTIONS

- 19", 23", or 24" Panel Mount
- Ruggedization against shock and vibration to MIL-STD-810
- Static Transfer Switch
- Electromechanical Transfer Switch
- MS Connectors or Outlets
- Switchable 50/60 Hz Output
- Provision for 3Ø Connection with 2 more identical units
- Input and Output Circuit Breakers
- Input/Output Voltmeter and Ammeter
- Output Frequency Meter
- Input Transient Filter or Hash Filter
- Input Overvoltage & Undervoltage Shut Off Circuit
- High Inrush for Motor Start
- Wall-Mounting Plate
- Wide Temperature Range –40°C to+71°C
- Custom Painting and Marking

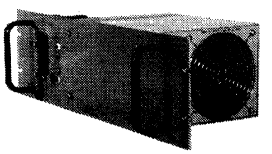
*Please note that the options listed above may not fit or may already be standard equipment on some Nova Inverters. Please consult the factory for details.

ULTRA-COMPACT CLC-SERIES

120 VA Model CLC1260-XX shown

Inverter Dimensions: 2.7"H x 4.5"W x7.75"D / 2.5 lbs.

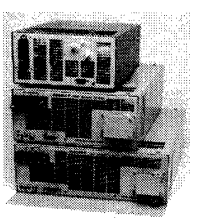
ADVANCED MODULAR IGL-SERIES



1 kVA Model IGL1K60-XX shown with optional 19" rack-mounting panel

Inverter Dimensions: 5.25"H x 19"W x 8.83"D / 10 lbs.

LIGHTWEIGHT GALAXY-SERIES 1Ø & 3Ø



Available in 1-10 kVA

-PARTIAL SELECTION OF SINGLE-PHASE & THREE-PHASE LIGHTWEIGHT HIGH-FREQUENCY TRANSFORMER DC-AC INVERTERS-

1Ø MODELS	KVA	OUTPUT VAC	Dimensions H"xW"xD"	LBS	Rack-Panel Height OPT / STD
CLC1260-XX[2]	0.12	Any standard output voltage available for all 1Ø Phase models shown.	2.7x4.5x7.75	2.5	3.25" OPT
IGL5060-XX	0.5		5x7.25x8.83	8.5	5.25" OPT
IGL1K60-XX	1		5x7.25x8.83	8.5	5.25" OPT
IGL1.5K60-XX	1.5		5x8.5x10	11	5.25" OPT
GL2K60-XX	2		5.25x10x16.5	28	7.00" OPT
GL2.5K60-XX	2.5		5.25x12.5x18.5	32	7.00" OPT
GL3K60-XX	3		5.25x12.5x18.5	36	7.00" OPT
GL5K60-XX	5		5.25x19x21	60	5.25" STD
GL6K60-XX	6		5.25x19x21	65	5.25" STD
GL10K60-XX	10		C/F	C/F	C/F

3Ø MODELS SEE NOTES 3 & 4	KVA	OUTPUT VAC	Dimensions H"xW"xD"	LBS
IGL1.5K3/6-XX(120/208)	1.5	120/208	5.25x19x24	32
IGL1.5K3/5-XX(220/380)	1.5	220/380	5.25x19x24	32
IGL1.5K3/4-XX(115/200)	1.5	115/200	5.25x19x24	32
IGL3K3/6-XX(120/208)	3	120/208	5.25x19x24	32
IGL3K3/5-XX(220/380)	3	220/380	5.25x19x24	32
IGL3K3/4-XX(115/200)	3	115/200	5.25x19x24	32
GL4.5K3/6-XX(120/208)	4.5	120/208	Consult Factory	80
GL4.5K3/5-XX(220/380)	4.5	220/380	Consult Factory	80
GL4.5K3/4-XX(115/200)	4.5	115/200	Consult Factory	80
GL6K3/6-XX(120/208)	6	120/208	Consult Factory	80
GL6K3/5-XX(220/380)	6	220/380	Consult Factory	80
GL6K3/4-XX(115/200)	6	115/200	Consult Factory	80
GL9K3/6-XX(120/208)	9	120/208	Consult Factory	C/F
GL9K3/5-XX(220/380)	9	220/380	Consult Factory	C/F
GL9K3/4-XX(115/200)	9	115/200	Consult Factory	C/F

Notes:
1) **REPLACE "XX" IN MODELS DEPICTED ABOVE WITH NOMINAL INPUT VOLTAGE REQUIRED.**
2) CLC-Series Inverters are available with nominal inputs of 24VDC and 48VDC only.
3) All Three-Phase IGL-Series models are equipped with standard 5.25" high rack-panels. Please consult factory for details.
4) All Three-Phase models with prefix "GL9K" are housed in NEMA-3R Wall-Mount Enclosure. Please consult factory for details.
5) Charts above depict partial model selection. Additional models available. Consult the factory for details.
6) Many types of enclosures are available. Please consult the factory for details.
7) All weighs shown above are approximate. Please consult the factory for details.
8) When ordering, choose model series, output power rating, output frequency, and input voltage (in order) to form Nova Inverter model number. Example: Model IGL1K60-24 is an IGL-Series Inverter with a nominal input of 24 VDC, and an output of 120 VAC, 60 Hz, 1 kVA.
9) Specifications are subject to change without notice. Please consult the factory for details.

GLOBAL VISION IN POWER CONVERSION

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NOVA

NOVA ELECTRIC
A Division of
TECHNOLOGY DYNAMICS, INC.
100 School St., Bergenfield NJ 07601

UL REGISTERED FIRM

ISO 9002
A5269

MK SERIES THREE PHASE UNINTERRUPTIBLE POWER SUPPLY

Nova MK-Series Three Phase UPS 10-300 kVA

ADVANCED FEATURES

- True On-Line Technology
- True Double Conversion Design with Isolation Transformer
- Input Power Factor Correction Typical Input THD <6%
- Compliance to Military Specs
- No-Break Static Bypass Switch, No Bypass Contactors
- Internal Manual Bypass Switch
- LCD Monitoring Panel with Power Flow Diagram RS232 Port
- Paralleling Capability
- Custom Features and Options
- UPS also functions as Frequency Converter

INPUT

Voltage (specify) : 120/208, 220/380, 277/480 VAC 3 Phase
Frequency: 60 Hz, 50 Hz and 400 Hz Available (select)

OUTPUT

Voltage (specify): 120/208, 220/380, 277/480 VAC 3 Phase.
Frequency: 60 Hz, 50 Hz and 400 Hz Available (specify)
Static Voltage Regulation: ± 1%
Dynamic Voltage Regulation: ± 10% Recovering to 95% within 4mS.
Total Harmonic Distortion: 3% THD
Short Circuit Protected
Frequency Stability: ± 0.02% Crystal Controlled (on inverter)
Efficiency: 80-90% (inverter) typical
Crest Factor: 3:1

INTERFACE & MONITORING

- Interfaces can be supplied through normally open/closed contacts for connection to most computers.
- Power monitoring software packages are available.
- Remote monitoring facilities are also available.
- Built-in digital instrumentation and diagnostics.

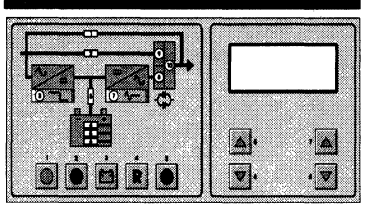
BATTERY

- Sealed, maintenance-free
- Internal up to 10 minutes (up to 15 KVA). (5-year lifetime).
- Any run-time to 24 hours using external batteries (10-year lifetime).

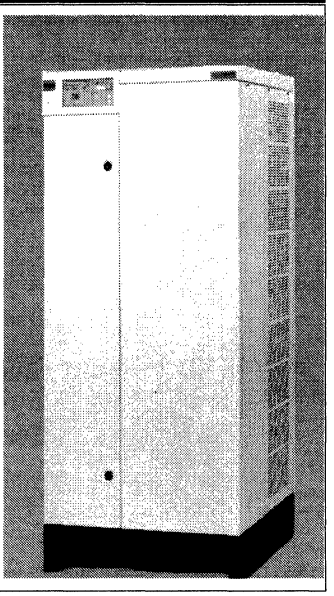
STATIC SWITCH

Fully Automatic Transfer/Retransfer
Freq. Tracking/Locking Range: 2% Adj.
Transfer Time : No Break
Slew Rate : 0.2 Hz/second Adj.

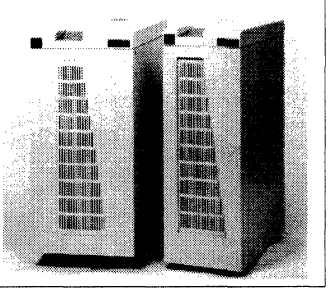
INFORMATIVE FRONT DISPLAY PANEL



MK-SERIES THREE-PHASE UPS AVAILABLE IN 10-300 KVA



MK-SERIES SINGLE-PHASE MODELS AVAILABLE IN 2.5 KVA – 80 KVA



PARTIAL MODEL SELECTION	KVA	IN/OUT VAC	SIZE	LBS.
MK11-10K3/6-120/208-120/208-II	10	120/208 VAC	65" (H) x 31.5" (W) x 29.5" (D)	860
MK11-15K3/6-120/208-120/208-II	15		65" (H) x 31.5" (W) x 29.5" (D)	950
MK11-20K3/6-120/208-120/208-II	20		65" (H) x 31.5" (W) x 29.5" (D)	1060
MK11-25K3/6-120/208-120/208-II	25	277/480 VAC	65" (H) x 31.5" (W) x 29.5" (D)	1100
MK11-30K3/6-120/208-120/208-II	30		65" (H) x 31.5" (W) x 29.5" (D)	1150
MK11-40K3/6-120/208-120/208-II	40		65" (H) x 31.5" (W) x 29.5" (D)	1200
MK11-50K3/6-120/208-120/208-II	50	220/380 VAC	65" (H) x 49.5" (W) x 29.5" (D)	1700
MK11-60K3/6-120/208-120/208-II	60		65" (H) x 49.5" (W) x 29.5" (D)	1720
MK11-80K3/6-120/208-120/208-II	80		65" (H) x 49.5" (W) x 29.5" (D)	1975
MK11-100K3/6-120/208-120/208-II	100	AVAILABLE ON MOST MODELS	65" (H) x 49.5" (W) x 29.5" (D)	2290
MK11-125K3/6-120/208-120/208-II	125		65" (H) x 49.5" (W) x 29.5" (D)	2600
MK11-150K3/6-120/208-120/208-II	150		65" (H) x 49.5" (W) x 29.5" (D)	2900
MK11-200K3/6-120/208-120/208-II	200		65" (H) x 81.0" (W) x 29.5" (D)	3900
MK11-250K3/6-277/480-277/480-II	250		65" (H) x 81.0" (W) x 29.5" (D)	4500
MK11-300K3/6-277/480-277/480-II	300		65" (H) x 81.0" (W) x 29.5" (D)	4650

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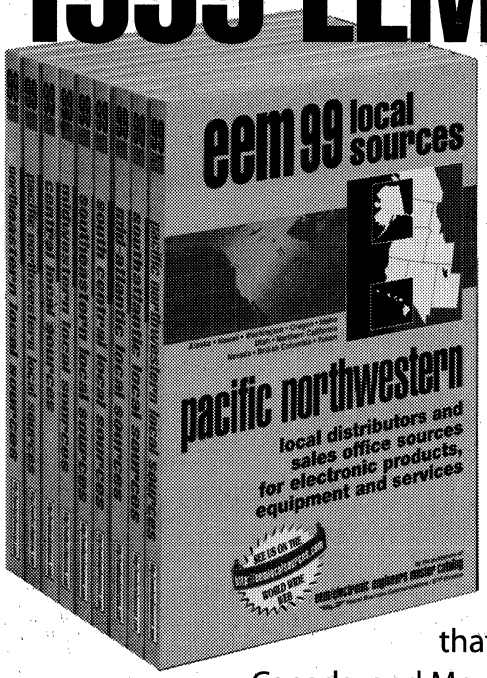
1999 EEM Local Sources



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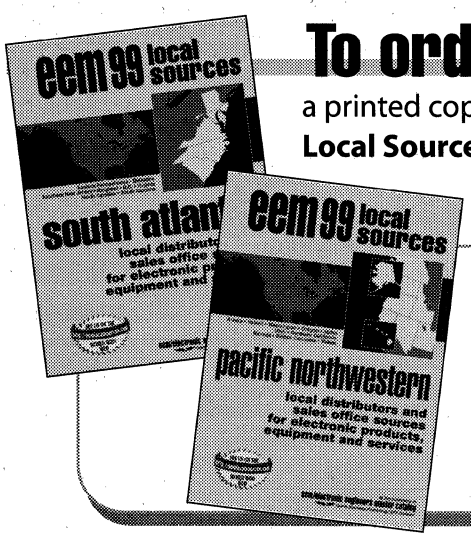

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EEM Local Sources is published annually in October.

Interpower™ International Power Source

Test your export product...

The Interpower™ International Power Source provides a low-cost, convenient source of 50 Hz power which is important for testing many products that are exported. Output power is delivered through either a standard NEMA 15A/115VAC socket or the Continental European Schuko socket. (Note: Products with other international plugs can be tested by also using the International Socket Strip—see right.) Output voltages are selectable at 100V, 115V, 220V, 230V, or 240V, and frequencies can be selected at 50 or 60Hz while under load. This flexibility permits testing of products with varying input voltages and frequencies in order to simulate real-world power mains conditions. Test points permit easy connection of your Digital Multimeter for checking voltage and frequency. The power rating of the International Power Source is 1250VA.

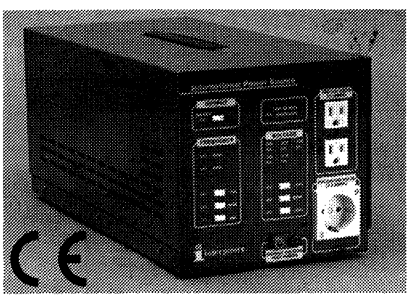
This model is designed to accommodate U.S. input voltage of 115V supplied through a NEMA 5-20P plug. (It can also be or configured for 230 or 240V input power and equipped with an international plug for overseas applications.)

This new model, at 30 pounds, can be easily moved between work stations or lab positions as needed.

Delivery: stock to six weeks; call PCC Customer Service Department for stock level.

International Power Source carries the CE mark! CE

Rental units are available.



Part #85510620: Interpower™ International Power Source

SPECIFICATIONS

Output Power:	1250VA
Output Voltage:	
Low Range:	100V, 115V
High Range:	220V, 230V or 240V RMS
Voltage Accuracy:	within 2.0% of Set Value
Frequency Accuracy:	50Hz, 60Hz — 1.0%
Output Current:	
Low Range:	11.0A RMS 33A Pk
High Range:	5.5A RMS 16.5A Pk
Regulation:	2.0% Max, Line/Load
Harmonic Distortion:	1.0% typ.
Output Noise:	
Low Range:	≤ 425mV (115V)
High Range:	≥ 850mV (230V)
Power Factor:	0 to Unity, lagging or leading
Input:	
Voltage:	100-240VAC or 85-265VAC
Current:	20A RMS Max. at 85V
Frequency:	45-63Hz
Holdup Time:	20mS
Isolation Voltage:	
Input/Output:	2200V RMS
Input/Chassis:	1350V RMS
Protection:	Output overcurrent (short circuit/over voltage); over temperature
Dimensions:	8.5"H x 8.75"W x 18"D (21.6cm x 22.2cm x 45.7cm)
Weight:	30 lbs. (13.6kg)
Air Intake/Exhaust:	Rear/Sides
Operating Temp.:	32°F to 104°F (0°C to 40°C)
Approvals:	UL, CUL; CE marked

Model is light weight, portable, and easy to use!

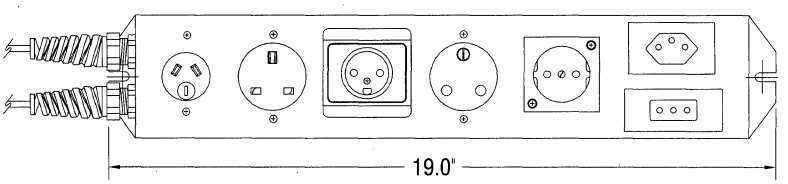
The Interpower™ International Power Source has been Redesigned to accommodate the requirements of most international test setups. Based on our information, most customers use only two international sockets for testing—the North American NEMA 5-15R and the Continental European CEE 7—so we supply a simplified unit. This model is small in size and weighs only 30 pounds (13.6 kg), making it easily portable. Test points permit easy connection to your DVM.

These sockets are included on the International Power Source:

Socket	Voltage	Freq.	Rating†
Continental Europe/Germany CEE 7	220-230VAC*	50Hz	16A
North America NEMA 5-15R	120VAC	60Hz	15A

To test products with other international plugs:

To test products with other international plugs, a test setup can be designed using the International Socket Strip (Part #85010120). See our pages in EEM section 2100 for more information on the International Socket Strip. This International Socket Strip is supplied with a "Schuko" (Continental European) power cord, a CEE 7/7, which will allow you to plug the Socket Strip into the International Power Source.



The International Socket Strip contains these sockets:

Socket	Voltage	Freq.	Rating†
Continental Europe/Germany (CEE 7)	230VAC*	50Hz	16A
Australia/N.Z./People's Rep. of China (AS 3112)	240VAC	50Hz	10A
U.K./Ireland (BS 1363)	230VAC	50Hz	13A
Denmark Afsnit 107-2-D1	230VAC*	50Hz	10A
India/South Africa (BS 546)	230VAC	50Hz	15A
Italy (CEI 23-16/VII)	230VAC*	50Hz	10A
Switzerland (SEV 1011)	230VAC*	50Hz	10A

** Note: European standard voltage was changed from 220V to 230V in 1995.*
† *Actual output will be 1250VA max.*

DESIGNING FOR EXPORT? WE MAKE IT EASY! See also EEM Sections 2100 • 4300 • 5600 • 6000

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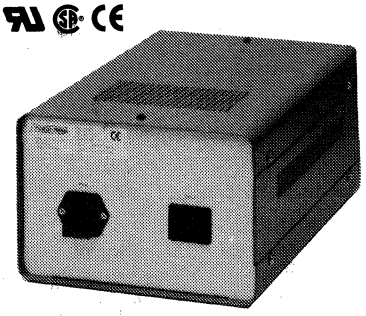
POWERTRONIX

MIU
MEDICAL ISOLATION UNIT



DESCRIPTION

POWERTRONIX low impedance MIUs – Medical Isolation Units – provide protection from overload and short circuit conditions, they completely eliminate ground-loop problems and insulate connected equipment against potentially harmful leakage currents. POWERTRONIX MIUs are available in computer gray, metal enclosures, and they are provided with hospital grade receptacles.

A variety of voltage ratings, enclosures, connectors, and features (such as over-temperature protection, ground-fault interruption, and soft start) are available.

APPLICATIONS:

POWERTRONIX MIUs are used with medical and dental instruments, EEG monitors, electro-surgical equipment, medical lasers, NMR equipment, scanners and ultrasonic devices.

SPECIFICATIONS

- **Input Voltage:** 120 V or 230 V
- **Output Voltage:** 120 V or 230 V
- **Power Range:** 500 VA – 5,000 VA
- **Efficiency:** 98% - 95%
- **Frequency:** 47 Hz - 63 Hz
- **Isolation:** 4,000 VRMS

Safety Approvals:

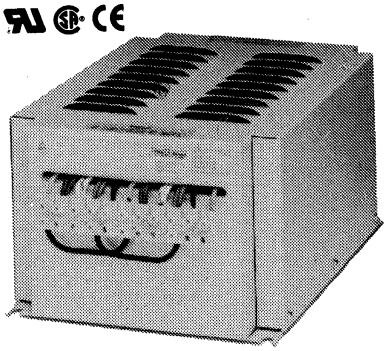
- UL 2601
- CSA 22.2, No. 66
- CE Marking

Built to:

- IEC 601.1
- VDE 750 Part 1
- CSA 22.2 No. 601.1-M90

Model Number	Power (VA)	Dimensions L x W x H	Weight (lbs)
MIU 0500	500	11″ x 8″ x 5.2″	12
MIU 1000	1000	11″ x 8″ x 5.2″	18
MIU 1500	1500	12″ x 11″ x 5.2″	24
MIU 2000	2000	12″ x 11″ x 5.2″	29
MIU 2500	2500	17″ x 11″ x 5.2″	36
MIU 3000	3000	17″ x 11″ x 5.2″	45
MIU 4000	4000	17″ x 11″ x 5.2″	56
MIU 5000	5000	17″ x 11″ x 5.2″	62

PLC - POWER LINE CONDITIONER



DESCRIPTION

POWERTRONIX low impedance PLCs – Power Line Conditioners – assure tight voltage regulation, completely eliminate ground-loop problems, greatly reduce EMI and RFI, and insulate connected equipment against potentially harmful leakage currents. In addition, POWERTRONIX power conditioners use toroidal power isolation transformers with half the size and weight of conventional, laminated transformers. Thus, Powertronix PLCs are smaller and lighter than the existing standard.

A variety of voltage ratings, enclosures, connectors, and features (such as over-temperature protection, ground-fault interruption, and soft start) are available.

APPLICATIONS:

POWERTRONIX PLCs are used with medical and dental instruments, computer systems, automatic test equipment, and telecommunications systems, among others.

SPECIFICATIONS

- **Input Voltage:** 120 V or 230 V
- **Output Voltage:** 120 V or 230 V
- **Power Range:** 500 VA - 5,000 VA
- **Efficiency:** 98% - 95%
- **Frequency:** 47 Hz - 63 Hz
- **Isolation:** 4,000 VRMS

Safety Approvals:

- UL 2601
- CSA 22.2, No. 66
- CE Marking

Built to:

- IEC 601-1
- VDE 750 Part 1
- CSA 22.2 No. 601.1-M90

Model Number	Power (VA)	Dimensions L x W x H	Weight (lbs)
PLC 0500	500	11″ x 8″ x 5.2″	15
PLC 1000	1000	11″ x 8″ x 5.2″	21
PLC 1500	1500	12″ x 11″ x 5.2″	27
PLC 2000	2000	12″ x 11″ x 5.2″	32
PLC 2500	2500	17″ x 11″ x 5.2″	40
PLC 3000	3000	17″ x 11″ x 5.2″	49
PLC 4000	4000	17″ x 11″ x 5.2″	60
PLC 5000	5000	17″ x 11″ x 5.2″	66

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See our pages in Volume A, Section 5600

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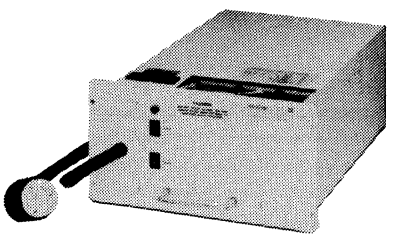
POWERTRONIX

PDU
POWER DISTRIBUTION UNIT



DESCRIPTION

POWERTRONIX PDUs are revolutionizing the industry of AC power distribution with features such as transient surge and EMI/RFI suppression, over-temperature protection, extended brownout range, ground-fault interruption and soft start. They completely eliminate ground-loop problems, assure tight voltage regulation, and insulate connected equipment against potentially harmful leakage currents. POWERTRONIX PDUs are housed in attractive, computer gray, rack mountable enclosures with an on/off switch and indicator light.

A variety of voltage ratings, enclosures, and connectors are available.

APPLICATIONS:

POWERTRONIX PDUs are typically used for medical imaging, medical lasers, main frame computer systems, automatic test equipment, robotics, and semi-conductor manufacturing equipment.

SPECIFICATIONS

- **Input** 100/120/200/220/240 Volt
- **Frequency:** 47 Hz - 63 Hz
- **Output:** 120/240 Volt
- **Power Range:** 1,000 VA – 5,000 VA
- **Isolation:** 4,000 VRMS
- **Leakage Current:** < 100 µA
- **Ambient Temperature:** 0 - 40°C
- **Voltage Temperature:** 3%
- **Efficiency:** 97%

Safety Approvals:
- UL 2601
- CSA 22.2, No. 66
- CE Marking

Built to:
- IEC 601-1
- VDE 750 Part 1
- CSA 22.2 No. 601.1-M90

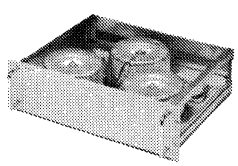
Model Number	Power (VA)	Dimensions L x W x H	Weight (lbs)
PDU 1000	1000	12″ x 11″ x 5.2″	24
PDU 2000	2000	12″ x 11″ x 5.2″	35
PDU 2500	2500	15″ x 12″ x 6.5″	44
PDU 3000	3000	15″ x 12″ x 6.5″	53
PDU 4000	4000	17″ x 15.7″ x 7″	66
PDU 5000	5000	17″ x 15.7″ x 7″	74

3-PHASE TRANSFORMERS

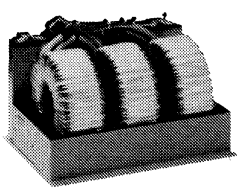
SPECIFICATIONS

- **Power:** 3,000 VA-15,000 VA
- **Frequency:** 47 Hz- 63 Hz
- **Primary:** Customer specified
- **Secondary:** Customer specified
- **Efficiency:** 98%- 95%
- **Isolation:** 4,000 VRMS
- **Creepage:** Minimum 8mm
- **Temperature rise:** Customer specified
- **Voltage tolerance:** Better than 3%

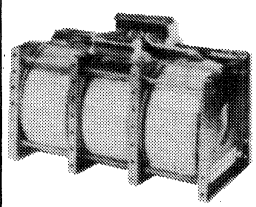
RACK MOUNTED



POTTED IN AN L-BRACKET



ASSEMBLED WITH FLANGES



Power (KVA)	No-load loss (W)	Copper loss (W)	Dimensions L x W x H	Dimensions L x W x H	Dimensions L x W x H
3.0	15	159	19″ x 14″ x 5.2″	11.6″ x 7″ x 7″	11.6″ x 7″ x 8.4″
4.8	21	195	19″ x 16″ x 5.2″	11.6″ x 8″ x 8″	11.6″ x 8″ x 9.6″
6.6	27	230	19″ x 16″ x 5.2″	12.5″ x 9″ x 9″	12.5″ x 9″ x 10.6″
7.5	29	245	19″ x 16″ x 5.2″	13.1″ x 9″ x 9″	13.1″ x 9″ x 10.6″
9.6	39	290	19″ x 16″ x 5.2″	13.9″ x 10″ x 10″	13.9″ x 10″ x 11.5″
13.2	50	350		14.5″ x 11″ x 11″	14.5″ x 11″ x 13.2″
15.0	60	375		16″ x 11″ x 11″	15.7″ x 11″ x 13.2″

* A complete 3-phase transformer consists of three (3) transformer cores.

See our pages in Volume A, Section 5600

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Z-LINE® power distribution and control systems.

GENERAL SPECIFICATIONS COMMON TO ALL Z-LINE® POWER DISTRIBUTION AND CONTROL SYSTEMS

TRANSIENT VOLTAGE SPIKE PROTECTION
Multi stage voltage clamping devices have been incorporated for maximum transient protection. 150V A.C. RMS clamping. Transient peak current, 6500 A (8x20 μs^1). Transient energy to 80 joules (10x1000 μs). Response time approx. 50 nanoseconds.

SPIKE AND SURGE PROTECTION:
LINE TO LINE, LINE TO GROUND, AND NEUTRAL TO GROUND.

RUGGED, 16 A.W.G. STEEL CONSTRUCTION.
Zinc Plated with black silkscreening.
GSA, FSS: 92704-PUL-001
GOV. FSCM #70513

SAFETY PROTECTION
Most components:
- **UL Recognition**
- **CSA Certification**
- **VDE Approval**

*As well as other European agency approvals.

AGENCY FILE NUMBERS FOR PULIZZI ENGINEERING, INC.
- **UL Recognition #E94081 (UL1950)**
- **CSA Certification #LR63198**
- **TUV File # Varies by Model (IEC 950)**
- **UL Recognized #E148245 (UL1950)**

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EMERGENCY SHUTDOWN PROTECTION
Allows easy interfacing with your mechanical, electronic or thermo-switching devices thru the remote power control bus connectors (all except TPC 12, TPC 115-8 & TPC 884-1).

EMI/RFI FILTER SPECIFICATIONS
Rated Voltage: 115/250 VAC
Operating Frequency: 50/60 HZ
Operating Temperature: -10°C to 60°C
Dielectric Withstanding Voltage:
2250 VDC (Line-Case)
(1 minute duration) 1450 VDC (Line-Line)
Maximum Leakage Current:
.5mA @ 250 VAC, 60 HZ
(each line to ground)

PC 125 C-F, SDC 1559-C, SUC 1558-C

Typical Common Mode Insertion Loss				
.15MHz	.20MHz	.50MHz	1.0MHz	2.0MHz
20dB	25dB	37dB	46dB	60dB
Typical Differential Insertion Loss				
.15MHz	.20MHz	.50MHz	1.0MHz	2.0MHz
17dB	22dB	32dB	42dB	46dB

PC 726 Series, 3 Phase

Typical Common Mode Insertion Loss				
.15MHz	0.50MHz	1.5MHz	5.0MHz	20MHz
18dB	38dB	44dB	50dB	50dB
Typical Differential Mode Insertion Loss				
0.15MHz	0.50MHz	1.5MHz	5.0MHz	20MHz
20dB	40dB	60dB	50dB	50dB

Rated voltage: 250VAC
Operating frequency: 50/60Hz
Dielectric withstanding voltage: line to line: 1.7 KVDC
line to ground: 2.2 KVDC
Max leakage current: 1.4mA at 250VAC 50/60Hz

POWER CONTROL BUS
Mating Plug, AMP #1-480305-0
Mating Contact, AMP #60620-1

OVERLOAD CIRCUIT BREAKER PROTECTION
Precision electromagnetic breaker provides manual switching and opens automatically under overload conditions.

PC 125 A&B, SDC 1559-D, SUC 1558-D, TPC 115-8 A&B TPC 115-10/MTD™ A&B, TPC 884-1

Typical Common Mode Insertion Loss				
.15MHz	.20MHz	.50MHz	1.0MHz	2.0MHz
12dB	18dB	30dB	50dB	50dB
Typical Differential Insertion Loss				
.15MHz	.20MHz	.50MHz	1.0MHz	2.0MHz
8dB	12dB	41dB	42dB	35dB

PC 500, TPC 115-8 C&D, TPC 115-10/MTD™ C&D

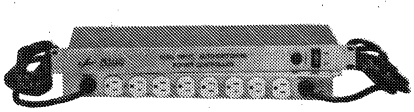
Typical Common Mode Insertion Loss				
.15MHz	.20MHz	.50MHz	1.0MHz	2.0MHz
20dB	21dB	25dB	30dB	52dB
Typical Differential Insertion Loss				
.15MHz	.20MHz	.50MHz	1.0MHz	2.0MHz
7dB	8dB	15dB	45dB	60dB

IPC™ 3200 Series, PC 301, TPC 2234

Typical Common Mode Insertion Loss			
.2MHz	1MHz	2MHz	10MHz
15dB	25dB	45dB	50dB
Typical Differential Insertion Loss			
.2MHz	1MHz	2MHz	10MHz
10dB	22dB	32dB	50dB

NEW PRODUCT

TPC 2234 DUAL INPUT, AUTO-SWITCHING AC POWER CONTROLLER



Model -A
Front (top) & Rear (bottom) views shown

RACK MOUNTED
19" wide, 1¾" high, 4½" deep.
Approximate Weight: 5 lbs.

INDICATOR LIGHT
Lighted On/Off Switch

OPTIONS:
Model "-A" - 110VAC, 5-15R Receptacles.
Model "-B" - 220VAC, 6-15R Receptacles.
Model "-A-F" - 110VAC with EMI/RFI Filter/Spike & Surge Suppression.
Model "-B-F" - 220VAC with EMI/RFI Filter/Spike & Surge Suppression.

8 OUTLETS
Unswitched (See OPTIONS:)

PROTECTION:
15 Amp Resetable Push Button Circuit Breaker

POWER INPUT:
14/3 AWG Cable W/ 5-15P Plug

SWITCHING TIME:
Approximately 10ms switch over time from primary source to secondary source.
Approximately 15ms reset time from secondary source to primary source.

The TPC 2234 is a single phase power distribution system that has two separate redundant inputs to ensure distribution of AC power to the eight outlets. If the primary power source fails, the system automatically switches from primary to secondary power. When primary power returns, the system will automatically switch back from secondary power.

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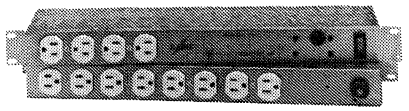
TPC 12

Ask about 48 hour delivery



Front (top) & Rear (bottom) views shown
Model "-A"

RACK MOUNTED
19" wide, 1¾" high, 4½" deep.
Weight: "A" Model 5 lbs., "C" 9 lbs.

POWER INPUT CABLE/PLUG
Model -A: 14/3AWG, 9ft. with 5-15P.
Model -C: 10/3AWG with L5-30P.

12 OUTLETS (5-15R) UNSWITCHED

CIRCUIT BREAKER PROTECTION
Model -A-RCB: 15 Amp push button, reset.
Model -A-CB: Single pole, 20 Amp toggle.
Model -C: 2 pole, 20 Amp single throw.

INDICATOR LIGHT
Lighted On/Off rocker switch for Models -A, -A-RCB. Power to system for Models -A-CB & -C.

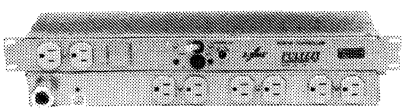
POWER RATING
120VAC, 12 Amps for Models -A, -A-RCB, -A-CB.
120VAC, 24 Amps for Model -C.

EMI/RFI FILTER (Optional)
35dB @ 1MHz
Add F after 12 & before "-" in part number.

AGENCY APPROVALS
All are UL recognized but only TCP 12-C is both UL and CSA

TPC 115-8

Ask about 48 hour delivery



Front (top) & Rear (bottom) views shown

RACK MOUNTED
Designed to fit standard 19" wide EIA STD.
Rack 1¾" high, 5" deep.
Weight: A&B 7 lbs. C-F 8 lbs.

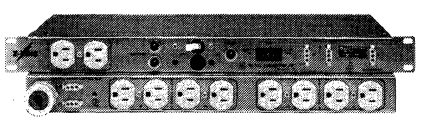
EMI/RFI FILTER
Dual Protection:
Common mode, line to ground.
Differential mode, line to line.

8 OUTLETS
6 mounted on the rear for easy access to other instruments in the cabinet, 2 additional outlets on the front panel.

OPTIONAL REMOTE FEATURES
Low voltage remote:
Pins 1 & 4 are for remote on/off with 24VAC between the pins. Pins 2 & 4 are for a remote indicator light with 24VAC between the pins. (Add "RL" to end of standard part number.)

INDICATOR LIGHT
Power to controller switched "ON."
NOTE:
Specifications listed below for models A through D only. Models A, B & C are both UL & CSA. Model D is UL only.*

TPC 115-10
TPC 115-10/MTD™



Front (top) & Rear (bottom) views shown

Ask about 48 hour delivery

RACK MOUNTED
Designed to fit standard 19" wide EIA STD.
Rack 1¾" high, 8" deep.
Weight: 14 lbs.

EMI/RFI FILTER
Dual Protection:
Common mode, line to ground.
Differential mode, line to line.

10 OUTLETS
8 outlets switched, 2 outlets unswitched, always "ON" for convenient AC Power requirements.

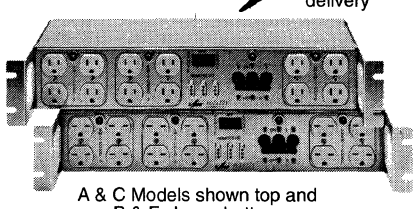
INDICATOR LIGHT
Power to controller.
Power to switched 1 outlets.
Power to switched 2 outlets.

TIME DELAY, POWER UP (MTD™)
Multiple Time Delay®, approximately 4 seconds between switched outlets 1 and switched outlets 2, provides sequential power up through the 8 switched outlets. Time delay remote power up.

REMOTE POWER CONTROL BUS
5 Remote I/O connectors for either;
A) Remote Power On/Off
B) Emergency shutdown with a mechanical, electronic or Thermo switching device.
C) Power up additional equipment.
D) Sequencing power up of additional equipment with MTD™
NOTE:
Specifications listed below for models A through D only.

PC 125
DEC® COMPATIBLE WITH MODEL 871, MODEL 861

Ask about 48 hour delivery



A & C Models shown top and
B & F shown bottom

RACK MOUNTED
Designed to fit standard 19" wide EIA STD.
Rack 3½" high, 6" deep (excluding recess brackets). Front panel recessed 2½" with convenient side cut outs for cable routing.
Weight: 19 lbs.

EMI/RFI FILTER
Triple noise protection:
Both common mode and differential mode, plus high frequency ground isolation.
NOTE:
Specifications listed below for models A through F only. Models A, B, C & F are both UL & CSA. Model D is UL only.

12 OUTLETS
8 outlets switched, 4 outlets unswitched, always "ON" for added convenience.

INDICATOR LIGHT
Power to controller. Power to unswitched outlets.
Power to switched outlets.

REMOTE POWER CONTROL BUS
3 Remote I/O connectors for either:
A) Remote Power On/Off
B) Emergency shutdown with a mechanical, electronic or Thermo switching device.
C) Power up additional equipment down line.

DEC is a trademark of Digital Equipment Corporation

SPECIFICATIONS FOR MODEL NUMBER: TPC 115-8 A-D, TPC 115-10/MTD™ A-D, TPC 115-10 A-D, PC125 A-F

MODEL	A	B	C	D	F
A.C. VOLTAGE INPUT	90/135	180/270	90/135	90/135	180/270
A.C. VOLTAGE OUTPUT	90/135	180/270	90/135	90/135	180/270
HERTZ	47-63	47-63	47-63	47-63	47-63
CURRENT	12 AMPS	12 AMPS	24 AMPS	24 AMPS	24 AMPS
FULL LOAD-VOLT AMPS	1440 VA	2880 VA	2880 VA	2880 VA	3840 VA
CIRCUIT BREAKER	20 AMPS	20/20 AMPS	20/20 AMPS	20/20 AMPS	20/20/30 AMPS
FILTER EMI/RFI	20 AMPS	20 AMPS	30 AMPS	30 AMPS	30 AMPS
OPERATING TEMPERATURE	0 TO 60°C	0 TO 60°C	0 TO 60°C	0 TO 60°C	0 TO 60°C
STORAGE TEMPERATURE	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C
ALTITUDE-MAXIMUM	10,000 FT.	10,000 FT.	10,000 FT.	10,000 FT.	10,000 FT.
RELATIVE HUMIDITY	95% MAX.	95% MAX.	95% MAX.	95% MAX.	95% MAX.
POWER CABLE: AWG & LENGTH	14/3 9'	14/3 9'	10/3 15'	10/3 15'	12/3 15'
INPUT PLUG-NEMA	5-15P	—	L5-30P	L5-30P	—
MATING RECEPTACLES-NEMA	5-15R	N/A	L5-30R	L5-30R	N/A
OUTLETS-NEMA	5-15R	6-15R	5-15R	5-20R	6-15R

— NOT PROVIDED

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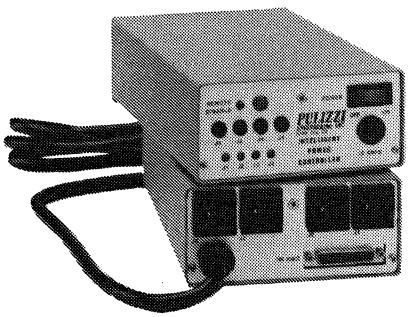
VISA MasterCard

NETWORK COMPATIBLE µP CONTROLLED, RS 232 REMOTE ON/OFF INTELLIGENT POWER CONTROLLERS™ WITH OPTIONAL, WINDOWS COMPATIBLE "ULTIMATE POWER"™ GRAPHICAL USER INTERFACE

The **IPC™ 3200** series is a family of **MICRO PROCESSOR** controlled AC power or Form C dry contact distribution systems. They can be remotely operated via a modem, to power up less accessible equipment or computers. Using a computer keyboard, any or all of the outlets can be turned on or off by a fixed command syntax. When the unit is turned on, there is no power applied to the outlets. Operation is via a rear-mounted RS 232 serial port, or the units may be locally operated by front panel mounted switches which will disable the RS 232 remote control. There are three basic models of the **IPC™**: The desk top **IPC™ 3200**, and two rack mountable configurations, **IPC™ 3201** and **IPC™ 3202**. All systems have available user defined initial turn-on sequence, password protection, a "Watch-Dog" (self booting) function and are individually addressable, allowing control of multiple systems connected in parallel.

IPC™ 3200



Front (top) & Rear (bottom) views shown

DIMENSIONS
5¾" wide
2½" high
9" deep
Weight approximately 2½ lbs.

INPUT AC POWER
AC voltage: 95 - 130
Max current: 15 Amp
6' 14/3 AWG Cable
5-15P Input Plug

INDICATORS
Lighted On/Off Rocker Switch
4 Green LEDs for power on to each outlet
1 Red Led for local operation

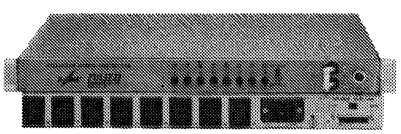
OUTPUTS
4 switched NEMA 5-15R
Individually selected
via communications port
or front panel switches

COMMUNICATIONS PORT
RS 232-C
Configured DTE
DBM 25 pin female
8 bit data, 1 stop bit, no parity
2400 baud rate

PROTECTION
15 Amp resetable push button circuit breaker

SPIKE/SURGE SUPPRESSION
EMI/RFI FILTERING

IPC™ 3201



Front (top) & Rear (bottom) views shown

DIMENSIONS
19" wide (removable/reversal side brackets)
1¾" high
9" deep
Weight approximately 14 lbs.

INPUT AC POWER
AC voltage selectable: (95-130 / 180-250)
Max current: 20 Amp
IEC power inlet

INDICATORS
1 LED for power on
8 Green LEDs for power on to each outlet
1 Red Led for local operation

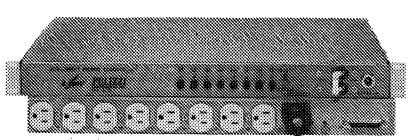
OUTPUTS
8 switched IEC 320
Individually selected
via communications port
or front panel switches

COMMUNICATIONS PORT
RS 232-C
Configured DTE
DBM 25 pin female
8 bit data, 1 stop bit, no parity
2400 baud rate

PROTECTION
2-pole, 20 Amp circuit breaker

SPIKE/SURGE SUPPRESSION
EMI/RFI FILTERING

IPC™ 3202



Front (top) & Rear (bottom) views shown

DIMENSIONS
19" wide (removable/reversal side brackets)
1¾" high
9" deep
Weight approximately 14 lbs.

INPUT AC POWER
AC voltage: 95 - 130
Max current: 20 Amp
15' 12/3 AWG cable
NEMA L5-30P input plug

INDICATORS
1 LED for power on
8 Green LEDs for power on to each outlet
1 Red LED for local operation

OUTPUTS
8 switched NEMA 5-15R
Individually selected
via communications port
or front panel switches

COMMUNICATIONS PORT
RS 232-C
Configured DTE
DBM 25 pin female
8 bit data, 1 stop bit, no parity
2400 baud rate

PROTECTION
2-pole, 20 Amp circuit breaker

SPIKE/SURGE SUPPRESSION
EMI/RFI FILTERING

✦ ELECTROMAGNETIC/RADIO FREQUENCY INTERFERENCE (EMI/FRI) FILTER SPECIFICATIONS

TYPICAL COMMON MODE INSERTION LOSS			
200KHz	1MHz	2MHz	10MHz
15dB	25dB	45dB	50dB

TYPICAL DIFFERENTIAL INSERTION LOSS			
200KHz	1MHz	2MHz	10MHz
10dB	22dB	32dB	50dB

™ "INTELLIGENT POWER CONTROLLER," "INTELLIGENT POWER" and "IPC" are Trade Marks of Pulizzi Engineering, Inc.

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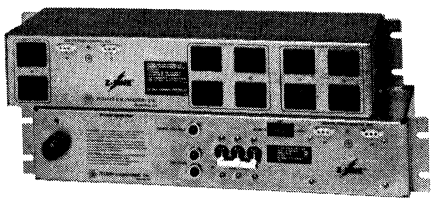
PC 500

SUN MICROSYSTEMS COMPATIBLE – CATALYST PROGRAM



Front (bottom) & Rear (top) views shown

RACK MOUNTED
19" wide
3½" high, 6" deep, with 1" inset mount
Weight: 18 lbs.

EMI/RFI FILTER
Triple noise protection:
Both common mode and differential mode, plus high frequency ground isolation

10 OUTLETS
8 outlets switched, 2 outlets unswitched
IEC 320 rated at 10 Amps/250VAC (VDE) or 15 Amps/250VAC (UL/CSA)

PLUGS ARE OPTIONAL
TUV: Pin and sleeve 220-240V, 32A. IEC 309
UL/CSA: Pin and sleeve 250V, 30A. IEC 309
NEMA L6-30P 250V, 30A

TIME DELAY, POWER UP
Time delay approximately 4 seconds between switched outlets 1 and switched outlets 2, provides sequential power up through the 8 switched outlets

REMOTE POWER CONTROL BUS
4 Remote I/O connectors for either:
A) Remote Power On/Off
B) Emergency shutdown with a mechanical, electronic or Thermo switching device
C) Power up additional equipment

INDICATOR LIGHT
Power to controller
Power to switched 1 outlets
Power to switched 2 outlets

SPECIFICATIONS FOR MODEL NUMBERS PC 500	PC 500	PC 500-429	PC 500-1050	PC 500-1106
AGENCY	UL/CSA	UL/CSA	TUV	TUV
A.C. VOLTAGE INPUT	220-240	220-240	220-240	220-240
A.C. VOLTAGE OUTPUT	220-240	220-240	220-240	220-240
HERTZ	47-63	47-63	47-63	47-63
CURRENT	24 AMPS	24 AMPS	24 AMPS	24 AMPS
FULL LOAD-VOLT AMPS	5760 VA	5760 VA	5760 VA	5760 VA
CIRCUIT BREAKER	20/20/30 AMPS	20/20/30 AMPS	20/20/30 AMPS	20/20/30 AMPS
FILTER EMI/RFI	30 AMPS	30 AMPS	30 AMPS	30 AMPS
OPERATING TEMPERATURE	0 TO 60°C	0 TO 60°C	0 TO 60°C	0 TO 60°C
STORAGE TEMPERATURE	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C
ALTITUDE-MAXIMUM	10,000 FT.	10,000 FT.	10,000 FT.	10,000 FT.
RELATIVE HUMIDITY	95% MAX.	95% MAX.	95% MAX.	95% MAX
POWER CABLE: AWG & LENGTH	12/3 15 FT.	12/3 15 FT.	3x4.00 mm² 15 FT.	3x4.00 mm² 15 FT.
INPUT POWER PLUG	L6-30P	—	IEC 309 32A	—
OUTLET-NEMA	L6-30R	—	IEC 309 32A	—
WEIGHT	IEC 320 15A	IEC 320 15A	IEC 320 10A	IEC 320 10A

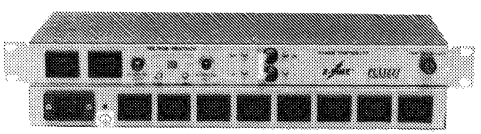
— NOT PROVIDED

TPC 884-1

VOLTAGE SELECTABLE INTERNATIONAL SYSTEM

■ The IEC Advantage

Equipment can be manufactured utilizing the IEC 320 inlet regardless of final destination.



Front (top) & Rear (bottom) views shown

The model TPC 884-1 is a compact power distribution unit offering the user 10 IEC outlets in a one unit high (1¾") package. It is a voltage selectable system, operating at either 95 to 135 VAC or 190 to 250 VAC. **Recognized to meet the safety the requirements of UL 1950, CSA 22.0-950 and IEC 950, the system is rated at 16 Amps for International use.**

RACK MOUNTED
19" wide, 1¾" high, 7" deep
Weight: 8 lbs.

PROTECTION
2-pole, 20 Amp circuit breaker

10 IEC 320 OUTLETS
8 on the rear panel, 2 on the front panel
Rated 10 Amps (VDE); 15 Amps (UL/CSA)

VOLTAGE SELECTABLE
Output voltage is selected with a rear panel switch to either 95 to 135 VAC or 190 to 250 VAC to match the input

POWER INLET
IEC 320 C-20 inlet, rated 16/20 Amps

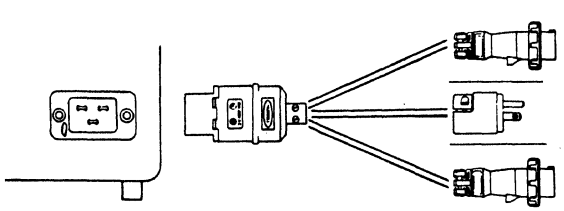
INDICATOR LIGHT
Power available light

EMI/RFI FILTER
Dual protection;
Common mode; line to ground
Differential mode; line to line

SPIKE/SURGE SUPPRESSION

MTBF (MEAN TIME BEFORE FAILURE)
Per MIL-HDBK-217E
875,000 Hrs.

Various power cable configurations that may be used with the TPC 884-1.
Detachable Connector, Portable Cord and Detachable Plug are not supplied.



Panel Mount Inlet Detachable Connector Portable Cord Detachable Plug

3-wire 20A. 250 VAC. IEC 309 plug for the North American Market

3-wire 15A.	250 VAC.	NEMA 6-15P
3-wire 20A.	250 VAC.	NEMA 6-20P
3-wire 20A.	250 VAC.	NEMA L6-20P
3-wire 15A.	125 VAC.	NEMA 5-15P
3-wire 20A.	125 VAC.	NEMA 5-20P
3-wire 20A.	125 VAC.	NEMA L5-20

3-wire 16A. 220-240 VAC. IEC 309 plug for the International Market

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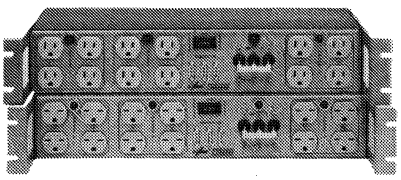
All Pulizzi Engineering standard 3 phase systems are designed a "Y" type input. The "Delta" configuration style can be furnished, however, the customer must specify when ordering. Special model numbers will be assigned to these systems.

PC 301 PC 301/MTD™

LOW COST 3-PHASE INPUT,
SINGLE PHASE OUTPUT



A & C Models shown top and
B & F shown bottom

RACK MOUNTED
19 wide, 3½" high, 6" deep,
(including 2½" recess brackets)
Weight: 19 lbs.

EMI/RFI FILTER
Triple noise protection: Both common mode and differential mode

12 OUTLETS
Located on the front panel.
4 switched receptacles allocated per phase

TIME DELAY, POWER UP (OPTIONAL)
Time delay approximately 4 seconds between phase X, Y and Z provides Multiple Time Delay™ power up through the 12 switched outlets.

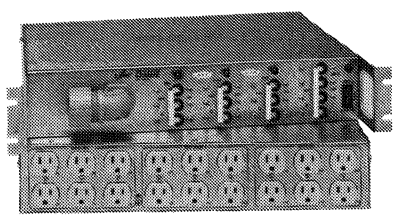
INDICATOR LIGHTS
Power to controller
Power to each of the switched outlet sections

REMOTE POWER CONTROL BUS
3 remote I/O connectors for either:
A) Remote Power On/Off
B) Emergency shutdown with a mechanical, electronic or Thermo switching device
C) Power up additional equipment down line

ADDITIONAL FEATURES AND OPTIONS:
A 9 foot 14/5 Power Cable with NEMA L21-20P is standard. Options include either 15 amps or 20 amps per phase; NEMA outlet receptacle types (5-15R, 5-20R, 6-15R or 6-20R).

PC 726 and PC 726/MTD™

3-PHASE INPUT,
SINGLE PHASE OUTPUT



Front (top) and Rear (bottom)
Model "C" shown

RACK MOUNTED
19" wide, 3½" high, 14½" deep
Recessed 2½" to either the front or rear panel
Flush mount is also available (specify)
Weight: 29 lbs.

EMI/RFI FILTER
30 amps per phase, triple noise protection
Both common mode and differential mode, plus high frequency ground isolation

18 OUTLETS (C=5-15R, D=5.20R)
Located on the rear panel
6 switched receptacles allocated per phase

INDICATOR LIGHTS
1 light to indicate "power on" to system.
3 lights to indicate power to be switched sections

TIME DELAY, POWER UP (MTD™ MODELS)
Time delay approximately 4 seconds between phase X, Y and Z provides Multiple Time Delay™ power up through the 18 switched outlets.

REMOTE POWER CONTROL BUS
2 bussed remote I/O connectors allows for either:
A) Remote Power On/Off
B) Emergency shutdown with a mechanical, electronic or Thermo switching device
C) Power up additional equipment down line

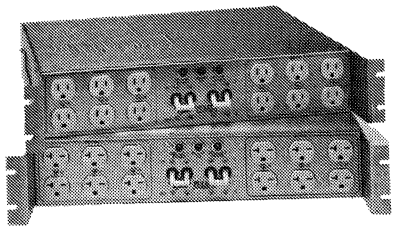
PROTECTION
Main Circuit Breaker - 4 pole, 30 Amps
Secondary Breakers (3) - 3 pole, 20 Amps

INPUT POWER
120/208 VAC, rated 24 Amps, 8640VA
Cable 10/3 AWG with L21-30P plug

MODELS SDC 1559 AND SUC 1558 (A-D) 1440 AND 2880 VA

The model SDC 1559 reduces the operating voltage from a single phase input of 190-240 VAC to an output of 105-135 VAC.

The model SUC 1558 increases the operating voltage from a single phase input of 105-135 VAC to an output of 190-240 VAC.



Front Views: SDC (top) and SUC (bottom)

RACK MOUNTED
19" wide, 3½" high, 17" deep, recessed 2½"

EMI/RFI FILTER
Common and Differential mode are filtered and spike & surge protection in model C & D only

12 OUTLETS
Six outlets in section 1 and six in section 2

INDICATOR LIGHT
Power to controller
Power to section 1
Power to section 2

SPECIFICATIONS FOR MODEL NUMBERS:	SDC 1559-				SUC 1558-			
MODEL	A	B	C	D	A	B	C	D
A.C. VOLTAGE INPUT	190/240	190/240	190/240	190/240	105-135	105-135	105-135	105-135
A.C. VOLTAGE OUTPUT	105/135	105/135	105/135	105/135	190/240	190/240	190/240	190/240
HERTZ	47-63	47-63	47-63	47-63	47-63	47-63	47-63	47-63
CURRENT	24 AMPS	12 AMPS	24 AMPS	12 AMPS	15 AMPS	7 AMPS	15 AMPS	7 AMPS
FULL LOAD-VOLT/AMPS	2880 VA	1440 VA	2880 VA	1440 VA	2880 VA	1440 VA	2880 VA	1440 VA
CIRCUIT BREAKER	2 POLE 20 AMPS	2 POLE 20 AMPS	2 POLE 20 AMPS	2 POLE 20 AMPS	2 POLE 10 AMPS	2 POLE 10 AMPS	2 POLE 10 AMPS	2 POLE 10 AMPS
EMI/RFI FILTER	—	—	30 AMPS	20 AMPS	—	—	30 AMPS	20 AMPS
OPERATING TEMPERATURE	0 TO 60°C	0 TO 60°C	0 TO 60°C	0 TO 60°C	0 TO 60°C	0-60°C	0 TO 60°C	0 TO 60°C
STORAGE TEMPERATURE	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C	-40 TO +70°C
ALTITUDE-MAXIMUM	10,000 FT.	10,000 FT.	10,000 FT.	10,000 FT.	10,000 FT.	10,000 FT.	10,000 FT.	10,000 FT.
RELATIVE HUMIDITY	95% MAX.	95% MAX.	95% MAX.	95% MAX.	95% MAX.	95% MAX.	95% MAX.	95% MAX.
POWER CABLE: AWG/LENGTH	4.00mm² 9 FT.	1.5mm² 9 FT.	4.00mm² 9 FT.	1.5mm² 9 FT.	12/3 AWG 9 FT.	12/3 AWG 9 FT.	12/3 AWG 9 FT.	12/3 AWG 9 FT.
INPUT PLUG-NEMA	—	—	—	—	—	—	—	—
OUTLETS-NEMA	5-15R	5-15R	5-15R	5-15R	6-15R	6-15R	6-15R	6-15R
WEIGHT	65 lbs.	40 lbs.	65 lbs.	40 lbs.	65 lbs.	40 lbs.	65 lbs.	40 lbs.

— NOT PROVIDED

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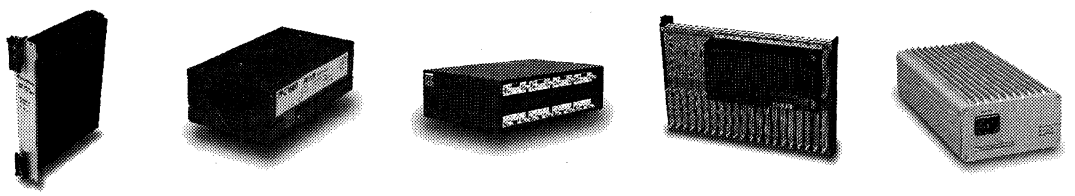

Tracewell Power designs, manufactures and markets power supplies ranging from 200 to 2000 Watts. We are committed to innovative design, excellent quality and rapid response manufacturing of high performance power supplies. Tracewell's innovative line of standard products and broad spectrum of custom designs deliver power solutions to OEMs throughout the world.

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Our applications include:

- **IT equipment**
- **Computers**
- **Telecom**
- **ATE**
- **High availability/on-line equipment**
- **High volume/high performance**
- **Defense systems**

Our capabilities include:

- **Turnkey power/packaging/cooling**
- **COTS**
- **International agency approvals**
- **CE mark**
- **Outstanding applications support**
- **High quality manufacturing**

Our products include:

- **200 to 2000 Watt power supplies**
- **Industry standards (cPCI, VME, VXI and DIN)**
- **AC/DC and DC/DC converters**
- **Fault tolerant and redundant configurations**
- **Distributed power systems**
- **Configurable power supplies**
- **Power factor correction**
- **Single and multiple outputs**
- **Custom designs**
- **Battery chargers**
- **Low noise design**
- **Outstanding thermal management**
- **Ruggedization**

ISO 9001

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Tracewell Power

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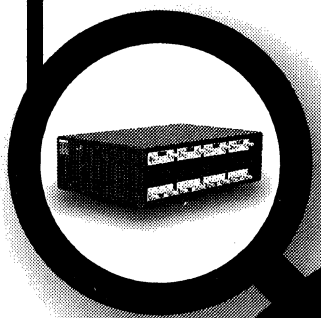
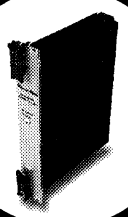
STF Modular Series

- 500, 1000 and 2000 Watt models
- 1-8 independent outputs
- Wide-range AC input
- Power factor correction (PFC) on most models
- Straight-Through-Flow high performance cooling
- Current sharing modes
- Pluggable chassis versions available



PCI Series

- CompactPCI form factor
- 350 or 500 Watts in 6U x 8HP
- Standard PCI voltages: 5V, 3.3V, ±12V
- N+1 redundant and hot swap
- Internal OR-ing diodes
- Single wire current sharing
- Fully shielded



FEATURES

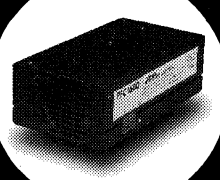
Configurable

Ruggedness

Advanced Thermal Design

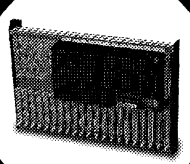
Agency Approvals

2-Year Warranty



Front Ends

- 600 Watt auto-ranging input or 1600 Watt PFC
- Output 350-380 Vdc
- EMI/Transient surge protection
- 20 ms holdup
- DC OK, AC OK, front panel ON/OFF



VME/VXI

- Harnessless design
- 400-800 Watt DC-DC
- Variety of DC output options
- Fan and peripheral outputs
- EMI filter
- Meets VME/VXI specifications

Custom

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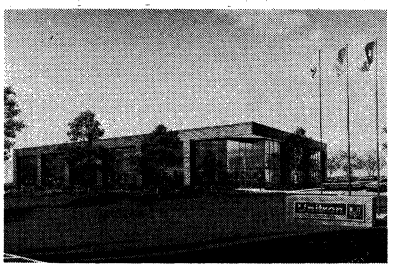
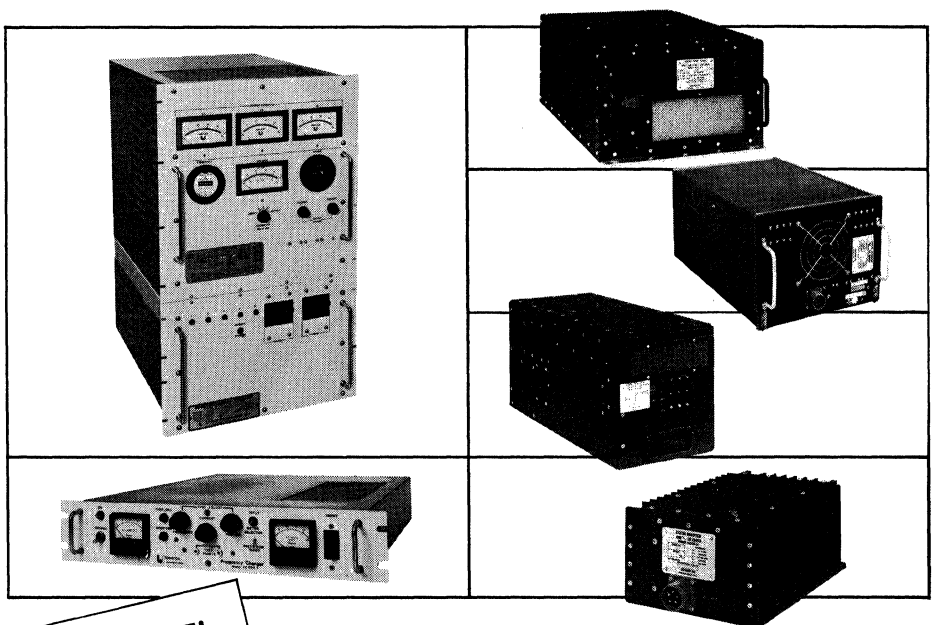


Frequency Converters

Beginning in 1960, Unitron, Incorporated has concentrated on the design and development of solid-state frequency conversion equipment. This single point concentration has resulted in Unitron becoming the supplier of one of the largest variety of 50/60 Hz to 400 Hz and 400 Hz to 50/60 Hz converters to both the defense aerospace and industrial markets. We invite your inquiries.

PS Series	400 Hz to 50/60 Hz	2.0 kVA to 10.0 kVA
CR Series	50/60 Hz to 400 Hz	7.5 kVA to 15 kVA
MFC Series	50/60 Hz to 400 Hz	15 kVA to 400 kVA



NOW AVAILABLE!
Ultra-lightweight highly efficient mobile power carts for support of aircraft in maintenance hangars and on ramps.

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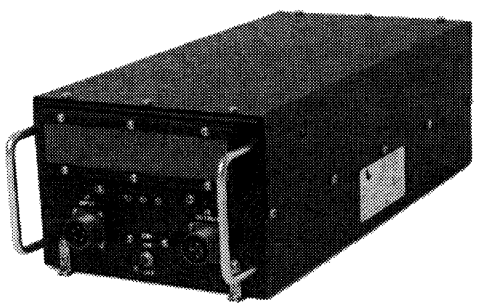
AVTEL

ULTRA LIGHTWEIGHT FREQUENCY CONVERTERS 400 Hz TO 50/60 Hz

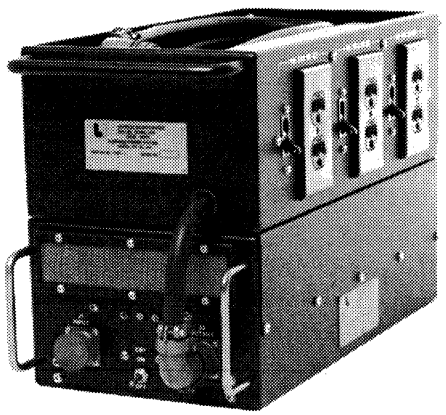
Unitron

The **PS-94 Series** is the newest generation of 400 Hz to 50/60 Hz frequency converters developed to be the lightest weight on the market today for airborne operations. This new generation of frequency converters incorporates the latest state-of-the-art technology to meet aircraft low input current distortion and a high input power factor in a small size for both the military and industrial aircraft markets.

As an expansion of the PS-94 Series, Unitron has developed the **PS-95-448-1 MEDI-VAC PORTABLE POWER SYSTEM,** a self-contained, easily transportable unit to convert 400 Hz aircraft power into a 3-station, 60 Hz power bus for medical evacuation stations aboard military and commercial aircraft.



MODEL PS-94-444-2
(6"H x 9"W x 18"D)
(Weight 29 lbs.)



MODEL PS-95-448-1
(12"H x 9.25"W x 25"D)
(Weight 44 lbs.)

General Specifications

Input
- Voltage: 115/200 VRMS ±10%
- Frequency: 360 to 440 Hz
- Current Distortion: <5%
- Power Factor: >.98

Output
- Voltage: 115 VRMS ± 1%
- Frequency: 60 Hz ± 0.01%
- Harmonic Distortion: 2% maximum
- Power Factor: 0.8 lagging to 0.8 leading

Other Specifications

- Efficiency: 85% minimum
- Temperature: –55%C to +71°C operating
- Altitude: 15,000 ft. operating; 50,000 ft. storage
- Vibration: MIL-STD-810E, Method 514.4
- Shock: MIL-STD-810E, Method 516.4
- EMI: RTCA DO-160D*

* Paralleling and EMI IAW MIL-STD-461D are both optional

PS-94 SERIES	
OUTPUT POWER	**MODEL NUMBER**
2.0 kVA	PS-94-443-2
3.5 kVA	PS-94-444-2
5.0 kVA	PS-94-445-2
7.5 kVA	PS-94-446-2
10.0 kVA	PS-94-447-2

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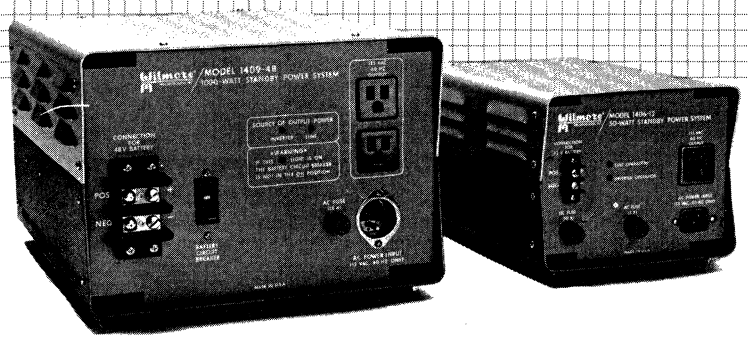
Wilmore



DC-To-AC Inverters And UPS/Standby Power Systems

- **Power Ratings From 50 To 1000 Volt-Amperes**
- **Standard Input Voltages 12, 24, 48 Volts**
- **Highly Efficient**

Series 1400 Inverters and Standby Power Systems are industrial-grade, general-purpose ac power sources in rugged, free-standing metal enclosures. They are compatible with sensitive electronic loads including personal computers, communications equipment and test instruments. Models rated at or above 250VA also provide a 2:1 ouptut-power surge capability for powering loads with high inrush current demands such as small motors, lighting equipment and small power tools. These ac power sources feature a frequency-stable quasi-sine-wave output having peak, average and rms voltages approximating those of a sine wave while maintaining high operating efficiency and low idle current.

DC-to-AC Inverters

Table 1 describes the heavy-duty portable inverters in this series. Mutual galvanic isolation is provided between the dc input, the ac output and chassis, allowing these inverters to be connected either to a positive or a negative dc power source. These inverters are conservatively rated over an ambient temperature range of -20°C to +55°C and well-protected from electrical and physical abuse.

Standby Power Systems

Each Wilmore Standby Power System consists of a dc-to-ac inverter, a battery charger and sensing/transfer circuitry. In normal operation, commercial power is presented directly to the load and the system float charges the user's battery and monitors the ac line. When commercial power is interrupted, the sensing circuitry detects the loss of power and transfers the load to the inverter. This sensing and load transfer takes less than 15 milliseconds. When the commercial power returns, the sensing circuitry will sample the ac line for a period of 5 to 7 seconds to ensure that proper ac voltage is maintained. The reverse transfer from inverter operation to normal ac operation is then accomplished, also in less than 15 milliseconds. With the load again being supplied directly from the commercial line, the battery charger begins to recharge the batteries.

Power for Wilmore's Standby Systems is provided by external batteries which are maintained at full charge by the built-in battery charger. Batteries are not supplied with the Standby Power Systems. Since the capacity of the user-supplied battery bank determines the backup time available for the system, sizing the battery should be coordinated with the battery supplier.

Table 1. DC-to-AC Inverters

Output Power (Volt-Amps)	Nominal Input Voltage (Vdc)	Nominal Output[1] Voltage And Frequency (Vac/Hz)	Dimensions (h" x w" x d")	Weight (Pounds)	Efficiency (Typical)	Model Number
50	12, 24, 48	115/60	4.2 x 5.2 x 7	6	60%	**1401**
250	12, 24, 48	115/60	7.7 x 9 x 12	31	80%	**1402**
500	12, 24, 48	115/60	8.7 x 12.7 x 11	44	80%	**1403**
1000	24, 48	115/60	8.7 x 12.7 x 11	47	80%	**1404**

Table 2. Standby Power Systems

Output Power (Volt-Amps)	Battery Input Voltage (Vdc)	Battery Charger Current (Adc max)	Nominal Output[1] Voltage And Frequency (Vac/Hz)	Dimensions (h" x w" x d")	Weight (Pounds)	Model Number
50	12	3	115/60	6.3 x 8.5 x 11.5	15	**1406-12-115-60**
50	24	2	115/60	6.3 x 8.5 x 11.5	15	**1406-24-115-60**
250	12	3	115/60	8.7 x 12.7 x 11	42	**1407-12-115-60**
250	24	2	115/60	8.7 x 12.7 x 11	42	**1407-24-115-60**
500	12	6	115/60	8.7 x 12.7 x 16	56	**1408-12-115-60**
500	24	3	115/60	8.7 x 12.7 x 16	56	**1408-24-115-60**
1000	24	3	115/60	8.7 x 12.7 x 16	60	**1409-24-115-60**

[1]230 Vac, 50Hz versions available for all models.

WILMORE ELECTRONICS CO., INC.
P.O. Box 1329, Hillsborough, N.C. 27278 • Telephone: (919) 732-9351
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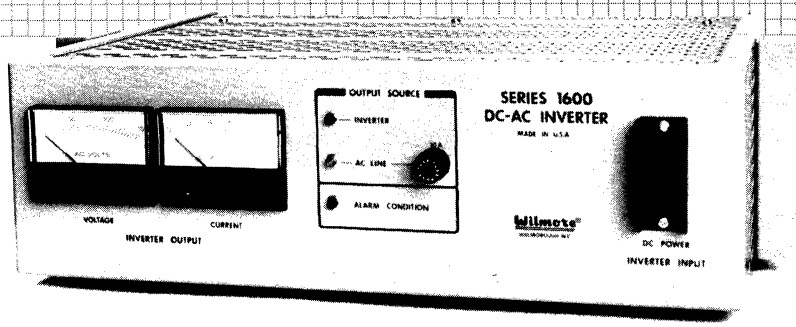
Wilmore

Rack-Mount DC-To-AC Inverters



- **500 And 1000 Volt-Ampere Power Ratings**
- **24, 48 Or 130 Vdc Input**
- **For 19 Or 23-Inch Equipment Racks**
- **Well-Regulated, Frequency Stable Output**

Designed for use in 19" and 23" equipment racks, these state-of-the-art inverters achieve superior electrical performance in low profile enclosures. Conservatively rated and very efficient, Series 1600 and Series 1650 inverters will operate continuously at any load within their rating over a wide ambient temperature range with simple convection cooling. They are well-suited to powering sensitive telecommunications and data-processing equipment. In addition, these inverters are compatible with many loads normally considered difficult for solid-state inverters, including small motors and other nonlinear loads.

Output Waveshape

Model 1653 and Model 1654 inverters feature a **quasi-sine-wave output** having peak, average and rms voltages approximating those of a sine wave while maintaining high operating efficiency and low idle current. Occupying only 3.5 inches of vertical rack space, these inverters are designed as a compact, rugged, cost-effective alternative to the inverters typically available for use in telecommunications and utility equipment racks.

For applications requiring a **low-distortion sine-wave output**, Model 1603 inverters feature unique power-processing circuitry to maintain a pure sinusoidal output waveform while powering even severely nonlinear loads. Unlike other sine-wave inverters these are true "four-quadrant" power sources. That is, they can provide rated voltage and current regardless of the phase relation of these two power components. Additional features include quartz clock frequency stability (±0.01 Hz) and light weight (23 lbs).

Optional Transfer Circuitry

The inverters in Table 1 are available with optional internal high-speed transfer circuits to provide inverter-to-line or line-to-inverter automatic load transfer. ("Line" refers to commercial ac power).

In the inverter-preferred configuration, designated by changing the part number suffix from "P" (plain) to "U" (uninterruptible), the load power is normally provided by the inverter. However, if the inverter output is interrupted, an internal transfer switch automatically transfers the load from the inverter to commercial ac power. Because the transfer time between inverter and line is short (2 msec. typical), such transfers are normally not detected by even highly sensitive loads. Upon restoration of inverter power, transfer back to inverter power automatically takes place.

In the line-preferred configuration, designated by changing the part number suffix to "L" (line preferred) the load power is normally provided by the commercial ac line and the inverter operates in the standby mode.

Custom-Designed AC Power Sources

The majority of our work is designing and manufacturing custom power conversion equipment. Our three-level and multi-level quasi-sine-wave technology can reliably and economically power most ac loads. If, however, you have an application requiring a very low-distortion ac power source, our unique sine-wave power circuitry can make it lighter, smaller and electrically rugged. Whether you would like a quotation on your completed specification or just want to discuss your application, our New Products Group would like to hear from you.

Table 1. Rack-Mount DC-to-AC Inverters

Output Power (VA)	Nominal Input Voltage (Vdc)	Nominal Output[1] Voltage And Frequency (Vac/Hz)	Output Waveshape	Dimensions (h" x w" x d")	Weight (Pounds)	Model[2] Number
500	24	120/60	Sine	5.2 x 17.0 x 13.25	23	**1603-24-120-60-P**
500	48	120/60	Sine	5.2 x 17.0 x 13.25	23	**1603-48-120-60-P**
500	130	120/60	Sine	5.2 x 17.0 x 13.25	23	**1603-130-120-60-P**
500	24	120/60	Quasi-Sine	3.45 x 17.0 x 14.95	38	**1653-24-120-60-P**
500	48	120/60	Quasi-Sine	3.45 x 17.0 x 14.95	38	**1653-48-120-60-P**
500	130	120/60	Quasi-Sine	3.45 x 17.0 x 14.95	38	**1653-130-120-60-P**
1000	24	120/60	Quasi-Sine	3.45 x 17.0 x 14.95	16	**1654-24-120-60-P**
1000	48	120/60	Quasi-Sine	3.45 x 17.0 x 14.95	16	**1654-48-120-60-P**
1000	130	120/60	Quasi-Sine	3.45 x 17.0 x 14.95	16	**1654-130-120-60-P**

[1]Versions may be specified with voltage and frequency of 230-Vac/50Hz by replacing the "120" with "230" and "60" with "50" in the model number.

[2]Inverter-preferred "U" or line-preferred "L" versions may be specified by replacing the "P" in the model number with the appropriate letter designation.

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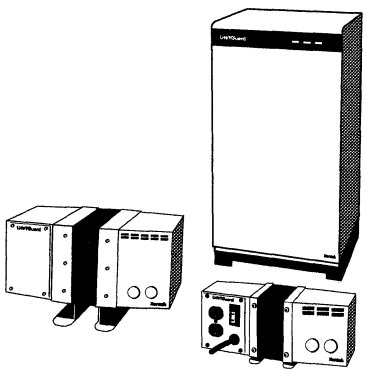
XENTEK POWER SYSTEMS
AC POWER CONDITIONING

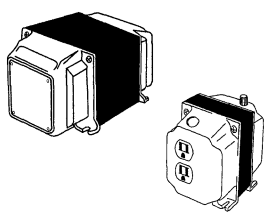
FEATURES

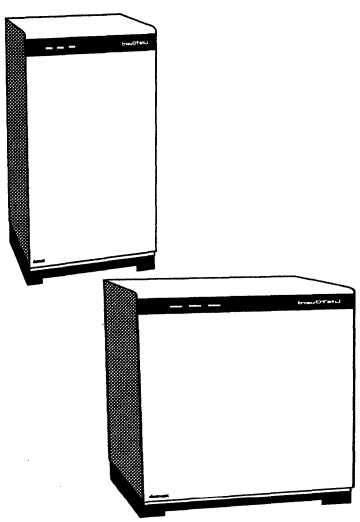
- Extreme Isolation Transformers (EIT) and Power Line Conditioners (PLC)
- Industrial-Grade (Power Guard™) Models
- Medical Grade Ultra-Low Leakage (Life Guard™) Models
- Wide-Band Noise Attenuation
- FCC Level B EMI/RFI Filtering
- Performance Tested to ANSI/IEEE C62.45 (IEEE 587 Cat A & B)
- CSA C22.2 (cUL) on all 1Ø Models

SPECIFICATIONS

AC Input:
1Ø Models: 115/230VAC, 50/60 Hz
3Ø Models: 208; 480; 600 VAC
Input Range: -15/+20% (PLC only)
Regulation: ±3%, typical
Common Mode Rejection: up to 150dB
Normal mode Rejection: up to 65dB
Isolation: 100 MΩ
Efficiency: up to 97% (EIT);
K-Factor up to 13 (Y Series)
Leakage Current:
1Ø: 10µA; 3Ø: 100µA (Medical Grade Models)
Agency Listings:
X-Series: UL1012/UL 544-A/ CSA22.2/VDE0550
Y-Series: UL1561/UL544-B







Y-SERIES SINGLE PHASE MODELS

	Power Guard		Life Guard	
	EIT	PLC	EIT	PLC
500VA	—	PLC-500	—	LPC-500
1.0KVA	—	PLC-1.0K	—	LPC-1.0K
2.0KVA	—	PLC-2.0K	—	LPC-2.0K
3.0KVA	—	PLC-3.0K	—	LPC-3.0K
5.0KVA	—	PLC-5.0K	LGY-5.0K	LPC-5.0K
7.5KVA	EYT-7.5K	PLC-7.5K	LGY7.5K	—
10KVA	EYT-10K	PLC-10K	LGY-10K	LPC-10K
15KVA	EYT-15K	PLC-15K	LGY-15K	LPC-15K
20KVA	EYT-20K	PLC-20K	LGY-20K	LPC-20K

X-SERIES SINGLE PHASE MODELS

	Power Guard		Life Guard	
	EIT	PLC	EIT	PLC
125VA	—	—	LGT-125	—
250VA	EIT-250	—	LGT-250	—
500VA	EIT-500	—	LGT-500	—
750VA	EIT-750	—	LGT-750	—
1000VA	EIT-1.0K	—	—	—
1500VA	—	—	LGT-1.5K	—
2500VA	EIT-2.5K	—	LGT-2.5K	—
5000VA	EIT-5.0K	—	—	—

Y-SERIES THREE PHASE MODELS MODELS

	Power Guard		Life Guard	
	EIT	PLC	EIT	PLC
7.5KVA	EYT-7.5K	PLC7.5K	LGY-7.5K	LPC7.5K
10KVA	EYT-10K	PLC10K	LGY-10K	LPC10K
15KVA	EYT-15K	PLC15K	LGY-15K	LPC15K
22.5KVA	EYT-22.5K	PLC22.5K	LGY-22.5K	LPC22.5K
30KVA	—	PLC30K	—	LPC30K
45KVA	EYT-45K	PLC45K	LGY-45K	LPC45K
75KVA	EYT-75K	PLC75K	LGY-75K	LPC75K
100KVA	EYT-100K	PLC-100K	LGY-100K	LPC-100K
150KVA	EYT-150K	—	LGY-150K	—
200KVA	EYT-200K	—	LGY-200K	—
250KVA	EYT-250K	—	LGY-250K	—

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A Taiyo-Yuden Company

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AeroComm, Inc.
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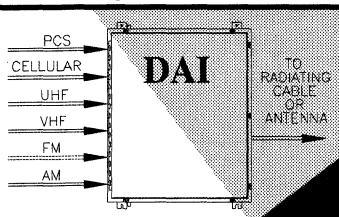
Available as a comprehensive system or as individual components, AeroComm's family of rebroadcast products are tailored to your system's needs. . . Filtering problems? See the Ultra-Q in Section 2750.

Rebroadcast Systems

for seamless communications



AeroComm's turn-key wireless products go where no signals have gone before.

Operating 24 hours a day at these locations:

PCS 1.85-2.0 GHz

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UHF TRUNKING 800-870 MHz

UHF 450-470 MHz

VHF 154-170 MHz

FM BAND 88-108 MHz

AM BAND 510-1630 KHz

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Distributed Antenna Interface
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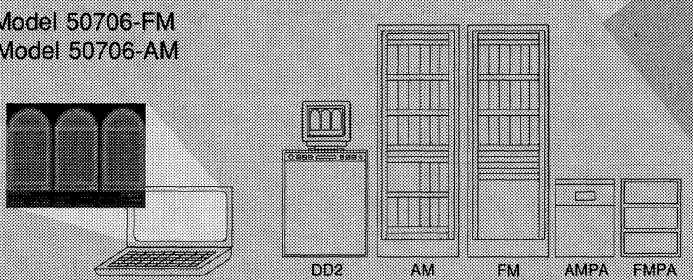
Cellular Booster Amp
Model 50289-CBA-CEL
Cross Band Couplers
(Call for models)

Channelized Booster Amplifier (CBA)

SmartBooster Model 50289-BA-8
UHF Channelized Booster Amp
Model 50289-CBA-UHF
VHF Channelized Booster Amp
Model 50289-CBA-VHF

AeroComm's turn-key wireless products: we design, build, install, & service our equipment.

FM Rebroadcast System Model 50706-FM
AM Rebroadcast System Model 50706-AM
Solid State Annunciator
Model 50706-DD2
Recording Station
Model 50706-TR
RF Power Amplifiers
Model 50706-AMPA
Model 50706-FMPA



Tunnel-Linc Rebroadcast System AM/FM 30 Channels

Tunnel-Linc is a channelized system: each independent receiver/transmitter per station provides flexible override capabilities. The ***Tunnel-Linc*** System has the capability to receive and rebroadcast up to 30 AM and 30 FM stations into areas where these signals may not otherwise be received. Pre-recorded and live voice messages allow communication to vehicles via AM/FM radio. The first channelized system of its kind, ***Tunnel-Linc*** is both a convenience and a powerful aid to public safety.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE - CONSULT FACTORY FOR DETAILS ON ANY PRODUCT

Azonic products, inc.

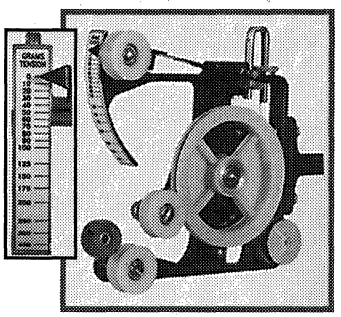
Coil Winding Tensioning Equipment

Azonic Series 3000/4C3000

High Performance Tension Now Calibrated in Grams

It's a tension control, tension meter and continuous tension monitor all at one affordable price!

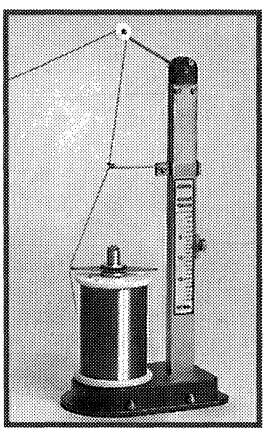
- Actual tension in grams is continuously displayed during winding cycle.
- Self-compensating braking system maintains tension at preset level.
- Low inertia assures uniform tension during rapid starts and stops.
- Compact design allows for close spacing in multiple winding setups.
- Inexpensive wear parts assure long life. Illustrated parts list available.



Model	Item Description
3000	from AWG #30 - #44
3000-F	from AWG #40 - #47
3000-H	from AWG #26 - #40
4C3000	from AWG #16 - #32

Azonic 3535 Series Ultra Fine Wire Tension Control

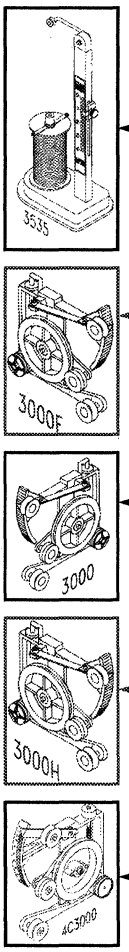
- From 2 to 25 grams – AWG #44 to #56 (copper magnet wire)
- Automatic compensating tension control – long term consistent tension
- Large tension scale calibrated in grams – excellent repeatability
- Simple reel change and wire threading – user friendly
- Complete wire control – no waterfall effect or wire snags
- Inexpensive wear parts – low maintenance cost



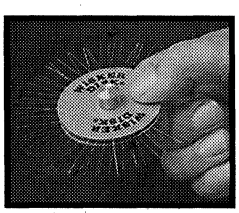
Model	Item Description
Azonic 3535	from AWG #44 - #56

Azonic Coil Winding Tension Control Chart

The range of copper wire sizes and related tension covered by each model of Azonic tension control equipment.



Grams Tension	AWG	INCH
2.2	**56**	**.00049**
2.7	55	.00055
3	54	.00062
4	53	.00070
5	52	.00078
6	51	.00088
7	50	.00099
9	49	.00111
11	48	.00124
14	**47**	**.00140**
17	46	.00157
21	45	.00176
26	**44**	**.0020**
31	43	.0022
39	42	.0025
47	41	.0028
58	**40**	**.0031**
70	39	.0035
85	38	.0040
100	37	.0045
130	36	.0050
150	35	.0056
190	34	.0063
230	33	.0071
280	**32**	**.0080**
350	31	.0089
420	**30**	**.0100**
510	29	.0113
620	28	.0126
780	27	.0142
940	**26**	**.0159**
1120	25	.0179
1400	24	.0201
1700	23	.0226
2100	22	.0253
2500	21	.0285
3100	20	.0320
3800	19	.0359
4700	18	.0403
5700	17	.0453
7100	**16**	**.0508**



The Azonic Wisker Disk

IT'S PROVEN! IT WORKS!

Azonic Wisker Disks have many uses:

- As a dereeling aid to eliminate the *waterfall* effect and resulting snags and breakage during rapid start/stop applications.
- As the general purpose pre-tensioner required on most tension devices to eliminate slippage and provide positive traction on the braking mechanisms.
- As a pre-tensioner for multiple winding applications to keep the wire in control path for the long distance between the supply reel and the tension head.
- As a means of eliminating a container or bucket over the supply reel in many instances, saving space and equipment costs.
- As an inexpensive, reliable and maintenance free tension device where a relatively low but controlled amount of tension is sufficient or desirable.

Azonic Wisker Disks are available in *L* (light), *H* (heavy) or *XH* (extra heavy) versions for reel diameters from 2.5" to 12". Customized disks for any reel diameter up to 24" can be supplied with specific filament diameters and densities. Feel free to consult us about your specific needs.

OUR 38th YEAR

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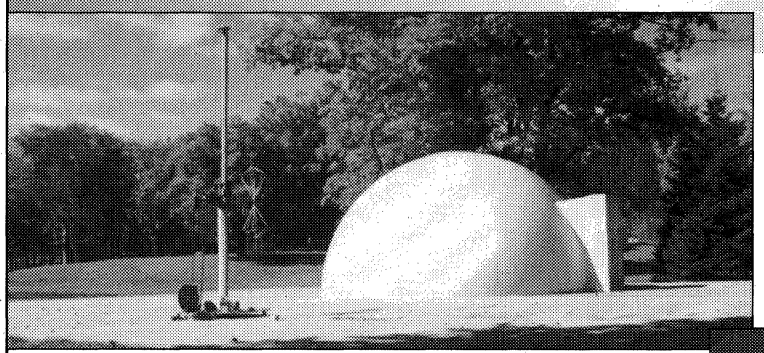

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- Highly Accurate NIST Comparison Standards
- In-House 15' x 25' Recirculating Wind Tunnel
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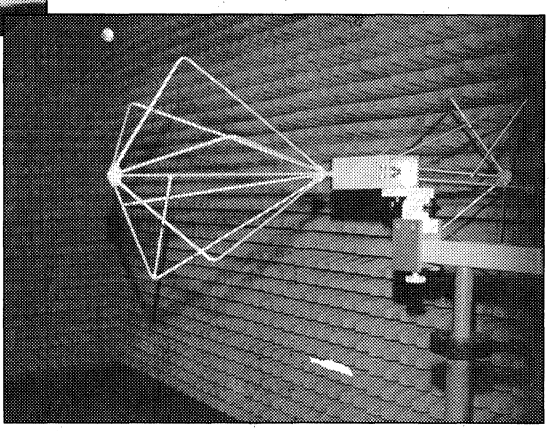

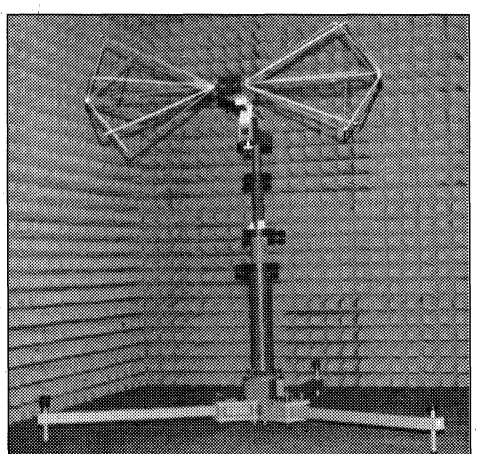

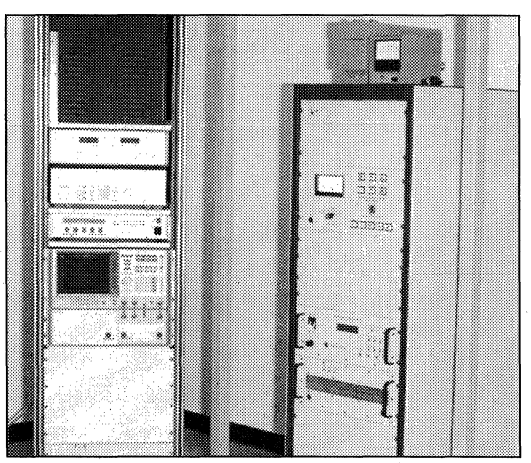

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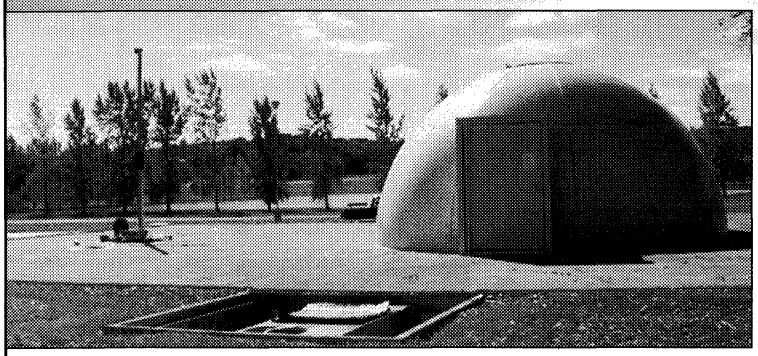

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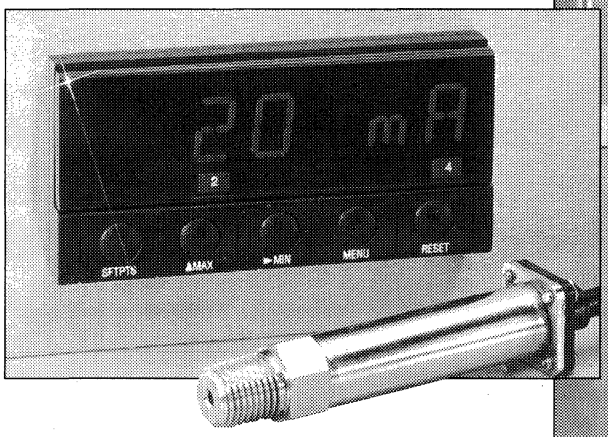
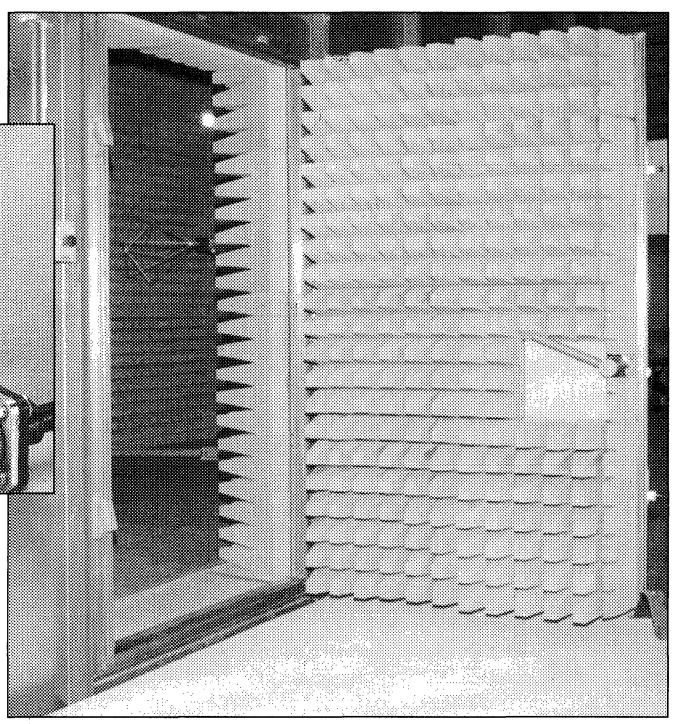
CE





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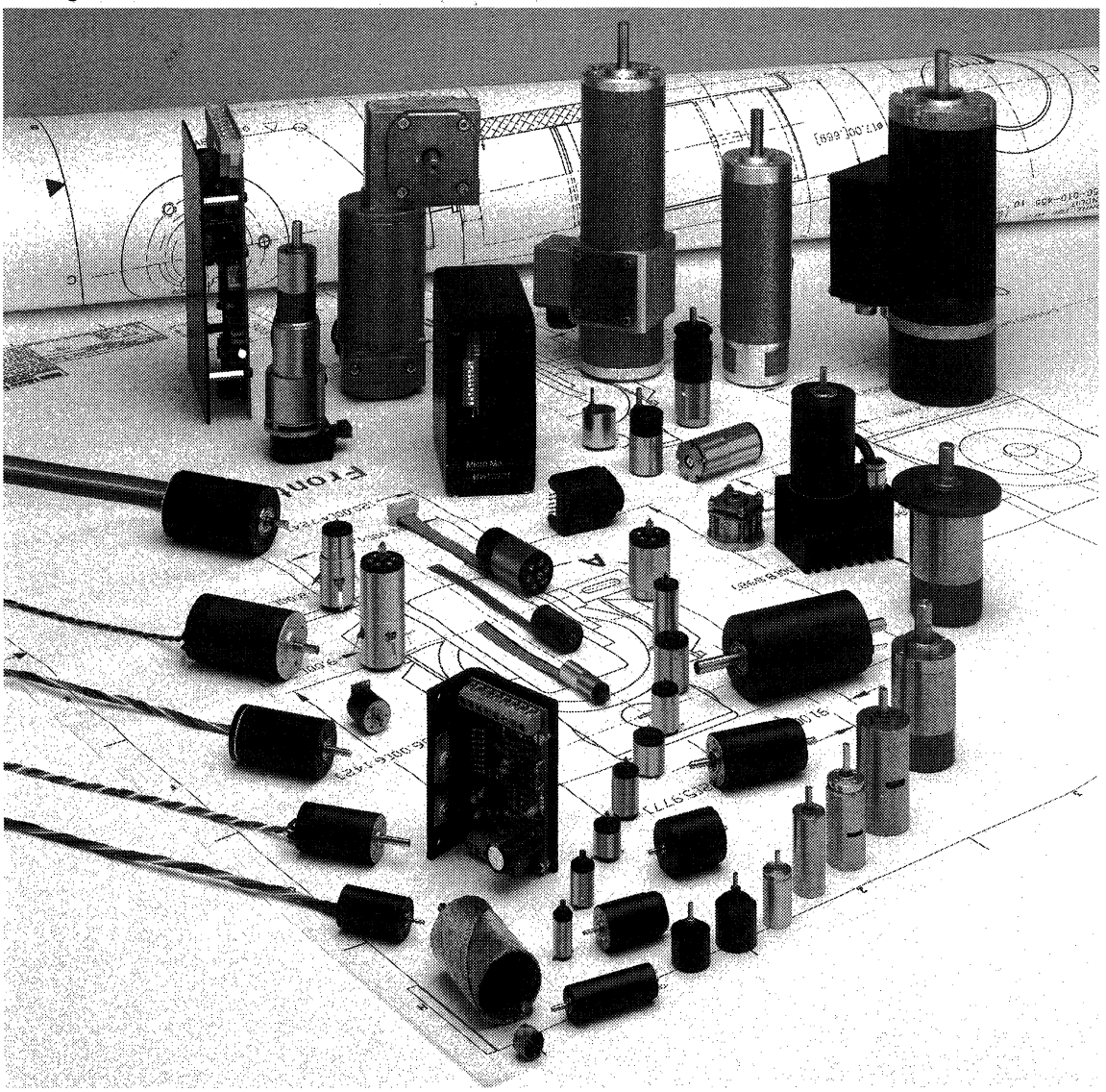
Miniature DC Drive Components

Originators of Skew-Wound Coreless Micromotors. Patented and Licensed the World Over.



Coreless DC Motors

Ø From 8mm (.315 in) - 38mm (1.496 in)
.015 - 100 Watts Cont. Output Power
.007 - 16 oz-in Max. Cont. Torque
Speeds up to 21,000 RPM

PMDC Motors

Up to 700 Watts Cont. Output Power
Up to 315 oz-in Max. Cont. Torque
Custom Windings Available up to 180 VDC
Speeds up to 7,350 rpm

Precision Gearheads

Ø From 1.9mm (.075 in) - 120mm (4.724 in)
Continuous output Torque up to 250 ft-lbs.
Bi-directional operation in ratios up to 983,447:1

Brushless Motors

Ø From 1.9mm (.075 in) - 35mm (1.378 in)
Speeds up to 100,000 Rpm
2-Wire Drives available
Servo Amplifiers

Also Available:

Tacho-Generators
Optical Encoders
Magnetic Encoders
Precision Gearheads
Motor Tachometers
Zero Backlash Gearing
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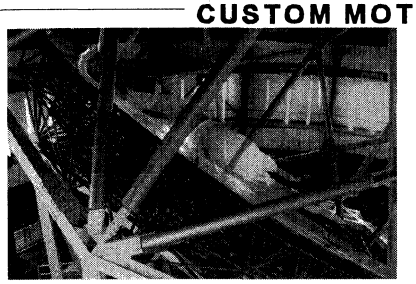
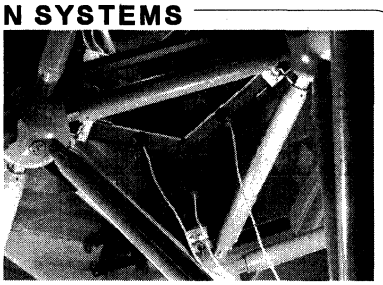


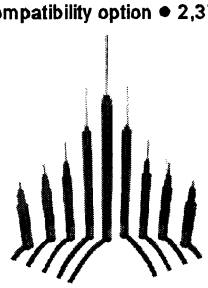


Mirror Pointing for **Hobby-Eberly Spectrographic Telescope** at McDonald Observatory, Ft. Davis, TX (University of Texas @ Austin)

- 91 1-meter hexagonal sub-mirrors in the Primary Mirror
- 273 Linear Actuators (2200-series Step Motor)
- Managed from a single computer through 137 MC-602 Dual Step Motor Partylined Controllers
- Open-loop with Failsafe Position Control
- Second largest telescope in the world
- http://hyperion.as.utexas.edu/mcdonald/het/

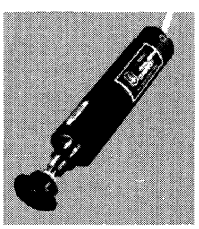
LINEAR ACTUATORS

Housed in a nominal 1" OD tube, Linear Actuators generate linear movement by converting rotation into translation through a DC or stepping motor activating a precision DriveScrew and DriveNut. •Thruster protrudes on-axis •Vacuum-compatibility option • 2,374 configurations



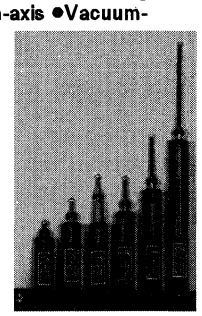
1000/2000-series

- High-quality, high-precision for semi-conductor processing, optics, metrology, medicine
- Non-rotating Thruster
- Magnetic Position Encoder
- 0.5" to 6" Travel
- 300 lbs. $Thrust_{max}$
- 15mm/sec $Velocity_{max}$
- 2.5ηm $Resolution_{min}$
- Home/End-of-Travel sensors
- Axial/Side cable discharge
- Prices start at $931 (Q=10)



1100/2100-series

- Smaller, with encoder for closed-loop operation
- Half the length of 1000/2000-series
- 0.25" to 12" Travel
- 300 lbs. $Thrust_{max}$
- Visual position display
- Home/End-of-Travel sensors
- Push/Pull Adaptor
- Axial/Side cable discharge
- Prices start at $841 (Q=10)

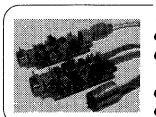


1200/2200-series

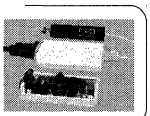
- Smallest, simple mover
- 0.25" to 18" Travel
- 300 lbs. $Thrust_{max}$
- 13 mm/sec $Velocity_{max}$
- Open-loop operation
- Home/End-of-Travel sensors
- Push/Pull Adaptor
- Axial/Side cable discharge
- Many custom options
- Prices start at $336. (Q=10)

NEW! Low NoseButton run-out! Low DriveScrew wobble!

ANALOG LINEAR VELOCITY SERVO



- Quiet linear balanced-bridge
- Velocity regulation within load window
- Limit-of-travel/stall sensing
- Dynamic braking
- SER3000 — 1A/2A peak
- SER3010 — 5A/10A peak
- 1.7"x3.7" PCB
- Weight < 2 oz.
- Enclosure option

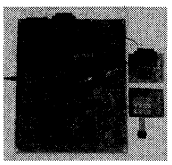


CONTROLLERS

µ-PROCESSOR

STEP MOTOR
MC-602

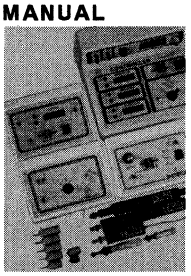
Highly integrated state-of-the-art Indexer/Driver for use with all types of 2-phase step motors. Serial communication, single power voltage, and compact size allows remote installation near the driven motor. Communication is either RS-422/485 or RS-232. Wiring is easily set up with straight modular telephone-type cables. The high-level command language of the MC-602 provides the user with a powerful motion control interface.



DC MOTOR
CONTROL3

Commonly housed in an enclosure, it either receives motion commands from a Host Computer, or from internally-stored commands, or joystick, or from the Remote Panel. Managing 2-32 motors, it supports concurrent RS-232 and IEEE-488 communications. With 48-bits programmable and 60-bit fixed I/O, CONTROL3 is a power-house of external control.

MANUAL



1200SC Controls 1-of-4 Linear/Rotary Actuators (DC Motor) with DIRECTION, VELOCITY, LIMIT INDICATORS, JOG/SLEW, and MOTOR SELECTION. Computer [C] version.

1200J 2-axis Joystick controls two Linear/Rotary Actuators simultaneously with dual built-in Analog Velocity Servos. Computer [JC] version.

1000INT-family Combines open-loop control with position display in a single integrated enclosure — single axis, dual axis, joystick.

1000MOD-family Mixes modules for SPEED, CONTROL, POSITION DISPLAY, and POSITION ENTRY for 1-to-3 axes.

MINIGLOSSARY POWER SUPPLIES

Ambient reference: Refers to the temperature of the still air surrounding the power supply

Case reference: One of the specs that make up the nominal rating. The temperature of the case with the temperature of the surrounding still air at a stated temperature (usually 25°C).

Crowbar circuit: Protects the load. A protective circuit that applies a short circuit across the output immediately upon overload. (See overvoltage).

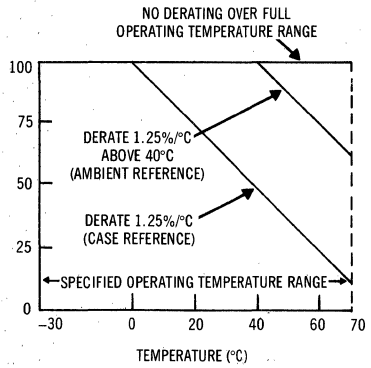


Fig. 1. Power output derating can be referred to ambient or case.

Derating: The degree output is reduced as temperature increases. Usually referenced to ambient case temperature and shown on a graph.

Efficiency: Ratio of the output power to the required input power. Usually expressed as a percentage given nominal environmental temperature.

EMI/RFI: Interference electronic circuitry caused by energy from electromechanical or radio frequency power supplies.

Foldback: Built-in protective circuits that automatically reduce the output voltage and/or current to very low levels in the event of an overload.

Holdover (Holdup): The interval that rated output will continue after input ceases. Usually milliseconds.

Input reflected current: The peak-to-peak alternating current generated by switching transients in DC/DC converters. Should not exceed 1%.

Inrush current limiting: Built-in circuits that monitor high currents through the rectifiers to the capacitors at turn ON. Circuit is usually inhibited as capacitors attain full charge.

Nominal rating: The spec value of the supply at stated conditions of input, output, and temperature.

Overshoot: A transient voltage change occurring during turn ON or OFF or during an abrupt load change.

Overvoltage (Overload) protection: Built-in circuits that protect the load or the supply by shutting it down or providing foldback.

Recovery: The time interval between the termination of an overload and restoration to normal operations.

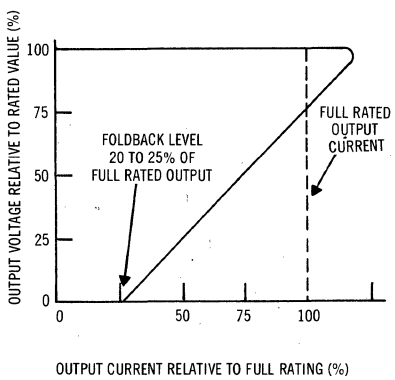


Fig. 2. Current foldback limiting self-resets with removal of fault.

Response: The time interval between a stated step change in input voltage or load current and return of output to normal operating conditions.

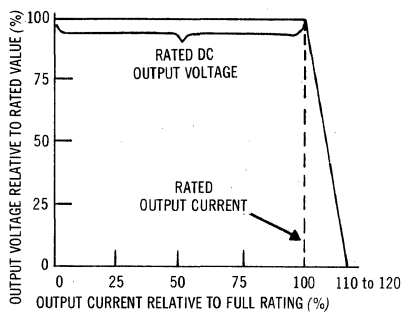


Fig. 3. Current limiting restrictions output current to a valve somewhat greater than full rated output; it resets when fault is removed.

Sensing: Regulation techniques that monitor output voltage and/or current. *Local sensing* refers to the output terminals. *Remote sensing* allows a feedback from the load circuit to the power supply.

Soft start: Allows the supply to start from zero current and/or voltage over a stated period of time during start up to prevent voltage overshoots and current imbalances.

Switchers: Power supplies using switching techniques to achieve high efficiency regulation. These techniques can have attendant EMI/RFI problems.

Tracking: The maintaining of fixed ratios between multiple outlets despite variations in line, load or temperature. Particularly important in supplies with symetrical (+)(−) outputs.

Transient protection: Circuitry designed to protect the supply from high amplitude line transients. Generally expressed in terms of peak voltage and maximum transient time duration.

CHARACTERISTICS OF BATTERIES AND FUEL CELLS

System	Anode	Cathode	Theoretical battery		Practical battery		
			Voltage, V	Capacity, Ah/kg	Typical voltage, V	Capacity[a]	
						Wh/kg	Wh/dm³
Primary:							
Leclanche	Zn	MnO_2	1.6	230	1.2	65	175
Magnesium	Mg	MnO_2	2.0	270	1.5	100	195
Organic cathode	Mg	*m*-DNB	1.8	1,400	1.15	130	180
Alkaline MnO_2	Zn	MnO_2	1.5	230	1.15	65	200
Mercury	Zn	HgO	1.34	185	1.2	80	370
Mercad	Cd	HgO	0.9	165	0.85	45	175
Silver oxide	Zn	AgO	1.85	285	1.5	130	310
Zinc-air	Zn	Air (O_2)	1.6	815	1.1	200	190
Li-organic electrolyte	Li	[b]	2.1-5.4	130-660	1.8-3.2	250	400
Secondary:							
Lead-acid	Pb	PbO_2	2.1	55	2.0	37	70
Edison	Fe	Ni oxides	1.5	195	1.2	29	65
Nickel-cadmium	Cd	Ni oxides	1.35	165	1.2	33	60
Silver-zinc	Zn	AgO	1.85	285	1.5	100	170
Silver-cadmium	Cd	AgO	1.4	230	1.05	55	120
Zinc-nickel oxide	Zn	Ni oxides	1.75	185	1.6	55	110
Zinc-air[c]	Zn	Air (O_2)	1.6	815	1.1	150	155
Cadmium-air[c]	Cd	Air (O_2)	1.2	475	0.8	90	90
Zinc-O_2	Zn	O_2	1.6	610	1.1	130	120
H_2-O_2	H_2	O_2	1.23	3,000	0.8	45	65
Reserve:							
Cuprous chloride	Mg	CuCl	1.5	240	1.4	45	65[d]
Silver-chloride	Mg	AgCl	1.6	170	1.5	60	95[d]
Zinc-silver oxide	Zn	AgO	1.85	285	1.5	30	75[e]
Thermal	Ca	[b]	2.8	240	2.6	10	20[f]
Ammonia-activated	Mg	*m*-DNB	2.2	1,400	1.7	22	60[g]
High-temperature	NA	S	2.1	685	1.8	200	[h]
	Li	S	2.2	1,150	1.8	200	[i]
Solid electrolyte	Ag	Polyiodide	0.66	. . .	0.6	180	75[j]
Fuel cell:							
Hydrogen[c]	H_2	Air	1.23	26,000	0.7		[k]
Hydrazine[c]	N_2H_4	Air	1.5	2,100	0.7	800[b]	[l]
Methanol[c]	CH_2OH	Air	1.3	1,400	0.9	175[b]	185[m]

a Delivered capacity when discharged at normal temperatures (20°C) at normal discharge rates.
b Based on fuel consumption only.
c Weight of air not considered in computation of watt hours.
d Water-activated
e Automatically activated; high rate discharge; 2- to 10-min rate.
f Fused salt; heat-activated; high rate discharge; 2- to 10-min rate.
g Four-minute discharge rate.
h β-alumina electrolyte, 300°C operation.
i Fused salt; 350°C operation.
j Solid $RbAg_4I_5$ electrolyte.
k Several different cathode materials used.
l Fuel consumption is based on source of H_2.
m Based on methanol battery-fuel supply in situ.

MINIGLOSSARY SERVO COMPONENTS

SPECIFICATIONS

Excitation: The input voltage and frequency.

Transformation Ratio: The ratio of the output voltage, at maximum coupling, to the input voltage.

Phase Shift: The lead or lag of the output voltage with respect to the input voltage. For most synchros and resolvers, the phase shift can be approximated by the angle whose tangent is the ratio of the primary winding's DC resistance to its reactive component.

Impedance: Specified as R + jX, where R is the AC resistive component and X is the reactive component. Important impedances are: (a) Z_{po} (or Z_{ro} for rotor primary units), which is the impedance of the primary winding with the secondary open; (b) Z_{so}, which is the impedance of the secondary winding with the primary open; and (c) Z_{ss}, which is the impedance of the secondary with the primry shorted (essentially when driven by a low impedance).

Null Voltage: The voltage remaining when the unit is at electrical zero or in the minimum coupling position.

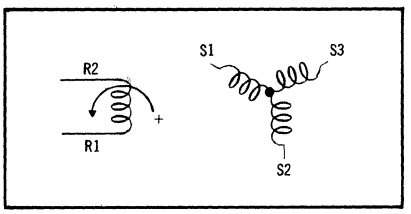
Accuracy: The error of the position of the rotor with respect to the electrical angle. It is defined as the output voltage driven by the "speed" (pole pairs) of the unit, referenced to the starting point of the calibration (usually the electrical zero position). Error is commonly expressed in minutes of arc (1/60 of a degree) or in seconds of arc.

Loads: For a transmitting unit, the impedance that the output voltage signal faces. This can be a receiver, a differential with its load, a control transformer, an A/D converter, etc.

Operation Temperature: The ambient temperature range over which the unit performs its primary function.

FUNCTIONS

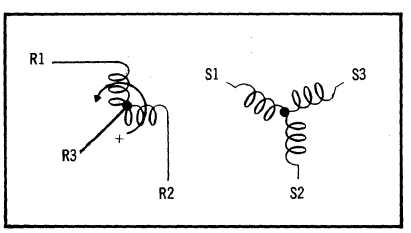
Transmitter: A unit with a Y-connected stator that outputs a signal proportional to the position of its single-phase excited rotor. High power units, called "torque transmitters," are used to drive one or more receivers. Low power transmitters are used to drive control transformers.



Receiver: A unit with a three-phase stator excited by the input, usually from a torque transmitter, and a single-phase rotor that follows the resulting stator field. Usually used to drive a position pointer.

Control Transformer: A unit with a three-phase stator excited by the input from a transmitter and a single-phase rotor mechanically driven to the null position by an external motor or other device.

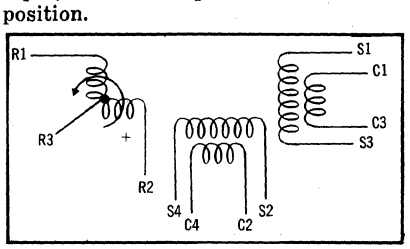
Differential: A unit with a three-phase stator and a three-phase rotor. It is usually connected between a transmitter, which excites its stator, and a receiver or control transformer. It can be used to "dial in" correction factors for the synchro chain.



Transolver: A unit with a three-phase stator and a two-phase rotor that can be used either as a control transmitter (with one rotor phase excited and the other shorted), or as a control transformer with the signal obtained from one phase of the rotor—making sure the other phase is equally loaded to prevent unbalances.

Differential Resolver: A unit with a two-phase stator and a three-phase rotor that is used as a transolver with the advantage that when connected as a control transformer, the signal does not travel through slip rings.

Resolver: A unit with a two-phase rotor and a two-phase stator that is used to create or receive SIN-COS signals such as vector resolutions for solving inertial platform coordinate transformations, unknowns of right triangles, etc. Resolvers can also be used as transmitting, differential, or receiving elements by proper choice of impedances. It is also possible to use resolvers as phase shifters where, in one mode, one rotor phase is excited and the two stator windings are feeding an appropriate RC network and indicating a phase shift, referred to the input, that corresponds to the rotor position.



Compensated Resolver: A unit with a "2×2" phase stator and a two-phase rotor used as a resolver with the added benefit of feedback windings in parallel with the stator windings that increase the useful accuracy over a wide range of environmental operating conditions.

Linear Transformer: A unit with a single-phase stator and single-phase rotor designed to provide a linear output voltage that is directly proportional to the rotor input angle. It operates over a range of less than ±90°, and is analogous to a potentiometer providing infinite resolution, but without contact between the elements. It can be used only with AC voltages.

Brushless Synchro: Available in two types—hairspring and bobbin. Hairspring synchros use spiral wound conductor springs to pick off the rotor signal, and are generally limited to a ±165° rotation. Most have mechanical stops to prevent damage due to overrotation. Bobbin synchros pick off the rotor signal with rotary transformers inside the unit, allowing the rotor unlimited motion.

Pancake Unit: A name derived from the physical dimensions of the unit, which has a diameter that exceeds axial length. Sizes range from under 1" to 20" or more. The unit is frequently used as a gimbal pickoff element and is designed to fit a particular application envelope. It can be supplied as a rotor and stator only.

NOMOGRAPH VOLTAGE DROP

NOMOGRAPH OF VOLTAGE DROP ACROSS LOAD SUPPLY LEADS (as a function of wire size and load current)

THIS NOMOGRAPH CAN BE USED TO FIND:

Maximum current carrying capacity recommended for any standard wire size.*

1) With a straight edge, connect from the wire size on Scale 2 to the point "A" on Scale 3.
2) Read I_{max} on Scale 1.

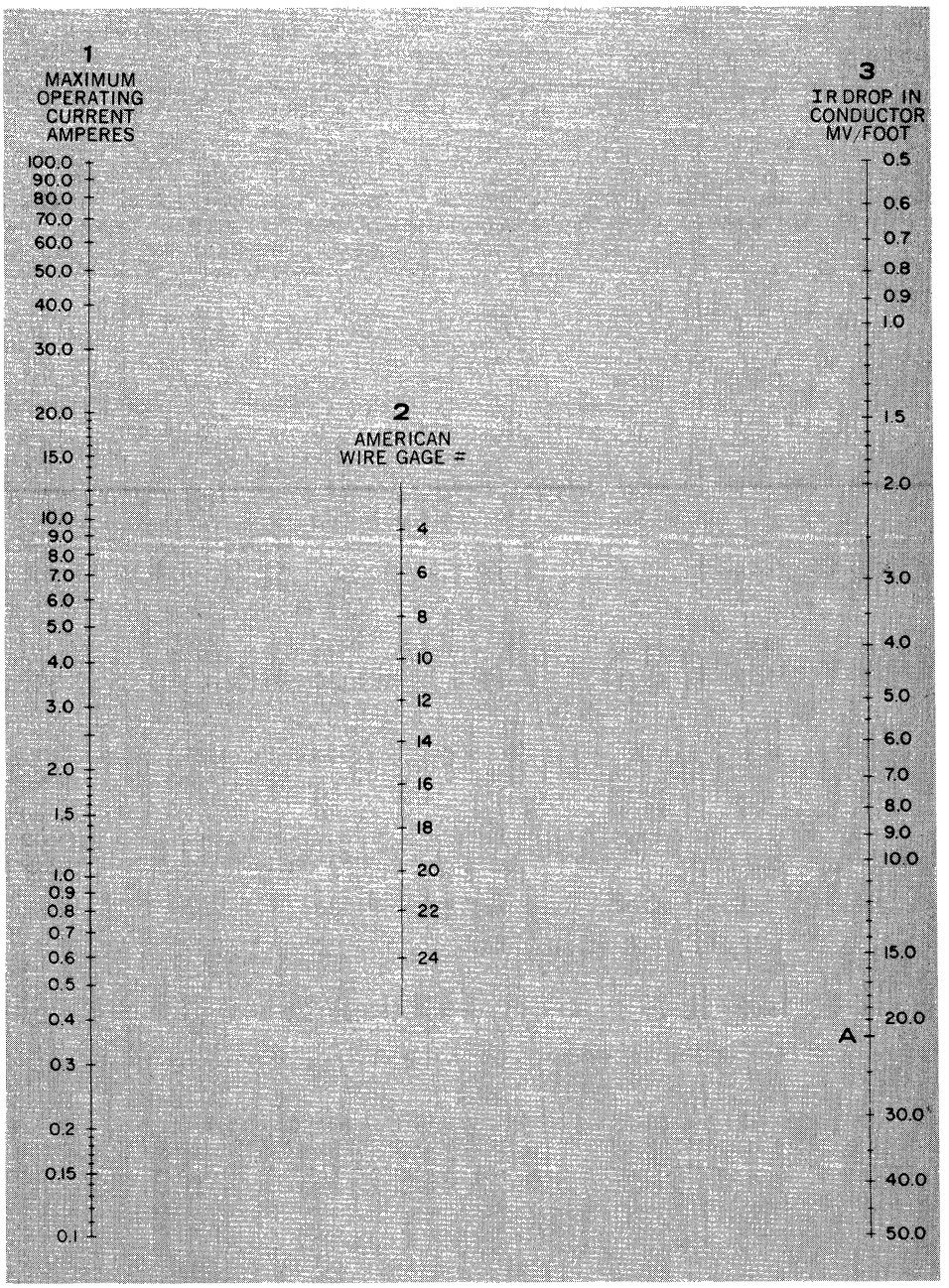
Voltage drop in millivolts per foot for known wire size and operating current.

1) With a straight edge, connect the known current on Scale 1 and the wire size on Scale 2.
2) Read voltage drop on Scale 3.

Wire size required for known operating current and known maximum tolerable voltage drop across supply leads.

1) Determine maximum tolerable drop in millivolts **per foot** of lead (sum of positive and negative leads).
2) Connect the value on Scale 3 (as determined in step 1) to the known current on Scale 1.
3) Read wire size on Scale 2.

* *Based on an arbitrary minimum 500 circular mils per ampere. High-temperature class insulation will safely allow higher currents.*



NOTE: A voltage stabilized Power Supply controls the voltage across its output terminals. Hence, the wire conductors used to connect the load must be considered as part of the load. At high load currents, the voltage drop across the supply leads may appreciably degrade stablization at the load. Kepco models equipped with the *remote error sensing* feature can automatically compensate for voltage drops of up to 500 mV across each load supply lead.

WIRE GAUGES— DIAMETER, AREA AND COPPER WEIGHT

	Diameter at 20°C (68°F)		Area at 20°C (68°F)			Weight at 20°C (68°F), bare copper wire		
Size, AWG	mils	mm	mils	c mils	mm	lb/1,000 ft.	lb/mile	kg/km
4/0	460.0	11.68	166,200	211,600	107.2	640.5	3,382	953.2
3/0	409.6	10.40	131,800	167,800	85.01	507.8	2,681	755.7
2/0	364.8	9.266	104,500	133,100	67.43	402.8	2,127	599.5
1/0	324.9	8.252	82,891	105,600	53.49	319.5	1,687	477.6
1	289.3	7.348	85,730	83,690	42.41	253.3	1,338	337.0
2	257.6	6.543	52,120	66,360	33.62	200.9	1,061	298.9
3	229.4	5.827	41,330	52,620	26.67	159.3	841.1	237.1
4	204.3	5.189	32,780	41,740	21.15	126.3	667.1	188.0
5	181.9	4.620	25,990	33,090	16.77	100.2	528.8	149.0
6	162.0	4.115	20,610	26,240	13.30	79.44	419.4	118.2
7	144.3	3.665	16,350	20,820	10.55	63.03	332.8	93.80
8	128.5	3.264	12,970	16,510	8.367	49.98	263.9	74.38
9	114.4	2.906	10,280	13,090	6.631	39.61	209.2	58.95
10	101.9	2.588	8,155	10,380	5.261	31.43	166.0	46.77
11	90.7	2.304	6,460	8,230	4.17	24.90	131	37.1
12	80	2.05	5,130	6,530	3.310	19.8	104	29.4
13	72.0	1.83	4,070	5,180	2.63	15.7	82.9	23.4
14	64.1	1.63	3,230	4,110	2.08	12.4	65.7	18.5
15	57.1	1.45	2,560	3,260	1.650	9.87	52.1	14.7
16	50.8	1.29	2,030	2,580	1.31	7.81	41.2	11.6
17	45.3	1.150	1,610	2,050	1.040	6.21	32.8	9.24
18	40.3	1.02	1,280	1,620	0.823	4.92	26.0	7.32
19	35.9	0.912	1,010	1,290	0.653	3.90	20.6	5.81
20	32.0	0.813	804.0	1,020	0.519	3.10	16.4	4.61
21	28.5	0.724	638.0	812.0	0.412	2.46	13.0	3.66
22	25.3	0.643	503.0	640.0	0.324	1.94	10.2	2.88
23	22.6	0.574	401.0	511.0	0.259	1.55	8.16	2.30
24	20.1	0.511	317.0	404.0	0.205	1.22	6.46	1.82
25	17.9	0.455	252.0	320.0	0.162	0.970	5.12	1.44
26	15.9	0.404	199.0	253.0	0.128	0.765	4.04	1.14
27	14.2	0.361	158.0	202.0	0.102	0.610	3.22	0.908
28	12.6	0.320	125	159.0	0.0804	0.481	2.54	0.715
29	11.3	0.287	100.0	128.0	0.0647	0.387	2.04	0.575
30	10.0	0.254	78.50	100.0	0.0507	0.303	1.60	0.450
31	8.9	0.226	62.20	79.2	0.0401	0.240	1.27	0.357
32	8.0	0.203	50.30	64.0	0.0324	0.194	1.02	0.288
33	7.1	0.180	39.60	50.40	0.0255	0.153	0.806	0.227
34	6.3	0.160	31.20	39.7	0.0201	0.120	0.634	0.179
35	5.6	0.142	24.60	31.4	0.0159	0.0940	0.501	0.141
36	5.0	0.127	19.60	25.00	0.0127	0.0757	0.400	0.113
37	4.50	0.114	15.90	20.20	0.0103	0.0613	0.324	0.0912
38	4.0	0.102	12.60	16.0	0.00811	0.0484	0.256	0.0721
39	3.5	0.0889	9.62	12.2	0.00621	0.0371	0.196	0.0552
40	3.1	0.0787	7.55	9.61	0.00487	0.0291	0.154	0.0433
41	2.8	0.0711	6.16	7.84	0.00397	0.0237	0.125	0.0353
42	2.5	0.0635	4.91	6.25	0.00317	0.0189	0.0999	0.0282
43	2.2	0.0559	3.80	4.84	0.00245	0.0147	0.0774	0.0218
44	2.0	0.0508	3.14	4.00	0.00203	0.0121	0.0639	0.0180
45	1.8	0.0457	2.54	3.24	0.00164	0.00981	0.0519	0.0146
46	1.6	0.0406	2.01	2.56	0.00130	0.00775	0.0409	0.0115
47	1.4	0.0356	1.54	1.96	0.000993	0.00593	0.0313	0.00883
48	1.2	0.0305	1.13	1.44	0.000730	0.00436	0.0230	0.00649
49	1.1	0.0279	0.950	1.21	0.000613	0.00366	0.0193	0.00545
50	1.0	0.0254	0.785	1.00	0.000507	0.00303	0.0160	0.00450

MAXIMUM CURRENT CAPACITY—CONDUCTORS

Size, AWG	MIL-W-5088				National Electrical Code	Underwriters Laboratory		American Insurance Association	500 c mils/A
	Copper		Aluminum			60°C	80°C		
	Single-wire	Wire-bundled	Single-wire	Wire-bundled					
30	...	...	...	...	...	0.2	0.4	...	0.20
28	...	...	...	...	...	0.4	0.6	...	0.32
26	...	...	...	...	...	0.6	1.0	...	0.51
24	...	...	...	...	...	1.0	1.6	...	0.81
22	9	5	...	...	...	1.6	2.5	...	1.28
20	11	7.5	...	...	...	2.5	4.0	3	2.04
18	16	10	...	...	6	4.0	6.0	5	3.24
16	22	13	...	...	10	6.0	10.0	7	5.16
14	32	17	...	...	20	10.0	16.0	15	8.22
12	41	23	...	...	30	16.0	26.0	20	13.05
10	55	33	...	...	35	...	...	25	20.8
8	73	46	58	36	50	...	...	35	33.0
6	101	60	86	51	70	...	...	50	52.6
4	135	80	108	64	90	...	...	70	83.4
2	181	100	149	82	125	...	...	90	132.8
1	211	125	177	105	150	...	...	100	167.5
0	245	150	204	125	200	...	...	125	212.0
00	283	175	237	146	225	...	...	150	266.0
000	328	200	...	...	275	...	...	175	336.0
0000	380	225	...	...	325	...	...	225	424.0

eem

MINIGLOSSARY

BASIC ASCII CODE

				b7	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
1	1	0	0	12	FF	FS	,	<	L	\	l	|
1	1	0	1	13	CR	GS	-	=	M	]	m	}
1	1	1	0	14	SO	RS	.	>	N	^	n	~
1	1	1	1	15	SI	US	/	?	O	_	o	DEL

Control Character Representations

NUL	Null
SOH	Start of Heading (CC)
STX	Start of Text (CC)
ETX	End of Text (CC)
EOT	End of Transmission (CC)
ENQ	Enquiry (CC)
ACK	Acknowledge (CC)
BEL	Bell
BS	Backspace (FE)
HT	Horizontal Tabulation (FE)
LF	Line Feed (FE)
VT	Vertical Tabulation (FE)
FF	Form Feed (FE)
CR	Carriage Return (FE)
SO	Shift Out
SI	Shift In
DLE	Data Link Escape (CC)
DC1	Device Control 1
DC2	Device Control 2
DC3	Device Control 3
DC4	Device Control 4
NAK	Negative Acknowledge (CC)
SYN	Synchronous Idle (CC)
ETB	End of Transmission Block (CC)
CAN	Cancel
EM	End of Medium
SUB	Substitute
ESC	Escape
FS	File Separator (IS)
GS	Group Separator (IS)
RS	Record Separator (IS)
US	Unit Separator (IS)
DEL	Delete

(CC) Communication Control
(FE) Format Effector
(IS) Information Separator

Special Graphic Characters

SP	Space
!	Exclamation Point
|	Logical OR
"	Quotation Marks
#	Number Sign
$	Dollar Sign
%	Percent
&	Ampersand
'	Apostrophe
(	Opening Parenthesis
)	Closing Parenthesis
*	Asterisk
+	Plus
,	Comma
-	Hyphen (Minus)
.	Period (Decimal Point)
/	Slant
:	Colon
;	Semicolon
<	Less Than
=	Equals
>	Greater Than
?	Question Mark
@	Commercial At
[	Opening Bracket
\	Reverse Slant
]	Closing Bracket
^	Circumflex
¬	Logical NOT
_	Underline
`	Grave Accent
{	Opening Brace
¦	Vertical Line (This graphic is stylized to distinguish it from Logical OR)
}	Closing Brace
~	Tilde

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
A/D acrylonitrile butadiene-styrene
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AFC audio frequency control
AFT automatic filter test
ALGOL algorithmic language
AM a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
ASIC application specific IC
ATE automatic test equipment
ATG automatic test generation
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility syste

C
CAD computer-aided design
CAE computer-aided engineering
CAM computer-aided manufacture
CAMAC computer-automated measurement and control
CAPP computer-aided process planning
CAT computer-aided test
CATV cable television or community antenna television
CCC (leaded) ceramic chip carriers
CCD computer-controlled display
CERMET ceramic metal element
CIE computer-integrated engineering
CIM computer-integrated manufacturing
CLCC ceramic leadless chip carriers
CMOS complementary metal-oxide semiconductor
Comm. communications
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DBMS data base management system
DC direct current
DFT design for testability
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DRAM dynamic RAM
DTL diode transistor logic

E
EDA electronic design automation
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EIA Electronic Industries Association
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM erasable programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide FET
CMIP commn management information protocol
GPIB general purpose interface bus
GPS global positioning system

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement, and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IAB Internet Activities Board
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared
ISDN integrated services digital network
ISO International Standards Organization

J
JEDEC Joint Electronic Device Engineering Council
JFET junction FET
JMOS junction MOS

K
kHz kilohertz (10^3 hertz)
KSR keyboard send /receive

L
LAN local area network
LC (filters) inductance/capacitance
LCC leaded chip carrier
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
µF microfarad
MHz megahertz
MIC microwave IC
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor FET
MOSIGT metal oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM national instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator
OSI open systems interconnection

P
PAL programmable array logic
PC printed circuit
PCB printed circuit board
PCM pulse code modulation
PCS plastic clad silica
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLCC plastic leaded chip carrier
PLL phased lock loop
PPI plan position indicator
PROM programmable ROM
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon-controlled switch
SDA source & detector assemblies
SGMP simple gateway monitoring protocol
SIDAC bidirectional voltage-triggered switch
SIMM single in-line memory module
SIP single in-line package
SMD surface mount device
SMT surface mount technology
SNMP simpole network management protocol
SO small outline
SOIC small outline IC
SOT small outline transistor
SSI small scale integration
SSR solid-state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCE thermal coefficient of expansion
TXCO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAN value-added network
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency (30 kHz to 300 MHz)
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

eem SI UNITS

RELATIVE QUANTITY SYMBOLS

$\neq$	not equal to
$\approx$	approximately equal to
$\propto$	proportional to
$<$	smaller than
$\leq$	smaller than or equal to
$\ll$	much smaller than
$>$	larger than
$\geq$	larger than or equal to
$\gg$	much larger than
$\equiv$	identical to or equivalent
$\uparrow$	increases
$\downarrow$	decreases

PREFIXES FOR SI UNITS

Multiple	Prefix	Symbol
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p

Quantity	Symbol	SI Unit	Symbol	Derivation
acceleration	a	m s^{-2}	—	velocity/time
acceleration due to gravity	g	m s^{-2}	—	velocity/time
amount of substance	n	mole	mol	mole fraction (n) used
amplification factor	μ	*a ratio*	—	—
angle	$\theta_1,\varphi_1,\alpha_1$	—	—	—
angle of incidence	i	degree or radian	°	—
angle of refraction	r	degree or radian	°	—
angle, Bragg	θ	number	—	—
angle, critical	c	degree or radian	°	—
anode slope resistance	R_A	ohm	Ω	$\Delta V_a / \Delta I_a$
area	A	metres squared	m^2	$l \times b$
atomic number	Z	a number	—	number of protons
Avogadro constant	L, N_A	number	—	—
breadth	b	metre	m	fundamental unit
capacitance	C	farad	F	charge/p.d.
charge, electric	Q	coulomb	C	current × time
charge on electron	e	coulomb	C	$1{\cdot}6 \times 10^{-19}$ C
conductance	G	ohm^{-1}	Ω^{-1}	reciprocal of resistance
current, electric	I	ampere	A	fundamental unit
decay constant	λ	*a ratio*	—	—
density	ρ	kg m^{-3}	—	m/V
distance along path	s	metre	m	fundamental unit
efficiency	η	*a ratio*	—	work output/work input
electrochemical equiv.	z	g C^{-1}	—	mass/charge
electromotive force	E	volt	V	energy/charge
electron	e	—	—	—
energy	E	joule	J	N m
energy, kinetic	E_k	joule	J	N m. $E_k = 1/2mv^2$
energy, potential	E_p	joule	J	N m. $E_p = mgh$
Faraday constant	F	coulomb mol^{-1}	C mol^{-1}	96,500 C mol^{-1}
field strength, electric	E	V m^{-1}	—	potential gradient: p.d./dist.
field-strength magnetic	H	ampere-turns	—	current × no. of turns
flux, magnetic	Φ	weber	Wb	e.m.f/rate of change of flux
flux density	B	tesla	T	flux/area
focal length	f	metre	m	—
force	F	newton	N	kg m s^{-2}
free energy	ΔG	joule	J	—
frequency	f	hertz	Hz	oscillations/time
gas constant	r	joule	J	energy
half-life,radioactivity	$t_{1/2}$	second	s	fundamental unit
heat capacity	C	J K^{-1}	—	quantity of heat/temp. rise
heat of reaction	ΔH	joule	J	heat energy
heat capacity, specific	c	J K^{-1} kg^{-1}	—	heat capacity/mass
heat, quantity of	q	joule	J	energy

eem SI UNITS

Quantity	Symbol	SI Unit	Symbol	Derivation
height	h	metre	m	fundamental unit
image distance	υ	metre	m	fundamental unit
inductance, mutual	M	henry	H	induced e.m.f./rate of change of current
inductance, self	L	henry	H	—
intensity of radiation	I	*a number*	—	—
latent heat	L	joule	J	quantity of heat
latent heat, specific	l	J kg^{-1}	—	quantity of heat
latent heat, molar	L_m	joule mol^{-1}	J	quantity of heat
length	l	metre	m	fundamental unit
magnetizing force	H	ampere-turns	—	—
magnetic moment	m	Wb m	—	torque in unit magnetic field
magnification, linear	m	*a ratio*	—	—
mass	m	kilogramme	kg	fundamental unit
mass number	A	*a number*	—	number of neutrons + protons
molar volume	V_m	(dm^3)	—	volume of 1 mole
molar solution	M	*a ratio*	—	moles/dm^3
moment of force	—	N m	—	force × perp. distance
neutron number	N	*a number*	—	number of neutrons
number	n	—	—	—
number of molecules	N	—	—	—
number turns on coil	n	*a number*	—	—
number order spectrum	p	*a number*	—	—
object distance	u	metre	m	fundamental unit
peak current	I_o	ampere	A	see current
peak e.m.f.	E_o	volt	V	see e.m.f.
period	T	second	s	fundamental unit
permeability	μ	H m^{-1}	—	henry/metre
permeability, vacuum	μ_o	H m^{-1}	—	—
permeability, relative	μ_r	*a ratio*	—	$\mu = \frac{\mu}{\mu_o}$
permittivity	ε	F m^{-1}	—	farad/metre
permittivity, vacuum	ε_o	F m^{-1}	—	farad/metre
permittivity, relative	ε_r	*a ratio*	—	$\varepsilon_r = \frac{\varepsilon}{\varepsilon_o}$
potential, electric	V	volt	V	energy/charge
potential difference	V	volt	V	energy/charge
power	P	watt	W	J s^{-1}
pressure	p	pascal	Pa	N m^{-2}: force/area
radius	r	metre	m	fundamental unit
reactance	X	ohm	Ω	E_o/I_o
refractive index	n	*a ratio*	—	—
resistance	R	ohm	Ω	p.d./current
resistivity, electrical	ρ	ohm-metre	—	resistance × length
relative density	d	*a ratio*	—	ρ_{sub}/ρ_{water}
r.m.s. current	$I_{r.m.s}$	ampere	A	see current
r.m.s. voltage	$V_{r.m.s}$	volt	V	see e.m.f.
slit separation	s	metre	m	fundamental unit
tension	T	newton	N	see force
temperature, Celsius	θ	degree C	°C	from kelvin
temp. interval	θ	degree	° or K	—
temp. absolute	T	kelvin	K	fundamental unit
thickness	d	metre	m	fundamental unit
time	t	second	s	fundamental unit
torque	T	Nm	—	see moment
turns ratio	T	*a ratio*	—	n_{sec}/n_{prim}
(unit of electricity)	—	kW h	—	kilowatt × hour
velocity	u,υ	ms^{-1}	—	distance/time
velocity, angular	ω	$second^{-1}$	s^{-1}	angle/time
velocity, e.m.waves	c	m s^{-1}	—	—
velocity of sound	υ	m s^{-1}	—	—
volume	V	metre cubed	m^3	l × b × h
wavelength	λ	metre	m	fundamental unit
work	w	joule	J	force x distance (Nm)
weight	W	newton	N	kg m s^{-2}or mg

SYMBOLS USED BY INTERNATIONAL REGULATORY AGENCIES

These symbols appear on many electrical/electronic components distributed in the world market. They indicate that a country's standard-setting agency has approved the design of the component and/or a testing agency has approved the performance of the component in meeting the standard. This page lists only those countries that have a *symbol* to represent their authority.

Argentina (IRAM) Instituto Argentino de Racionalization de Materiales

Australia (SAA) Standards Association of Australia

Austria (ÖVE) Öesterreichischer Verband für Elektrotechnik

Belgium (CEB) Comité Electrotechnique Belge

Brazil (ABNT) Associação Brasileira de Normas Teonicas

Canada (CSA) Canadian Standards Association

Czechoslovakia Urad pro Normalizaci a Mereni (Office for Standards and Measurements)

Denmark (DEK) Dansk Elektroteknisk Komite (Danish Electrotechnical Committee)

Egypt (EOS) Egyptian Organization for Standardization and Quality Control

Finland (SETI) Electrical Inspectorate

France (UTE) Union Technique de l'Électricité

Germany, Democratic Republic of (East) (ASMW) Amt für Standardi-sierung Messwesen und Warenprufung (Office for Standardization, Metrology and Quality Control)

Germany, Federal Republic of (West) (DKE) Deutsche Electrotechnische Kommission im DIN und VDE (German Electrotechnical Commission of DIN and VDE)

Greece (ELOT) The Hellenic Organization of Standardization

Hong Kong Hong Kong Standards & Testing Centre

Hungary (MSZH) Magyar Szabvanyugi Hivatal (Hungarian Office for Standardization)

India (ISI) Indian Standards Institute "Manak Bhavan"

Indonesia Badan Kerjasama Standardisasi LIPI-YDNI (LIPI-YDNI Joint Standardization Committee)

Iran Institute of Standards and Industrial Research of Iran

Ireland (IIRS) Institute for Industrial Research and Standards

Israel (SII) Standards Institution of Israel

Italy (CEI) Comitato Elettrotecnico Italiano (Italian Electrotechnical Committee)

Japan (JISC) Japanese Industrial Standards Committee Agency of Industrial Science and Technology

Korea, Republic of (South) Industrial Advance Administration

Mexico (DGN) Dirección General de Normas Secretaria de Patrimonio y Fomento Industrial Puente de Tecamachalco

Netherlands (NEC) Nederlands Elektrotechnisch Comite

New Zealand (SANZ) Standards Association of New Zealand

Norway (NEK) Norsk Elektroteknisk Komite (Norwegian Electrotechnical Committee)

Pakistan Pakistan Standards Institution

Poland Polski Komitet Normalizacji Miar i Jakosci (Polish Committee for Standardization, Measures and Quality Control)

Portugal (CEP) Comissão Electrotécnica Portuguesa

Romania Institutul Roman de Standardizare (Romanian Standards Institute)

Singapore Singapore Institute of Standards and Industrial Research

South Africa (SABS) South African Bureau of Standards

Spain (IRANOR) Instituto Nacional de Racionalización y Normalización

Sweden (SEK) Svenska Elektriska Kommissionen (Swedish Electrotechnical Commission)

Switzerland (SEV) Schweizerischer Elektrotechnischer Verein Postfach

Turkey (TSE) Turk Standardlari Enstitusu (Turkish Standards Institution)

United Kingdom (BSI) British Standards Institution

United States (NEMA) National Electrical Manufacturers Association

United States (ANSI) American National Standards Institute

Venezuela CODELECTRA en Conjunto con COVENIN Avda. Ppal.

Yugoslavia Federal Institute of Standardization